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INTERACTION DESIGN
FOUNDATIONS, EXPERIMENTS

7.2
SLOW TECHNOLOGY

7.2.1 Program theme

Slow Technology refers to the design of computational things with a strong focus on time presence; a focus on time appearance as a central design variable. The central theme is design for reflective use with a clear focus on the appearance of time rather than design for efficient use with its focus on time disappearance –the presence of time versus the absence of time. It is a program that reverses the standards of HCI-usability: easy to use, easy to learn, efficient, measurable etc. A basic concern for efficiency in use turns into a basic concern for reflection in use. Slow technology is technology that is slow in the sense that it takes time to use it, to learn how to use it and to understand what it is. As opposed to fast and efficient technology designed to reduce the time it takes to do something, this is technology where we slow things down in order to make room for reflection upon the workings and expressions of devices and systems.

To slow things down is one way of introducing a shift in focus from practical functionality to expression of use since instead of disappearing as an efficient tool in your hand, it appears as something that makes you stop for a moment. It is like writing with a pen where you suddenly begins to think about the pen itself, how

it feels in your hand, how it shapes the letters you are writing, etc. The writing of a particular text is irrelevant – only writing itself matters. To use slowness in learning, in use, understanding, etc. as a way of preventing quick and easy acceptance.

To slow things down is also one way to expose the material expressiveness that builds the expression of things and systems in use. What makes the pen feel the way it feels? How does the pen shape the letters I write? …

When a thing suddenly does not work the way expected, we suddenly 're-discover' it. When a car that always starts at our first attempt in the morning one day doesn't even make a sound it makes us stop and think – what is this? We might think about outdoor temperature (is it too cold for the battery to work?), gas (did I fill it up last time as I had to?), lights (has the lights been left on, draining the battery?), etc. In this case, these reflections come from a breakdown but they could as well have come from a conscious design intention, namely that the object has been designed to promote moments of reflection upon this technology's – this material's – properties, consequences of its use, my relation to it, etc.

7.2.2 Basic motivations

As a program for experimental design Slow Technology is concerned with expressional design as well as act expressions with particular emphasis on the type of time design that computational technology introduces. The basic characteristics of computational things lie in the fact that their expressiveness, their appearance in use, depend on the execution of programs. Design of computational things thus necessarily involves components of time-design; questions about working models for a design practice where the

logic of time-structure appearance and the expressiveness of computational technology as a design material are central issues. This motivates experimental work where we pay special attention to time as a basic design parameter.

7.2.3 Example story

A fine music instrument is a typical example of slow technology; it takes time to learn how to use it, it takes time to understand how it functions, it is designed for reflective use… It is craft for artistic use. Now assume we would live our everyday life surrounded by things designed for artistic use. Everything I do would be based on intense training; the aesthetics of use would be present at all times… What could design of computational things mean in this context? How can we expose time design using the computational material?

7.2.4 Design examples

The art of use – design of everyday things for artistic use

A waiting tube – design for waiting

As we implement new computer based systems in our everyday rooms – shops, offices, our homes, public spaces – we initiate new forms of waiting; waiting for a system to respond in various ways. People are waiting for tickets, for money, receipts, connections etc. What is typical for this waiting is that we leave 'our' time to the computer system, we do nothing since we have no time to do something. Now if we reverse the situation we could think of 'waiting' as something we actually do allowing the system to compute; nothing happens unless we are 'waiting'. And to go one step further we turn waiting into an art. So the challenge is to design things for artistic use that we can use for the performance of 'waiting', i.e. for letting the computer systems compute.

The waiting tube is simply a two meter long tube with a diameter of about 4–5 centimetres. Inside the tube there are sensitive microphones and the tube is equipped with some cordless communication device. The tube is open in both ends. To 'wait' we put a steel marble into the tube and balance it in front of us keeping the marble in constant motion. The microphones listens to the sound of the rolling marble and a message that we are waiting is sent to the computer system allowing it to compute. If the balance act fails and the marble falls out of the tube, then waiting stops and so does the computing. We can also stop waiting through complete equilibrium – an act of somewhat delicate instability.

We see them in the streets, in shops, the reflective 'waiters'; not the nervous, irritated stop waiting as doing nothing, rather the intense reflective acts of allowing time for computation. Some pick up their waiting tubes…

A free antenna – design for communication

The systems working behind the scene in the world of telecommunication are certainly very complex things, but mobile phones and other types of sophisticated telecommunication equipment is often enough very simple to use. Just press some buttons and you establish communication across mountains and oceans. What could it be like if the act of establishing communication were an act of artistry, a difficult art to master? The challenge here is to design communication devices for artistic use and in particular to design for establishing communication.

The free antenna is a long stick – 1,5–2 meters – equipped with accelerometers and touch sensitive everywhere except at one of its tips. The antenna is also equipped with some cordless communication device. The antenna sends out a message "open for communication" when it is in motion and not blocked by a touch

sensor, i.e. as long as it balanced in the palm of our hands. The antenna is then connected to some standard communication device, typically your mobile phone. Instead of pressing a couple of buttons to connect your phone you use the antenna to announce that your mobile phone is open for communication.

We see them in the streets, at work, the reflective "communicators"; not the alienated reflexive mobile-phoning, rather the intense concentration in performing the art of communication. Some pick up their free antennas…

Mysterious things –
design of everyday things with mysterious interfaces

A slow mirror – a sound mirror of some sort

Sonitures are 'things' we use to furnish our rooms with sounds; the sound of a clock, the ill oiled hinges of a door, the favourite chair, the stereo of course… Furniture is, implicitly or explicitly, also soniture. Now imagine a slow mirror that only gradually paints the mirrored picture. As soniture a slow mirror slowly furnishes the room with its own sounds – a mysterious circular interior interface telling the near history of the room.

We have done some experiments using very simple techniques of record-playback loops. The basic setup – which we used both in an office context and at several museum exhibitions – consists of a number of microphones and small near field studio monitors connected through mixers, amplifiers etc to a computer that runs a simple program implemented in Java using the JavaSound class library. The program administers a number of record-playback threads – we have tested typically 5–15 threads – in a canon like structure. The structure of the record-playback loops is completely determined and should be possible after some months of intense

listening to begin understanding the reflective behaviour of the mirror. It could be a rather 'cheap' mirror where its mirroring behaviour would depend also on defects in material and manufacturing, or perhaps it is an old mirror where defects in mirroring behaviour depends on aging material. To obtain these types of 'defects' – that in fact makes the mirror much more interesting and 'alive' – we used a very cheap and simple sound card that together with limitations in the JavaSound library resulted in a somewhat defect 15-channel digital recording machine – perhaps it was just a bit old or a bit too cheap…

The Klein clock – a clock of some sort

A clock measures time in some way or another. We use a clock or watch to measure time distance; how many hours before the TV-program starts, how long the lecture is, how long time before the train leaves the station, how long time before we reach the city etc. This is done in terms of an exact numerical value stating the actual time, i.e. using the clock face or by displaying time in numerals 11:20:22 etc. Now assume we want a clock intended for more reflective use where time is displayed as a puzzle, a mystery. Some would say that it perhaps would be a much truer clock, though perhaps not efficient in the way we usually understand that word today…

An example; the Klein clock. The idea here is to display time in terms of a colour puzzle. The clock display consists of two colour fields. The clock 'ticks' towards the collapsing of the two fields into a monochrome – that's where the name of the clock comes from, the monochromes of Yves Klein.

The left field displays a 'static' reference on basis of which the right field is 'ticking'. The RGB code of the displayed colours correspond to three "time" parameters *(p1,p2,p3)* – it can be

(hours, minutes, seconds) for instance. In many cases the actual RGB code will be a constant function of given time parameters, i.e. when values differences will be too small to make a big enough difference in colour. Given a reference colour (a,b,c) and two initial colours *(a1,b1,c1)*, *(a2,b2,c2)* the right colour field "ticks" by adding modulo *(a,b,c)* starting with *(a1,b1,c1) + (a2,b2,c2) (mod(a,b,c))*. So the right colour field will present a structure of "colour symmetries" relative to *(a,b,c)*. The colour displayed in the right field is the sum of two preceding colours. Each coordinate has its own 'ticking' rate and the time a colour is shown is a simple function of two preceding colours.

The clock doesn't show time in 'real time', but during a period of time it shows a particular point in time or a given time distance. It can for instance be connected to an ordinary clock with reference to some time measure like *(24,60,60)* – 24 hours/day, 60 minutes/hour, 60 seconds/minute. Some external device could trigger the Klein clock to show the given time for say an hour or two – or a week or two – where the initial colour then would be *(00,00,00)* and *(12,00,00)* for 12 o'clock. It could also show the time distance between 'now' - 17:02:04 - and a given later time point – 19:08:02 – in which case the two initial colours would be given by *(17,02,04)* and *(19,08,02)*.

The clock is intuitively ticking towards a collapsing point where the colours in the two fields coincide. While ticking, the clock displays time structures of various kinds such as more or less complicated cycles of repetitions. From a mathematical point of view these structures are completely determined by initial data. But from a perceptual, or phenomenological, point of view they might look random at first. We can learn to read these structures and get an intuitive feeling for the time structures ticking with respect to its given collapsing point. Starting with what at first

looks like random noise we will gradually discover a predicable, and potentially very rich, structure.

Looking at ordinary time structures displayed we see for instance that 12:00:00 has a simple time structure whereas 03:00:00 is structurally much more complicated to recognize.

But time shown by the Klein clock could of course be something different from standard clock time. Given parameters *(p1,p2,p3)* assume *p1* measures the number of times I use my mobile phone during a day, *p2* measures the number of e-mails I receive and answer during a day and *p3* measures the number of times I click on the mouse attached to my computer. A suitable reference could be a measure done for a day off or a particular hard working day. The clock will then display working time in a certain sense. This type of time could of course be generated by all sorts of things I do, activity time.

The clock can also display computational structures, communication structures etc.

Whatever 'time' the clock displays it works in the same way, a no-real-time-clock stretching out given points of time to rich reflective structures, or for one who just passes by a random ticking of a simple colour field; a monochrome looking for its colour…

The Chatterbox – Some sort of messageboard

The Chatterbox is a system for sharing information in a public space, somewhat similar to an electronic messageboard. It was inspired by, and uses some of the techniques from, systems for community awareness for office spaces, e.g., systems for continuously posting information about ongoing activities. However, rather than presenting actual information, the Chatterbox messes things up by

creating new and more or less random re-combinations of the information.

The Chatterbox continuously 'reads' office mailing lists, documents published online and text sent directly to its e-mail account. Using language parsing methods from computational linguistic, it analyses the material and stores it in a database. Based on this database, it then generates 'new' material by re-combining the material, by substituting words from one text with words from another, etc. The results are new texts that resemble texts submitted to it, but where text elements have been replaced (cf. the 'cut-up' technique used by for instance William S. Burroughs).

At first glance, the ChatterBox might appear as a random text generator, and though the sentences appear to be grammatically correct, they do not necessarily always make sense. As one gets to experience it over time, however, the first impression might be replaced as one begins to recognize fragments of texts, certain words, etc. And so over time one begins to understand the underlying structures and texts through the transformations of the material.

The initial ambition with the Chatterbox was to develop an entertaining information display that could inspire new ways of looking at the material produced at the office. As such, there was also was a another ambition; to use technology developed for efficient information distribution to do almost the opposite and it is thus also a kind of counter example to designs made to increase awareness at the workplace.

7.2.5 Discussion and references

The art of use combines a focus on expressional design with a focus on act definitions. The very idea of designing for artistic use means

that we move focus from use in a more general sense to the specific expressions of use. It is where we nourish and use material expressiveness to define and determine basic acts of use; the expressionals we design mirror certain act definitions with focus on the expressions of intended use. The free antenna defines acts of communication; the waiting tube defines acts of waiting etc.

The mysterious things concern expressional design asking questions about lost or forgotten act definitions. You say it is a mirror, but what does mirroring mean here? You say it is a clock, but what does watching time mean here? The Chatterbox is a kind of message board you say, but what is it, that are we supposed to do with it?

The initial inspiration to these experiments on more reflective use of computational things did not come from ideas such as the 'slow food' and the more recent 'slow design' movements; only later did we learn about their existence. Rather, our starting points were discussions about Weiser and Seely Brown's notion of 'calm technololgy' *(1996)* and how it, at the time, was interpreted in work on new forms of human-computer interaction such as 'graspable and tangible user interfaces' *(Fitzmaurice et. Al. 1995, Ishii and Ullmer 1997)*, 'ambient displays' *(Wisneski et. Al. 1998)* and related work. A central aspect of the notion of calm technology is the idea that technology, or rather the perception of technology mediated information, should shift to the background, or periphery, of our attention. Somewhat interestingly the attempts to make this happen instead brought other aspects of interaction design to the foreground. For instance, characteristics of spatial manifestations of information became central, in some cases even taking over completely as a result of very strong expressions. Thus, inherent in these design examples there seemed to be a opportunity to make a shift from concentrating on efficient information presentation in interaction design, to instead concentrate on the various possible

spatial manifestations of information, perhaps even disregarding the actual information content as central to the design problem.

Another line of work that inspired these discussions came from the notion of 'focal things' by Borgmann *(1984)*, especially as interpreted by Verbeek and Kockelkoren *(1998)*. This work is in many ways a critique of the still prevailing ideology that technology should be transparent with respect to use, i.e. that the machine ideally becomes invisible in the hands of the user. As opposed to this perspective, the notion of focal things stresses the need for things that not only attract our attention, but even acts as centres for meaningful action and social interaction. The canonical example of a focal thing turning invisible due to technology development is how central heating replaced the hearth, and thus also a place for social gathering around certain activities related to the fireplace. Though we do not necessarily conform to Borgmann's view entirely, the idea of focal things suggests that how technology can, and sometimes need to, become the centre of our attention in meaningful ways is a rather neglected issue in design.

The design experiments discussed above are all part of experiments done at Interactive Institute – PLAY studio. The waiting tube and the free antenna are examples of experiments with "slow" abstract information appliances *(Hallnäs & Redström 2002)*. The sound mirror and the Klein clock is experimental work done by Lars Hallnäs *(Hallnäs and Redström 2001)*, and the Chatterbox is experimental work done by Patricia Jaksetic, Peter Ljungstrand and Johan Redström with additional input from Lars-Erik Holmquist *(Redström et. Al. 2000a)*.

7.3
ABSTRACT INFORMATION DISPLAYS

7.3.1 Program theme

Abstract Information Appliances as a program theme concerns the expressional interpretation of elementary acts of information technology use, interpretations through expressional design of computational things. We turn our attention to the aesthetics of elementary building blocks that constitute the acts defining use of given information appliances. It is an experimental program for turning information appliances into information expressionals; where function as a leitmotif turns into expression as a leitmotif.

An information appliance is something, i.e. usually a computational thing, we use for handling information of a specific form and in a specific context; it is something we use to write text with, something we use for verbal communication with people at distant places etc. An abstract information appliance is a computational thing designed to be the bearer of certain expressions of possible information appliances in use; something we can use in expressing acts of writing, reading, communicating etc. It is not designed on basis of functionality, but on basis of expressions of use.

Functionality, use, concerns what we can do with things in order to accomplish something, e.g. we move our legs in order to walk. An