On the Philosophy of Slow Technology

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Abstract. Technology is a driving force in development as well as is the answer to challenges for development. In evaluating technology, there is usually a strong focus on functionality, efficiency in relation to some given task or problem, where the issue of usability is central. Slow Technology as an agenda for design and technology development is in one way the opposite of this, saying things could be different. Instead of looking for efficiency with respect to solving some task, we could look for slowness in use, turning things upside down. One way to understand the notion of slow technology is that it suggests a turn in the technology perspective. We do not put the main focus on what technology can be used for but on what it means to use it, to master it, how it expresses itself in use. Slow technology focuses on *envelopment* rather than development, the term now used in a lightly different meaning than in military tactics theory or data envelopment analysis. It is a matter of envelopment for deep understanding rather than fast development for use. If we usually think of technology in terms of techniques and methods we use to reach certain objectives, to do certain things, technology envelopment turns technology into a technical and methodological locale we encircle exploring, mapping out an expressional landscape.

Keywords: slow technology, philosophy of technology, design critique, critical design

Introduction

Technology is deeply connected with development. It means solution to given problems as well as inventions that open up for new ways of thinking and new ways of living. Technology constantly redefines basic concepts, opens up for new perspectives, and changes the ways of working as well as gives new meanings to work. It redefines issues of communication and provides new tools for art as well as for supporting and redefining the machinery of war. Technology is a driving force in development as well as the answer to challenges for development. In evaluating technology, there is a strong focus on functionality, efficiency in

relation to some given task or problem. The issue of usability is central; the success of technology lies in its use.

Slow Technology as an agenda, or programme, if you like, for design and technology development is in one way the opposite of this, saying things could be different. Instead of looking for efficiency with respect to solving some task, we could look for slowness in use, turning things upside down.

Hallnäs and Redström (2001, 167) introduced the idea of slow technology in the following way:

Now, technology can also be slow in various ways as it takes time to: i) learn how it works, ii) understand why it works the way it works, iii) apply it, iv) see what it is, v) find out the consequences of using it. (…) Slow technology is technology that is slow in various degrees in respect to i–v. What is important to note here is that the distinction between fast and slow technology is not a distinction in terms of time perception; it is a metaphorical distinction that has to do with time presence. When we use a thing as an efficient tool, time disappears, i.e. we get things done. Accepting an invitation for reflection inherent in the design means, on the other hand, that time will appear, i.e. we open up for time presence.

Counterexamples to design for usability was one source of inspiration, while another was turning around a bit the idea of ubiquitous calm technology (Weiser and Brown 1996). In some sense, if we look around, we can see the world is full of examples of slow technology as this notion is defined above. Just take modern computational technology and nuclear technology. It is clear that (i)–(v) are conditions true in both cases. But here we strive hard to hide the 'slowness' inherent in technology. It is not slow technology by choice. It is still very, very much a matter of superiority, efficiency, and functionality. Just think what we can do and have done using this technology; from changing the notion of social communication to introducing nuclear meltdown. All the same, it is still a mysterious technology, very slow in nature, if we only shift the focus from abstract functionality and efficiency to the expressions of technology in use.

So one way to understand the notion of slow technology is that it suggests a turn in the technology perspective. We do not put the main focus on what technology can be used for but on what it means to use it, to master it, how it expresses itself in use.

This turn from functionality to expressiveness does, of course, not mean that we neglect function which would turn technology altogether into mystical machinery for nothing. The idea is rather to bracket functionality a bit as we focus on the way in which technology expresses itself in use.

Yes, nuclear power is a tool for energy production, but what about the ways in which this is done? It is with this question we are on the road to a slow perspective on technology. A nuclear meltdown is not only a breakdown in functionality, but it is moreover something very ugly with respect to the expressions of use.

So, here is a slow technology perspective on energy production. How does it express itself in use? What does it mean to master the technology involved in the production system?

We look for what is inherent in the art of using the system. We are not looking for proofs of correctness of implementation or for reasonable levels of probability of functionality breakdown, but we are looking for an aesthetics of use. It is a different view that might look a bit strange from a present-day engineering perspective, not to say bizarre, but if we turn the mirror around and try to apply a modern engineering perspective on the art of playing the violin we find something equally strange.

What could then slow technology mean with respect to the development and construction of system for energy production? It is techniques, methods, and processes we use for the development of energy production systems, but it is all about focus on energy production as an art of use. What does it mean to master the techniques and the methods? What does it mean to master the system as an instrument of energy production?

It is here that mastering the technology of nuclear power, as we know it today, in some sense could metaphorically be compared with using an instrument where you feel strongly that there is no way in which you can fully master it. No matter for how long and how much you practise the art of playing on the given instrument, you still cannot make music with it. But dwelling on these issues turns the development of nuclear technology into slow technology; it will take time to learn how it works, understand why it works the way it works, apply it, see what is it, and find out the consequences of using it. Nuclear technology as slow technology is in this sense somewhat the opposite of writing off technology, declaring it to be an invocation of the devil itself. It is quite possible that there will be no new 'slow' power plants built, but the technology will be around as something for us to dwell on and reflect on.

Technology envelopment

What is the point of this? A natural 'linear' way of thinking about the technical development is to say that given certain functionality in principle we try to find ways of expressing it concretely in an actually functioning system. Another way would be trying to discover or rediscover and redefine functionality by dwelling on the expressions of technology. This latter perspective is what characterizes slow technology development, taking the – somewhat self-evident – truth that function resides in the expression of things to its limits (Hallnäs and Redström 2002). In practice, a real breakthrough works by going back and forth between these two opposite perspectives, often bouncing back as the limits come into sight.

If slow technology is a perspective, a way of dwelling on technology, what does it mean in terms of technology 'development'? How do we start? What is the fundamental driving force for slow technology 'development'? Is 'slow technology' as technology just complex and mysterious technology?

The history of computational technology as well as the history of nuclear technology is interesting when reflecting on these matters – on the one hand, with respect to military applications as a driving force in fast technology development and, on the other hand, with respect to connections with foundational problems in mathematical logic and the development of modern physics respectively. These connections to deep issues in mathematics and physics open up for a more slow and reflective development. The art of programming and aesthetical aspects of programming language development are typical examples of this. But these attempts are faced with great difficulties as they are confronted with the challenges of bare functionality and efficiency; just think of the distinction between software engineering and the idea of programming as art.

Slow technology focuses on envelopment rather than development, the term now used in a lightly different meaning than in military tactics theory or data envelopment analysis. It is a matter of envelopment for deep understanding rather than fast development for use. There is a dilemma here that concerns both ends of the spectrum. Fast development is the obvious track in many cases where there is an urgent problem – just think of the urge for vaccines – but at a cost of not full envelopment of the technology, while slow envelopment, on the other hand, is a natural choice if we want to master a technology with deep understanding and full artistic skills, but in this case there is a question of where to start.

The start for technology development is positioned somewhere between a given problem, a challenge in search for a solution, and an insight opening up for possible applications. Technology envelopment can then be seen as a process of turning the functional perspective of this starting point into a search for mastering the technology as means of expressions, as means of expressing.

Although the development of the atomic bomb was for sure a process of fast technology development, there is a scary aspect of slow technology envelopment inherent in the process that goes back to the rise of modern physics. In the hand of politicians, the atomic bomb became an instrument for expressing surrender as the only option left. So it is certainly a matter of mastering the expression of certain aspects of physics. When Robert Oppenheimer cited Bhagavad-Gita – 'I am become death, the destroyer of worlds.'[1] Oppenheimer's reflection on the testing of the atomic bomb in the New Mexico deserts could be understood as a reflection on the functional consequences of the development of the bomb, but also as a reflection on the specific expressions of total destruction inherent in what was

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1   Wikipedia, (2015) 'J. Robert Oppenheimer' – available at: https://en.wikipedia.org/wiki/J._Robert_Oppenheimer (last visit on 8 July 2015).

created at the Los Alamos laboratories (Rhodes 1986). This example of the atomic bomb also shows that the distinction between 'fast' and 'slow' technology has in principle nothing to do with a distinction between moral values of technological perspectives. The art of torture is another very convincing example of this.

If 'function' refers to what a thing does as we use it, 'expression' then refers to what the thing displays as we use it. So, looking at technology as means of expressions is to say that we look for the ways in which a certain technology under development will display, express the functionality of its applications.

Why is it that an overall focus on this perspective, the envelopment bracketing or enveloping functionality, should lead to a reflective, slow technology?

If we usually think of technology in terms of techniques and methods we use to reach certain objectives, to do certain things, technology envelopment turns technology into a technical and methodological locale we encircle exploring, mapping out an expressional landscape. If it is a non-trivial technology, it takes time exploring the given expressional locale, learn how it works, understand why it works the way it works, apply it (that is bring performances back), see what it is, and find out the consequences of using it (that is explore its expressional power).

The graphical user interface we meet in modern personal computers – whether it is a laptop, a modern mobile phone, a tablet, or another type of computational device with a modern user interface – is a typical example of 'fast' technology. It hides the complexity of the computational machinery (Landin 2009), offering techniques and methods for efficiency and usability. We have next to no contact at all with what is going on in the actual execution of programmes as we navigate in the world of the desktop metaphors. Slow user interfaces based on turning computational technology into a technical and methodological locale mapping out its expressional landscape would be something quite different.

Techniques and methods for the construction and execution of programmes is the core of computational technology: programming languages and systems for programming, and computational devices for the execution of programmes. A user interface is a typical 'thing' that displays this technology in use, i.e. is a typical expression of computational technology in use, and so it is a given programmatic theme for explorations of and reflections on the locale of computational technology. The same goes for programming languages.

If, for a moment, we bracket the functionality, efficiency, and usability aspects of the user interface and focus on the expression as such, there are many foundational issues to further explore. A user interface is by definition an interface for handling input and output to computational processes, to start programme executions, and to display output.

So what does it mean to start a programme execution and what does it mean to display the output of computational processes?

We connect the 'computer' – in a very general sense, a type of machinery capable of algorithmic computing – to an input device of some sort and an output device of some sort, and by programming provide computational meaning to theses connections.

Now the envelopment of this locale has its focus not on a search for applications but on an open-ended exploration of this idea of the interface as something that expresses computational technology in use. This is something we find at the crossroads of basic design research, new media art, and explorative engineering research, but in general it is a way of dwelling on the expressions of computational technology – there is certainly a zen-perspective of slow technology here. Recently, work has been done by several researchers in further developing and exploring slow technology as a design agenda for interaction design (see, for example, Odom et al. 2012).

The dividing line between the digital and the analogue is an issue that offers a specific opening for explorations. If we leave input and output devices based on digital precision, such as the computer screen and the keyboard, for other types of displays there are all sorts of slow directions to explore. One such direction is to replace digital precision with textile imprecision. Instead of trying to mimic the traditional computational devices in textile constructions, we take the inherent imprecision as a starting point and open up for interface slowness and complexity. Assume we use the movement in fabric – induced by fans – as the foundation for a computer display (Hallnäs et al. 2001), or a carpet as input device. Very trivial means of communication are, of course, easy enough to handle – such as on–off –, but once we enter into the regions of more subtle things, the communication becomes much slower and more complex. It might take us years of intense studies to understand one single message that the fabric in motion tells us. To master the art of using, reading the interface is a real challenge and involves concentration, patience, reflection, and lots of very intense practice. Why would we do that? Well, to learn more, to understand more, and above all to display envelopment of computational technology as a way of critical reflection.

Craft is in many ways a form of technology envelopment and it is interesting to see new forms of crafts emerging in an answer to challenges as to master new technology as means of expression (see, for example, Buechley and Perner-Wilson 2012).

Questions

Transportation technology is a complex of technologies where the notion 'fast' has a very special meaning. The transportation of the future might mean more of public transport and less negative environmental impact, but, above all, faster

transportation. Slow transportation technology would bracket this perspective and open up for different issues focusing on the expressions of technology for transportation.

One way to encircle this technology would be by asking questions and exploring typical expressions of modern transportation technology, expressions that somehow define it, to revisit inventions of technology expressions by asking philosophical questions, to propose conceptual designs that challenge our 'normal' understanding – the norm critical stance –, or to actually introduce new designs all the way through redefining these expressions in slow terms.

What is a car? Is it a way to display technology for freedom in transportation or the canonical expression of a coming carbon dioxide disaster?

Closing in on the car as displaying technology for freedom in transportation, we can try to make a slow mystery of everything that builds up this expression. Just to open the door of the car, not to mention starting the car – which today is not just a matter of starting an engine, but to start up a whole system of communicating devices –, are mysteries to reflect on in themselves. To unfold these expressions – of opening the door and starting the car –, we could try by examples to open up the true complexity involved and introduce work to be done for the freedom in transportation that the car offers. The door might be a mystery we need to understand and starting the car might be an art to be mastered. Of course, when the modern car key or the starting machinery of the car breaks down, we realize for sure the complexity involved, but we know how to solve it in a 'fast' manner by picking up the mobile phone and call for help.

If we, on the other hand, see the car as an expression of a coming environmental disaster, then we could, for example, relate the car to foundational symbols of evil in a systematic theology of sustainability. In this case, we cover the technology with theological reflections. Opening the car becomes an act of distrust and starting it an act of not caring. Slow technology will in this case build an envelopment of resistance and refutation.

What is car driving as an expression of transportation technology? This is an interesting question as it involves the art of driving and is something that we have turned into a sport – motor sport. Sport and art that are focused on mastering certain technologies are directly, or indirectly, good examples of technology envelopment. In the case of motor sport, there is a great variety of challenges in mastering the art of driving from the utmost speed in F1 races to more slow forms of extreme concentration in motorbike trial. The relation between motor sport and the development of cars for personal and public use is an interesting example of the relation between technology envelopment and technology development.

What is a train? Is it a way to display transportation technology for sound environmental caring or a cold expression of total technology alienation? The idea of environmental caring is fairly abstract in relation to actual travelling, and

thus it introduces an element of trust (cf. Landin 2009) as a central expressional component. This element of trust is something we can strengthen by making acts of caring into basic expressions of the train as transportation technology. Slow technology is in this case a sort of methodological abstraction that hides the technology in a thick cover of faith.

What is travelling by train as an expression of transportation technology? The expressions of travelling by train relates to things like being a passenger, doing something else, working while travelling, waiting, the engine-driver as an abstraction, and so on. The idea of the train as expressing transportation technology for sound environmental caring turns travelling into acts of caring. Entering the train becomes an act of caring; as we sit down in the train, we express trust in this transportation technology. In what ways could that influence the design of a train? How will it affect the ways in which we act as passengers?

Now we could continue this by asking similar questions in relation to other types of transportation technology: What is an airplane? What is travelling by airplane as an expression of transportation technology? What is a bicycle? What is cycling as an expression of transportation technology? And so on.

As a methodological exercise, asking these types of questions in a systematic manner is one way to introduce slow technology as a reflective technology envelopment perspective.

Ways of living

At present, there is a vibrant discussion on the fruits of the second machine age, i.e. ideas about the robots taking over (Foreign Affairs 2015). As a programmatic promise for the future, it is technology under development. In such a context, envelopment naturally depends on mapping out the borders of a technology yet to come. A method of doing this is to search for strong examples of counter-functionality, that is to develop examples of counter-functionality in dialogue with technology development. What is it that we, in general terms, want the robots to do? What is the general machine functionality under development all about? Slow technology for artificial intelligence would typically involve further explorations of such issues as lying machines, idle machines, disobedient machines, sad machine, machine strike actions, machine conspiracy, and so on.

Besides positioning slow technology with reference to the duality in between technology development and technology envelopment, it is a vision of technology for new forms of reflective ways of living, the longing for slowing things down, i.e. a perspective within the 'slow'-movement. This strongly relates slow technology as a design programme to the ideas of focal things (Borgmann 1995; Verbeek and Kockelkoren 1998) and design programmes for sustainable technology.

The fact that technology defines forms of living is clear to everyone in daily life. One very obvious example today is the way in which communication and computation technology defines forms of living. Even if this concerns, to a rather large degree, entertainment and social media, it is all about fast and ubiquitous technology – everywhere, any time, now, and instantaneously. We meet these expressions of modern communication and computation technology everywhere and all the time. Slow technology for communication and computation as a visionary design programme would call for counteraction in relation to the fast technology that rules today. The obvious thing would be to introduce design thinking that opens up for the mysteries and complexity involved in the technology that provides the foundation for the present fast applications and expressions. Applications would then be instruments for artistic skilful use rather than for everyday usability. This would, of course, turn communication using this type of technology into something similar to sports and art practice. The true hackers, and others that master the art of programming and talking to the machine, are in some sense already there.

Concluding remarks

In conclusion, I will list the four main aspects of slow technology that, in one way or another, have been discussed above.

Slow technology is a general programme for critical design. This is a programme for design as counterexamples and counteractions to the agenda and ideology of usability. Here we strive to introduce design that opens up for reflection and provide time for reflection through intrinsic slowness. The critical aspect mainly concerns the forgetfulness of reflective aesthetics in the agenda and practice of usability, but the role of counterexamples is also to open up a wider perspective of design rationale in more general terms.

Slow technology is a reflective form of technology envelopment. As discussed at some length above, slow technology aims at introducing a reflective perspective of technology 'development' by mirroring development in the idea of envelopment, where the expressions of technology is the focal issue.

Slow technology introduces a redefinition of the notion of sustainable technology development. In the report of the Brundtland Comission, the notion of 'sustainable development' is defined as a development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED 1987).

Yes, we understand the general idea behind this, but taking the definition literally and following the precautionary principle there would be a deadlock in development since it is not very easy to know about the 'own needs' of

future generations, or we would have to accept that sustainable development is development that tends to infinity. In both cases, the issue is that we have to take care in development work, we have to be careful. This is not a technical matter but a matter of theology, a theology that has to explain the faiths and beliefs of sustainability to make caring understandable.

Slow technology introduces caring in technology development from a slightly different perspective. As we reflect on the expressions of technology in use, putting functionality somewhat in the background, we care about the way in which technology expresses itself in use. There is perhaps a difference here between theology and philosophy if you like.

Slow technology is a design aesthetics perspective. In very general terms, slow technology, as a perspective on technology development, can be seen as a methodological programme in design aesthetics. The notion of 'design aesthetics' then refers to an aesthetics of design from the perspective of designing, i.e. an expressional logic guiding the design process.

Slow technology has, as a critical perspective, nothing in particular to do with technology scepticism or pessimism. It is just a programme for reflection and exploration, trying to open up for questions that a fast technology development driven by urgent needs, political and ideological dreams, and commercial product thinking forgets to ask.

It is natural to consider in what ways slow technology relates to a post-modernistic critique of modernity and to Heidegger's philosophy of technology (Heidegger 1954). As a programme for a more reflective design of technological things, it certainly crosses some of the issues discussed by Heidegger, and it could well be that slow technology can be further developed along the lines of a critique of modernity. But as a methodological approach to critical design and design aesthetics, it can be viewed equally well as an instrument for defending modernity and the canons of the enlightenment. It is like an annoying younger sibling, always in opposition to all kinds of authorities and popular ideas.

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