OBSTRUCTED MAGIC

On the Myths of Observing Designing and of Sharing Design Observations

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Abstract. Much design research, including much research in the computer-aided architectural design field, is based on the assumption that the process of designing is observable and that what happens in designing can be known, explicitly described and shared. In this paper I examine this assumption from my subjective viewpoint and conclude that designing occurs behind a blind spot. It can be concluded that existing design process models used in the “science of design” are based on invention rather than on empirical evidence, which in turn suggests that science should be studied as a form of design instead of studying designing scientifically.

Keywords. Design research, observation, design process, language.

1. Introduction

In this paper I am concerned with the nature of the human activities that constitute designing and with the modes in which research in the “science of design” occurs. The purpose is to examine some of the implications that the convolutions of designing have for design research, in particular with respect to two common practices, namely that of observing designing and that of sharing (communicating) what was observed.

Often, design observations and reporting of design observations seem to be carried out based on the assumption that past observations can serve as a basis for the prediction of what will happen in the future. Similar to observations of “controlled” physical experiments, observations of designing are oftentimes assumed to offer predictive insight into, or even prescriptive authority over, future designerly action. Designers, however, are not predictable as repeatable experiments or “trivial machines” are. Two different designers cannot be expected to design in the same way, nor can one designer be expected to design in the same way repeatedly (the same applies to learners and learning). This should cast serious doubts on any attempt to describe faithfully (let alone generalise) what designers do when they are designing on the basis of observation and empirical research. For all I know, designers seem to be rather interested in doing exactly what has not
been done in the past. Where does the desire for formal design observation come from? Glanville (1999) notes that since the early 1960s a form of envy of scientific disciplines was apparent in the design field: “Proper scientific research (research was identified with science) would yield the secrets of the designer, allowing us unsentimentally to find the right answer to problems. Research was central to Science. Research was Science. In shameful contrast, Design was not Scientific. Design should be Scientific” (ibid., p. 80). It is still frequently argued that design (research) needs to change in order to gain the respect of “the other disciplines” and that this respect could be earned by following those other disciplines’ lead by practicing science and by conducting formal, empirical and objective experimental research. From there, the need for observation follows of its own volition. In accepting this doctrine, design researchers not only subscribe to the idea that designing is governed by causal laws, which experimental research aims to “discover”. They also subscribe to the idea that all activities constituting designing can be observed in a way similar to lunar eclipses or chemical reactions. Over the past forty-or-so years’ history of design research, however, design theory has progressed. While Simon (1969), p. 132 argued for design to become a proper scientific discipline, Cross (1982) describes design as co-existing next to the humanities and science, while Jones (1992), p.10 describes design as a hybrid of science, mathematics and the arts. Glanville (1999), p. 89 states “scientific research is a subset of design, not the other way round”. This statement can be tested by looking for products of science that are not the result of observation and formal inference but of designerly strategies of making. Plenty such products can be found. Von Foerster (in an interview in Dammbeck 2003, see also Foerster 2003), pp. 273-282 points out that from the Big Bang Theory to astrological bodies and sub-atomic particles, scientific models and theories of physics (the archetypical science) are often not the result of observation but of invention. They are ideas that offer explanations for observations that would otherwise be uncomfortably confusing. There is, I believe, nothing wrong in principle with the wish to observe designing and to describe what was observed. But trying to do so with the scientific agendas of describing designing fully and objectively and of reliably prescribing designerly strategies is hampered by obstacles, some of which I address in the following.

2. Defining designing

I know, and thus define, designing as the process of coming to know. The self-reference in this definition is probably at least in part responsible for the much-cited difficulty of defining designing. In what Pask (1976), pp. 296-333 and Glanville (1999) describe as conversation, I, the designer, look into myself. There, I find what an (imagined) other tells me (see Glanville 1999, p. 88-89), discovering what I do not yet know, first becoming aware, experiencing and forming uncoded knowledge. Then I invent ways to encode this knowledge, which allows me to present it, for example in the ongoing conversation. This understanding of the design process has a temporal dimension which I take into consideration below.
3. Discursive Context

Cross (2001), pp. 51-53 distinguishes scientific design, design science and science of design. Scientific design refers to the approach of using “scientific methods” in design as they were proposed by the design methods movement. Design science refers to an explicitly organised, rational, and systematic approach to designing as it was proposed by Buckminster Fuller. Science of design refers to “that body of work which attempts to improve our understanding of design through ‘scientific’ (i.e., systematic, reliable) methods of investigation.” (ibid., p. 53).

Frayling (1993), p. 5, Findeli (1999), p. 2 and Downton (2003), p. 2 categorise design research into three modes of enquiry: Research for design, research about design and research through design. Findeli describes research for design as best exemplified research and development work in support of design. He describes (ethnography-style) research about designing as “carried out under the heading of other disciplines (sociology, semiotics, economics, history, etc.) [on the subject] of design” (ibid, p. 2). Frayling describes research through design as “being achieved and communicated through the activities of [...] design” (see Frayling 1993, p. 5). The phrase “computer-aided architectural design research” does not indicate whether computer aid is applied to designing, to researching, or whether computers are applied to both. This produces the following combinations of computer support and research for, about and through design:

1. Research for design
   1a. Computer-aided research for design
   1b. Research for computer-aided design
   1c. Computer-aided research for computer-aided design

2. Research about design
   2a. Computer-aided research about design
   2b. Research about computer-aided design
   2c. Computer-aided research about computer-aided design

3. Research through design
   3a. Computer-aided research through design
   3b. Research through computer-aided design
   3c. Computer-aided research through computer-aided design

Cases 3a, 3b and 3c are not combinations of two activities (one referring to a research process for or about a second, supported or studied design process) but describe scenarios in which researching and designing are the same process. Hence, cases 3b and 3c are indistinguishable from case 3a and therefore eliminated from the list. Research through design manifests itself in designing itself, not in scholarly communications of design research. This has been challenged as violating the requirement for research to be “communicable” or “sharable” (see Cross 1999, p. 9, Kvan 2004, p. 16 and Pedgley 2007, p. 464). I address this issue further below.

Miller (1969), pp. 234ff. categorises design activities at a basic level into magic1 and hackwork. Magic refers to the origination of design concepts

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1 Miller’s choice of the term “magic” coincides with Heinz von Foerster’s lifelong interest in magic (see Poerksen 2003, pp. 12-14) and wonder (see Glanville 2003,
and ideas while hackwork refers to the translation of design concepts and ideas into actuality (see also Cross 1977, pp. 141-142). I see these two categories of action in a direct relationship to Glanville’s (1997, 2000) notions of being “out of control” and medium use (magic) and being “in control” and tool use (hackwork) in design conversations.

In this paper I am concerned with the science of design, that is researching empirically about and for design, investigating magic. This approach is based on the premise that designing is observable and assumes that hypotheses can be used to make predictions which can be tested by observing evidential outcomes of empirical experiments.

4. Mode of enquiry

It has been suggested that physical manifestations of designerly action such as sketches, drawings and artefacts (the results of “hackwork”) could be used in empirical research as observable “essential parts of the design process” (Purcell and Gero 1998, p. 389) and that from them qualities of personal design thinking (“magic”) could be deduced. In this sense Purcell and Gero (1998) for example identify “empirical evidence” for “creativity and innovation” (ibid.) throughout their survey of studies on design drawings. This assumes that design thinking and its physical manifestations are related in a linear cause-and-effect fashion, that for an observable effect (such as a drawing) there can only be one deducible cause (idea, thought, capability etc.) and that causes of this kind can be explicitly identified. I do not follow this assumption and agree with Pedgley (2007), p. 464 who notes that the artefacts arising from designing cannot be relied upon to communicate aspects of their conception. The argument I present here is therefore based on my personal introspection; on myself observing my own experiencing. This mode of enquiry seems to be a suitable choice given previous statements such as Lawson’s (1997), p. 39, who noted that “[c]onducting empirical work on the design process is notoriously difficult. The design process, by definition, takes place inside our heads.” As far as other’s heads are concerned, I argue that “notoriously difficult” should be replaced by “impossible” as “I can never really know what goes on in somebody else’s head” (see Poersksen 2004, p. 40). Since observation involves experience, and since I cannot experience anyone else’s experience, I cannot observe anyone’s experience while designing. Since I experience what I do, however, I may be able to observe my own experience while designing. Studying the design process as such (as a process, something that unfolds along a time line) offers in principle three temporal conditions for observation: Studying it a priori, in situ and a posteriori. I examine these three conditions below and, where possible, give accounts on my respective attempts at self-observation of my designing.

pp. 100ff.) as key concepts underlying the Second-Order Cybernetic thinking he developed and which forms the basis of the thoughts I present in this paper.

Instead of design ideas Miller (1969), p. 234 uses the word design principles, which I perceive as potentially misleading.
5. Observing designing a priori

Observing something before it happens does not seem to make sense to me, for something must be present in some form in order to be observable. I may anticipate something before it happens as a consequence of previous experience (my a posteriori observation), that is, of my belief in the stability of something I have experienced before. I may expect a future design process to unfold in ways in which I observed past design processes to unfold. This, however, is not observation but inductive conjecture, and, as stated above, it assumes reliable predictability, which I fail to identify in designing.

6. Observing designing in situ

Observing a process immediately as it unfolds seems to be a reasonable choice. At any time, I, assuming that I am healthy and conscious, am present in my actions. Thus I am, by default, a self-observer. Maybe I could fulfil the “multiple roles of self-observer, self-analyst and self-reporter” (see Pedgley 2007, p. 464)? Pask (1976) and Glanville (1999) put forward design process models that describe designing as conversations with others who are oftentimes imagined. According to these models, designers take on different imagined roles and perspectives in conversations with themselves. Recognising this conversational structure in my own designing, I do not in principle find it unnatural to take on multiple roles while designing. I nevertheless find it difficult to take on the role of an observer in the sense of a scientific experimental researcher who is removed from the observed phenomenon so as to ensure an objective vantage point. It seems that designing and observing myself designing are two things I need to do simultaneously (as opposed to a somewhat sequential conversation). There are numerous things which I can do simultaneously. But there are also things I cannot do simultaneously, and this seems to be one of them. I have experienced myself operating a car, observing road traffic and its rules, having a conversation with someone, listening to music and breathing all at the same time and without much effort. Some of these activities do not seem to require much focused attention, such as breathing. Some, I remember, used to require a lot of attention in the past but I perform them more or less automatically now, such as operating a car. Some require more or less of my attention every now and then such as listening to a song or having a conversation with someone. Some deserve my utmost and uninterrupted attention such as observing road traffic but I feel uncomfortably unable to achieve this. I cannot be as attentive and focused as I wish I could be. My focused attention is limited. Removed self-observation and designing are amongst the things that I can only do with undivided attention. Doing both at the same time seems hardly possible. It confuses me to the point that I fail in either observing or designing or both. In retrospect it seems as though the intensity of my designing fluctuates, with phases of stagnation and with peak moments, many of which, however, I may forget quickly if I discard their

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3 I am not in a position to speculate about less common circumstances of experience and observation such as those of hypnosis and deep meditation.
yield. Paying attention to this, I assume, would require a selective alertness that would trigger my self-observation capacity as needed. Accomplishing that, I still assume, would be yet another thing to pay attention to. Thus trying to self-observe my designing overburdens me. Pedgley (2007), p. 468 notes accordingly that concurrent verbalisation can confuse designers.

7. Observing designing a posteriori

The only option left is self-observing designing after it has already happened. This may seem unreasonable again because processes are volatile and are gone after they happened. But I have memory; I can remember. I often sense something like an echo or an afterglow of what I have experienced while designing. I believe apart from this afterglow I have nothing that I could observe about my designing. Observing this afterglow is challenging since observation is glaring and the afterglow is dim. It is like using a torch to spot a firefly. Moreover, something cruel happens to that afterglow when I try to describe my experience of it. Describing this is very difficult. In order to get this across, I refrain from attempting a straightforward description and use a metaphor to appeal to your (the reader’s) own experience. Remember, if you can, the last time you woke up from an intense dream, memories of which stayed with you (like an afterglow or echo) after you woke up. Now remember, if you can, what happened when you told someone about your dream, maybe while having breakfast. You probably inspected the afterglow of your dream and put it into words. Remember, if you can: what was left of your dream then? In my memory of such attempts, putting a dream’s afterglow into words is in a crucial way destructive. The afterglow is post-rationalised (see Glanville 1999, p. 83) and thus reduced to a few incomplete, static, distanced and lifeless impressions of an experience that was continuous, rich and involving. What was destroyed (overshadowed) was not just my account of my dream’s afterglow but, along with it, the afterglow itself. The possibility to communicate an experience is bought at the expense of the immediate memory of the experience. The lyrics of a Morcheeba (2002) track include the following lines:

“Once a label is on something, it becomes an it. 
Like it's no longer alive. It’s like a loss of vision. 
Or some dark impression. Or a black spot on your eye. 
[...] What is imagination may become a fact. 
If we think of it that way. If you want to know. 
I can tell you now, oh if you make it through somehow 
Or is it best to keep or fall to sleep 
It isn’t looking very good to me from here”

Words and symbols take the centre stage in transactions and reduce what they stand for to caricatures. This is, to give more examples, what money does to the things it buys, what school grades do to the work assessed using them and what universities and obedient researchers do to research by counting their publications in “A grade journals” (see Wilden 1972, pp. xxiii ff.). The benefit of explicit specification and unambiguous assessment is
achieved at the expense of a reduction and impoverishing of that which is of actual interest. The connection that is assumed to connect the symbol (such as a school grade) and what it stands for (such as a student’s work) is not more than someone’s (utterly informal) act of faith, which others may or may not agree with. This is the downside of symbolic exchange and thus of everything digital. It applies to each digital Bit that is assumed to stand for something (no matter if we categorise it as an element of data or of a programme). It applies to every word, algorithm, model, statistic report, theory and so forth. Wittgenstein (1922), 14.121 noted that “What expresses itself in language, we cannot express by means of language”.

To those who trust only what can be expressed in words or symbols, the impoverishing effect of this choice is difficult to see because languages themselves tend to diminish both what we may wish to convey using them as well as our readiness to fully appreciate what is not (yet) expressed in them. In my experience many who embrace design as students, teachers or practitioners seem to know this naturally and find it obvious and banal when it is suggested. But many without design training (including CAAD researchers as my past self) find this difficult to see, bizarre or even outrageous to suggest. What I try to explain here is better felt than communicated in words, just like a dream, hence my dream metaphor. I understand that not everybody will be inclined to follow, but I recommend it.

In everything that is perceived, the qualitative precedes the (distorting, impoverishing) quantitative and otherwise symbolically represented. Written exchanges of observations are exchanges not of experience but of caricatures of experiencing. What connects symbol-based accounts of observations to the described perceptions are acts of faith. One may or may not agree. I argue that designing is like dreaming in the sense that designing is essentially not evident except to the one who is doing it. The one who is doing it is absorbed in it and has little attention to observe his or her designing. After-glowing memories of designing, as of dreaming, are vague and putting them into words results in descriptions that are poor and do little justice to the experience of designing (or dreaming) they aim to describe. And, as in describing a dream, the process of putting a memory of a design experience into words seems to destroy much of that memory.

8. Conclusion

When formal empirical research is applied to designing, any of the following problems can occur: Empirical research requires its object to be observable. However, designing is, in its essence, not observable. Observables resulting from designing do not permit deduction of underlying design thinking.

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4 This problem is amplified for those (practically all) of us who operate in organisational contexts that demand our explicit accountability for our actions in terms of traceable causal chains and rational, licit justifications.

5 The early Wittgenstein assumed that every statement pictures something that can be found in reality and that therefore “The limits of my language mean the limits of my world” (ibid., 5.6). The later Wittgenstein assumed that the objects of one’s thoughts could not be determined by anyone else: “If God looked into our minds he would not be able to see there whom we were speaking of!” In between formulating his two philosophies Wittgenstein designed a house (see Aicher 1994, pp. 107ff.).
Describing subjective memories of designing using language overshadows and damages the memories. Symbolic (language based) exchange of (alleged) design observations puts symbols at the centre stage of the exchange and turns what is referred to into a caricature. Language-based accounts are tied to the experience they describe merely by acts of faith. Where computers (symbol processing machines) are applied to observing and analysing designing or to representing objects of designing and in particular where they represent design aids based on alleged design observation, the described problems are amplified. The computer-aided architectural design research field might be to blame to some extent for the slow speed at which design research is waking up to what I described here because the computer seduces us to quantify, to represent symbolically and to model in terms of linear cause and effect relationships.

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