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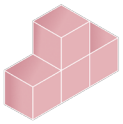

LIVING WORLD DYNAMICS – OR WHAT BRIAN ENO CAN TEACH US ABOUT KNOWING IN A COMPLEX WORLD

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ABSTRACT

In questioning how we come to know the world, we have to maintain the insight that things can hang together in many ways and that the world always exceeds our modeling attempts, regardless of scale, weight and representation. Multiple orders are at play in the world and perhaps the best way to get a measure of a lively world is to move with it in performance. Modelling knowledge on endlessly unfolding and endlessly changing performance provides a way of researching the world in a lively manner: beyond static specification and blue-print simplifications. This generates a new relationship between world, knowledge and performance in the enactment of a dynamic model of knowing

We live in an interconnected and dynamic world. At a global level, we are faced by the unwarranted environmental effects of the output of our current modes of consumption and production, as well as by unpredictable and high-risk phenomena such as illness, poverty and political instability. Everyday lives are subject to and dependent upon large-scale technological, infrastructural, industrial, political, economic and social systems. On an individual level, the combined pressure of interconnectivity and complexity shows itself in everyday lives strung out between large scale systems and infrastructures. Ordering is ever present, but if one link in the interconnected chain fails, the edge of chaos emerges. Complex phenomena challenge order, trust and reliability as principles governing the everyday, and furthermore make it evident that we need new models of knowing.

DESIGN BROADENS SYSTEM BORDERS

Phenomena in the world are not necessarily knowable in any kind of linear, simple or predictable sense. It is not always possible to develop valuable 'blue-prints' for action, detached, distanced, delimited.

Instead of dealing in reductionist, representational relationships, where codified knowledge holds truth, there is a need to explore interconnectivity, multiplicity and other muddled ways in which world and knowing can cohere.

The need to address and understand open, complex, dynamic and networked problems in society has led to a keen interest in design (Dorst 2015, 24). Dorst talks about design practitioners broadening the "system border": "design contains a process of thinking around the paradox rather than confronting it head-on." (Dorst 2015, 26)

Design-based working potentially involves 'playing around', coming up with ideas and possibilities, and 'trying things out': "in expert design practice, the design problem is not fixed before the search begins for a satisfactory solution concept. Expert design is more a matter of developing and refining both the formulation of a problem and ideas for a solution in concert, in a process of 'co-evolution' (Dorst 2015, 24)

Particularly worth highlighting here is the temporality of this process: it is not a sequential model, where you first define a problem and then find the solution. On the contrary, the problem-and-solution space are interconnected and emerge together, in coherence and incoherence.

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WEIGHING THEORY AND PRACTICE

Design and problem solving are ongoing processes: there is no absolute security and predictability to the efficiency and ultimate desirability of designs. Designs have unpredictable effects: solutions create new problems.

Design research - and other practice-based research - has the potential to trouble the often enacted linear sequentiality between theory and practice (where theory is presented as coming *before* practice. This addresses the relationship between research and practice, which also involves questions of how to mitigate between various forms of knowing. How can professional and practical experience be integrated as legitimate and relevant knowledge in academic scholarship? How may practice-based knowing be accounted for academically?

DESIGN ARGUES

Design researchers Rolf Hughes and Katja Grillner draw attention to the importance of authorial voice and the creative possibilities in discursive exploration of design and architecture (Grillner 2005, Hughes 2007), as well as sketching that there are many forms of knowing: knowing can be described and communicated through action (e.g. caring); representation (architecture design, writing); conversation (dialogues); materials and physical designs.

Design researcher Richard Buchanan models design knowledge on the persuasive qualities of rhetoric and communication, arguing that design, rhetoric and communication are closely related. Buchanan connects design with rhetoric and communication because design implicitly or explicitly is a mode of argument.Design conceives, plans and implements and it does so on the basis of values. It makes cases for certain realities and changes lives, for better or worse. Design addresses matters of concern, deals in the complex and contextual challenges of converging and social, technical and environmental systems. It is not controversial to say that design is world-making practice (Svabo & Bønnelycke 2020).

DESIGN IMPROVISES

Design researcher Johan Redström, building on science historian Ian Jacking, critiques such an ordering sequence (Redström 2017: 102). On the basis of examples from the natural sciences Hacking shows that there is reason to reject this assumption. Redström argues that the same is the case for design: asserting that it is simply not correct that design theory (in Redströms vocabulary in the form of programs) precede experimentation. The relationship between theory and practice is much more dynamic and complex. The design experiment does not just materialize an already given idea. Just as often the ordering sequence goes the other way around, starting with experiments long before any sort of general theoretical framing is articulated. A ‘blue-print approach’ where ideal / concept / theory comes before matter / design / experiment is too limited. It is not sufficiently sensitive to design process and the dynamics interrelationship between theory and practice. The theory - practice sequence of events is much more muddled.

Redström points out that a variant of the problematic of sequentiality is present in design when struggling to formulate a research question to guide and define design experimentation and when written accounts of design research place theory first - even when the practice, design and experimentation come before the concepts and ideas (2017: 103). Redström substantiates this with an example from industrial design - showing that the Bauhaus wasn’t a clear, preformulated program, where research grounds (comes before) design. There was much muddling around and a great deal oof searching in various directions and from all sides. The precise formulation emerges over time through ideas, concepts and manifestos, but also through making and experimentation. This involves amateurish playing with materials - experimentation - in an environment where making and ideas emerge together (Redström 2017, 103).

Considerable agency takes place in the midst of things, in situations of incomplete understanding, in situations without large-scale overview, based on assessments and incomplete information.

Open-ended and dynamic performance is a good ’thinking tool’ for exploring the dynamic qualities of design process, design research process, designers and users (see bibliography for various references).

There is a clear lineage for this kind of research in design where terms such as theatre, post-dramatic theatre, scenario, improvisation and performance have been used over the last three decades, with one of the first works being Ehn and Sjögrens 1991 exploration of the value of theatrical metaphor for collaborative engagements between users and designers.

WORLD UNKNOWABILITY

The foundations of scientific knowledge have been shown to be provisional and open to negotiation.

“Knowledge is embodied or enacted in the ever-unfolding choreography of action within the universe. Stated bluntly, the truth isn’t out there. Nor however, is the truth ‘in here’. […] what is known is acted out in what is done, and what is done contributes to the unfolding of the cosmos.” (Davis & Sumara 2006:70)

One example practice where the provisionality and temporary character of research-based knowledge, indeed of scientific fact, is modeling practice. Modeling is a key epistemic practice in the natural and technical

sciences and models are key epistemic technologies with strong creative, aesthetic and visual dimensions. Much knowledge of the world is built through modelling. These models are socially and historically contingent. They change. They develop over time. They are approximations, visualizations, reductions. They are designs with agentic effects on our understanding of the world. They are provisional and performative designs.

Models highlight particular understandings of the world, but they are not the world. The world always exceeds the model.

Complexity thinking makes manifest the limits to ways of thinking about the world which are founded on knowability, on the assumption that it is possible to fully describe the world and to make predictions about the course of events determined by relationships of causation.

According to systems thinking and non-linear dynamics, it is hardly possible to attain complete knowledge; to exhaustively know something. There is a fundamental 'unknowability' to the world, alongside features of 'knowability'.

A feature of complex systems is that they can be neither completely defined nor can their behaviors be predicted.

ONTOLOGICAL THEATRE

Any representation will always be provisional. This is well established by science studies from the last half century - through the interrogation of science in the making. In a fascinating history of British cybernetics, physicist and science and technology scholar Andrew Pickering provides 'sketches of another future', through a revitalization of cybernetics as 'ontological theater'.

Pickering unfolds the limits to representational, blue-print understanding. According to Pickering, performance is what we need to care about.

Knowing, modelled on Pickerings version of cybernetics, "stages for us a vision of the world in which fluid and dynamic entities evolve together in a decentered fashion, exploring each other's properties in a performative back-and-forth agency." (Pickering 2010, 106)

Pickering removes *knowledge* from the center of the model and replaces it with *performance*.

This takes inspiration from the 60ies/70ies operations management guru cybernetician and tantric practitioner Stafford Beer, whose work has influenced amongst others, the musician Brian Eno.

Eno unfolds how cybernetics inspired his approach to music, by referring to a particular phrase, which he picked up from Stafford Beer: *"instead of specifying it in full detail; you ride on the dynamics of the system in the direction you want to go."*

This became Eno's working method: *riding the dynamics of the system - in the direction you want to go*. This models performance beyond the control of the performer and gives us an idea about creative knowledge work, which emerges from interaction and engagement with elements beyond the person's control. Based on this model, knowing in and with the world is about engaging in open-ended and dynamic interplays, where randomness and unpredictability play their part. These engagements do not consist of control - it is not possible to predict, let alone control, the course of events. It is however, possible to interact and engage and through this to infrastructure and influence.

ENDLESSLY CHANGING, ENDLESS MUSIC

Brian Eno's music provides a model of engagement beyond static specification and reductionist, representational, blue-print simplifications. The music conjures up a lively performance; a generative audio-visual algorithm which continually is capable of generating new performances. Eno's musical worlds exhibit unpredictable, emergent becomings. Modeling knowledge on this kind of performance conjures up a lively world, a world continually capable of generating novel performances (Pickering 2007, 304).

This is particularly clear in Eno's app 'REFLECTION' (which has been playing incessantly, endlessly playing, endlessly changing for as long as this conference paper has been on its way).

Eno says: "My original intention with Ambient music was to make endless music, music that would be there as long as you wanted it to be. I wanted also that this music would unfold differently all the time - 'like sitting by a river': it's always the same river, but it's always changing. But recordings - whether vinyl, cassette or CD - are limited in length, and replay identically each time you listen to them. So in the past I was limited to making the systems which make the music, but then recording 30 minutes or an hour and releasing that. […] But the app by which REFLECTION is produced is not restricted: it creates an endless and endlessly changing version of the piece of music." (Brian Eno Reflection application, accessible for purchase in Appstore).

KNOWLEDGE

Does knowledge move? Transversally emerge in provisional performances? Endlessly change?

Do we envision knowledge as bounded, taking place in delimited territories, demarcated fields of knowledge?

These questions address research methodology.

In research methodology, the world is approached, modelled, represented, performed, scaled, enacted.

It matters with what models we model the world (paraphrasing Haraway, paraphrasing Strathern).

Methodology is important because it is the territory where what counts as knowledge is negotiated.

Methodology is where theory and practice are scaled and weighed up against each other. What counts? What does research-based knowledge look like? Which form does it have? With which rhythm or voice can it be articulated?

COHERENCY

Things that seemingly are far apart, can be close.

Philosopher Michel Serres accounts for this with his crumpled handkerchief. Serres in a conversation with Latour, says: "If you take a handkerchief and spread it out in order to iron it, you can see in it certain fixed distances and proximities. If you sketch a circle in one area, you can mark out nearby points and measure far-off distances. Then take the same handkerchief and crumple it, by putting it in your pocket. Two distant points suddenly are close, even superimposed." (1995, p.60)

According to science and technology scholar and empirical philosopher Anne-Marie Mol, this is one of the important contributions of the notion of the network: it is about *relational agencies and associations*. The network questions the singular spatiality of Euclidean territory – typically our default way of understanding space. This is a major insight offered by actor-network theory and other performative, relational and mediational approaches: things can hang together in many ways and things that seemingly are far apart, can be close.

"Latour dissolves the power of logical coherence by arguing that in as far as the world hangs together this is a matter of practical associations. How far these associations reach isn't given with the birth of a new configuration. Unlike epistèmes, networks are open. The elements within a network may link up with other elements, outside the network. But such external links are not different from internal links. They're all associations. Each new and successful association makes a network larger."(Mol & Law, 2002: 1).

The notion of the network has unsettled the hegemonic spatiality of Euclidean space, of thinking of space in terms of areas and regions. Network thinking has pointed out that space may also be contemplated in terms of networked relations (Mol & Law, 1994: 643).

Can we transfer this to knowledge practices? What happens if we think of knowledge not in terms of bodies, areas, territories of knowledge, but in terms of networks, relations and multiple orders?

"When investigators start to discover a variety of orders – modes of ordering, logics, frames, styles, repertoires, discourses – then the dichotomy between simple and complex starts to dissolve. […] we discover that we are living in two or more neighbouring worlds, worlds that overlap and coexist. Multiplicity is thus about coexistences at a single moment. To make sense of multiplicity, we need to think and write in topological ways, discovering methods for laying out spaces, and defining paths to walk through these." (Mol & Law 2002: 7f).

Multiplicity is an ontological premise: multiple orders are at play in the world. The central idea of multiplicity is to look for multiple orders, multiple patterns – and to find ways to move within them.

SHIFTING ALLOWS MOVEMENT

The concept of *shifting* may be helpful in finding ways to move between different scales, multiple orders, patterns and practices. Shifting is a spatial, temporal and actorial transportation. In semiotics, shifting is a way of conceptualizing translocations and transformations; moves across character, time and space. The 'I' in the here and now may be moved – shifted - into another character, another time and another space (Latour 1993: 13). This suggests that time and space may be considered as properties which are enacted along with an actor; that a 'character' comes with a characteristic spatiality and temporality. When a character emerges, a characteristic space and time also emerge. In material semiotics actor, space and time go together.

This mediation resembles what Star and Ruhleder, and Star and Bowker, based on information system research, call *infrastructuring* - as pointed out by Bjögvinsson, Ehn and Hillgren (2012, 108) *:* "Infrastructuring entangles and intertwines activities at project time (e.g., selection, design, development, deployment, and enactment) with everyday professional activities at use time (e.g., mediation, interpretation, and articulation), as well as with further design in use (e.g. adaptation, appropriation, tailoring, re-design, and maintenance)."

Importantly, infrastructuring simultaneously works with how existing infrastructures shape use, while at the same time leaving space for the unanticipated. This leaves space and time for multiplicity, heterogeneity. "As such, they are more like creative design activities than rational decision-making processes." (Bjögvinsson, Ehn and Hillgren 2012,109)

What we see enacted here is a dynamic relationship between world, performance and knowledge. (A relationship where it is not possible to obtain the distant

onlookers exhaustive overview.) (The observer can not predict or exhaustively know the system, let alone the dynamic interactions of multiple systems.)

The ontology which we see enacted is "world as a multiplicity of exceedingly complex systems, performatively interfering with and open-endedly adapting to one another." says Pickering 2010, 205 in relation to computer science – asserting that there essentially is no way to work out what the system will do – at least not by any procedure that takes less computational effort than 'just running the system and seeing what happens.' This, according to Pickering, following computer scientist Wolfram, is the starting point for 'a new kind of science' (2010, 169) in which knowledge is superseded by performance and where knowing is about riding system dynamics in the direction we want to go.

CONCLUSION

What Brian Eno can teach us about knowing in a complex world: his music provides a model of engagement beyond static specification and reductionist, representational, blue-print simplifications.

The article provides an account of knowledge as dynamic, open-ended process by bringing together design, culture, and science and technology studies.

Research and knowledge creation are modeled on open-ended, endlessly unfolding performance. This offers a 'thinking tool' for exploring the dynamic qualities of design. There is a clear lineage of previous work of this kind in design research, where terms such as theatre, post-dramatic theatre, scenario, improvisation and performance have been used for the past three decades to explore design process, design research, designers and users.

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