Start

PARADOX Start

Wolf Reuter

KNOWLEDGE IN DESIGN

by Wolf Reuter

1 In the swamp of the uncertain

"Design ... remains in hybrid form ... this hybrid swamp does not have any foundations. We are our own groundless foundation ... We are the swamp..." (Jonas 2001)

"O schaurig ist's über's Moor zu gehen,

wenn es wimmelt vom Haiderauche,

sich wie Phantome die Dünste drehn,

..." (von Droste-Hülshoff, 1907, S. 168)

Maybe the shuddering or the (I insinuate) suggested gesture of shuddering in the face of the uncertain, this numinously osculated fear, is, combined with a certain heroism in the face of adventure, one of the anthropological constants, which can hardly be changed. And maybe it improves ú like many fears ú the chances of survival, as it ú at best ú enhances attention; in the worst case it paralyses.

However, it is not the designer, who has the feeling of heroic shuddering in the face of the groundlessness of design, since he chose his job with the existential certainty that he will create something and the pleasure in doing so, and who did not chose it with the prospect of discovering something by research which already exists. Horror is rather felt by a person who orients himself or herself towards science, as he is a protagonist of science.

Since the time of renaissance, science has attained a high level of esteem as a way of secularised curiosity, since the Age of Reason it has done so as a vehicle of liberation, and since industrialization it has done so as an instrument of technical development and a way to augment economic as well as social power. Its inherent values ú such as being truthful and unbiased, criterions independent of the subject úcreep with great pressure into those areas of life and action that depend on norms and values which the subjects of these

communities provide for themselves, and which are constantly scrutinized and renewed (Habermas, 1968). Technology as a derivative of science focussing on application follows values such as efficiency, adapting the means to the end, maximising performance with minimal input, principles not too different from economy. To defer the determination of standards by society to the dictate of scientifical criterions, to organise coexistence according to criterions of science and technology, e.g. according to functional efficiency, is one of the most dubious yet most efficient achievements of the architects of ideological super- and substructures. Its efficacy is demonstrated by the attempts to break out of this corset of thoughts, which are still accompanied by severe labour pains.

In this respect, science is not only connoted positively in a superficial way ú reliable, certain, objective ú but rather these and other features and their rules are deeply anchored in the thought about our orientation towards the world. Only in this way can one explain a certain fixation on this authority and the astonishment that ensues when someone leaves the lap of science, the alma "mater", that uterine security. Much talk is devoted to coping with this emotional injury, or is it a world-view? Categories of hygiene, such as "cleaning", have to suffer for coping with this assumed defilement.

Let us assume that we have ú in auto-therapeutical work ú succeeded on our way to the clear view a little bit. If the pear, in the face of an apple, is no longer ashamed of being a pear, everything becomes unromantic and less sophisticated.

And as for the rest: At the latest since Sartre's demand that man and the matter of his being are the subject of design on the basis of nothing, and since the figure of thought by Camus of the sisyphos-like, absurd "nevertheless", dealing and living with the paradox should have become an unexcited matter of course. Or is it once again the case of an anthropological constant lagging behind better knowledge?

2 Science and design

This polemic is liberating in the discussion of the role of science as one of the basics of design, but it is not sufficient to bring both domains ú science and design ú into a relation, science being the classical production facility of knowledge and design being consumer, dealer, transformer as well as generator of knowledge. First of all, let's make some distinctions. (They already belong to a category of knowledge in design; we can call it "self-reflectory".)

2.1 Distinction 1: The "science of design" and "scientific design"

The first distinction concerns the trivial but sometimes neglected difference between the science of design and scientific design. The "science of design" makes the phenomena of design the object of its contemplation (= theory), and attempts to make statements about this object that are as correct as possible and tries to set them into coherence, if possible. According to the rules presently in effect in the scientific community, these statements are valid until refuted by someone. Both "Scientific design exists" as well as "Scientific design does not exist." could be such statements, even though ú according to current rules - not in the same theory. The science of design is an area of science and as such it is not disputable.

"Scientific design", on the other hand, states the fact that design as a process or a product that strictly abides by scientific rules. That is contestable.

2.2. Distinction 2: Design and science

The second distinction is doing just that, thus denying the possibility of scientific design as a matter of principle. It claims that design and science are concepts so exceedingly different that they mutually exclude each other. Indeed, both are innovative activities, one generating new knowledge, the other one producing new products, but because of this fact the way they look at a problem is fundamentally different.

What are essentially different features? (Popper, Rittel)

(UM1) Science aims at reliable knowledge about the world, as it exists, while design endeavours to create new products, enhancements of the real world.

(UM2) Science is bound to objectivity, which is independent of a person; design is based upon convictions and opinions of people.

(UM3) Science generates universal statements; design generates statements specific to an object.

(UM4) Science minimizes the effects it has on the examination of an object; design intentionally generates modifications.

(UM5) Science generates factual and explanatory knowledge; design generates primary deontic and instrumental knowledge.

(UM6) The goals of science, its own deontic premises such as objectivity and lack of prejudice are relatively stable over time and are only rarely the object of discussions. Still Popper's law of refutability applies, and some no-no's such as plagiarism and forging do, too. Normally they are not the subject of scientific activity itself. In order to avoid the paradox that lies in asking what value a lack of values has, it is important to distinguish the scientific values such as the claim to truth, relevancy, fecundity, power of explanation, simplicity, accuracy (among others) from the questions of value that are external to science.

Design, on the contrary, hinges primary on deontic questions. They are in the centre of discussing design from the first concept up to the final detail.

And there are still more of them.

2.2.1. Pro and contra of the distinction

The strategy of interpreting both concepts in a way so that they overlap or one of them contains the other has met with some success. Border crossers aim for this. Principles such as practicability concerning communicating, hence colloquial intermediation, or aesthetics of selectivity argue for a strategy of conserving the concepts' power of distinction by concentrating on their respective cores.

Some design theoreticians are inclined towards a stretching of concepts. One of their arguments: Developing a

(theoretical) model effectively is design. This is right in a limited way; the models of science are oriented towards the ideal of depicting existing realities, not imaginary ones as design does. It is one of the rules of science to open it up for inspection by other scientists to review its claim for truth. The inspection of the assumed models and their conclusions can result in their rejection/refusal/refutation. Rules exist for the inspection. In design business, on the other hand, there are no rules for that; criticism at best results in equally valid good/bad-judgments and not in a decision about a ú admittedly interim ú "truth", which would be an inadequate category for a new design product.

Another argument: Science with its rules is a construct in itself, an artefact, a product of design. Correct. But after establishing these rules, science works according to them and they are different rules from those applying to design. (As for the rest there is that mysteriously sensible fitting between instrument and task (Maturana). Science has other tasks than design. From the beginning, design was not devoid, as a deontic settlement, of science. The ability to practice science was evolutionary profitable.)

3 Knowledge in design

2400 years after that paradox "I know that I know nothing at all", 300 years after Berkeley's pre-constructivist idea of the world being made in our heads, 120 years after Nietzsche's destruction of the claims for validity made by centrally conceived world-views and the psychologising relativization of anthropogenic constructs (such as knowledge), 50 years after Popper's restriction of what is certain knowledge, and 30 years after Rittel's determination of a "symmetry of ignorance" in design and the bitter perception that one could ú in spite of good intentions ú not predict the consequences of considered actions (Rittel 1973), it is obvious not to build design on the foundation of knowledge.

However ú and in full awareness of the breeze of paradox ú the outstanding and elementary role of science in design may be postulated. A designer acts, but he or she does not act without knowledge. Design combines acting with knowing. In contrast to "believing", "knowledge" of a designer consists at least of the fact that he or she as an actor attributes validity to his statements at the moment of acting for certain reasons.

(The question whether knowledge is absolutely detectable, given, or if it is a straining construction of our brains, is of little importance in this context. Ultimately the first position complicates the discussion about design and the second one simplifies it. The proponents of the constructivist version do not assert a claim on absoluteness, but instead concede equal validity to the position of the other "constructivist" and develop argumentatively convincing positions based on this foundation. That is more useful and less annoying than resisting claims of absoluteness, particularly since discourses are likely to ignite in both cases.)

3.1 What types of knowledge exist in design?

"Ein Modell des Wissens ... beschreibt das Wissen eines Akteurs als Menge von Wissenselementen, die je als Aussagen faktischer, deontischer, instrumenteller oder erklärender Natur dargestellt werden können." ("A model of knowledge describes the knowledge of an actor as a sum of knowledge elements, which can be depicted as statements of a factual, deontic, instrumental, or explanatory nature.") (Kunz, Rittel 1972, S. 40). Later on Rittel adds "conceptual" knowledge. It is a model of knowledge of individuals who act. The preconditions are to represent knowledge (1) not detached from acting, and (2) not detached from a person, and (3) not confined to universal knowledge, and (4) referring to a certain time at which the actor knows.

It is a model tailored to designers. Designers are actors in time, they need knowledge for their acting, and the bigger part of it is context-related and specific (not universal) knowledge.

Factual knowledge describes what is at hand. Physical and chemical knowledge, analytical knowledge about a concrete situation, about end-user behaviour, about ergonomics and the cultural context belong to this.

Deontic knowledge describes the way things should be. Determinations in plans, including the decision on usage of a certain technique, a material, including the aesthetic statements belong to this.

After a longer practice of the profession, a personally acquired and dedicated knowledge becomes apparent that one accesses because of routine and conviction, a discernment building on experience, the "phronesis", which can be assigned to deontic knowledge.

Instrumental knowledge describes how a certain thing can be achieved, a way by which the imagination of what should be can be translated into reality; e.g by which trick a connection can be constructed that is flush with a surface, how one can deform plastics, or gum up metal in a durable and environment-friendly manner, etc.

Explanatory knowledge refers to the causes of a problem, but also to the prospective developments and effects proceeding in chains and nets of causality, e.g. the ecologic consequences of using aluminium or tropical wood, the effect of a certain arrangement of user controls, etc.; this is done with the awareness of the uncertainties concerning effects, of the constructed causalities in chaotic structures, of the constructiveness of perception as well, of the infinity of the chains.

Conceptual knowledge answers questions such as about the meaning of an object. Some definitions are unambiguous while their meaning is the subject of much debate. What exactly is "timeless" design, "functional" or "recycling"?

That model of the knowledge a designer has is complete. Or at least that is the claim.

This kind of classification is obviously independent of conventional knowledge classifications, which originate from science. In design, there are no technical places and limits, but rather trading areas that are organised around problems. Knowledge is sought, selected, and considered as relevant depending on the actual problem, and is then focussed on the problem's solution and processed.

3.2 How is knowledge generated and processed in design?

The diversity of knowledge in design suggests several different ways in which it is generated. Obviously, factual knowledge comes about in a different way than deontic knowledge is conceived. It belongs to the abilities of science to ascertain facts and deliver explanations for phenomena. To gain such insights, science uses the following method (Popper 1972, S. 106, 116): Scientists suggest approaches to a problem; they have to be open for factual criticism, thus a trial of refutation; as soon as one possible solution is refuted, another one is suggested; each trial of solution is only valid for as long as it has not been refuted yet. Thus, knowledge is always preliminary and tentative. The trials of refutation use rational criticism. Deductive logic is their method. The criticism aims at the claim for truth.

There is some knowledge in design, which indeed is generated in that way. Without exception, this knowledge resides in the categories of "factual" and "explanatory" knowledge in design. It is mainly universal, but can also be specific, such as the prognosis of system behaviour, e.g. traffic development or consumer habits of certain life-style groups. Knowledge on physical laws, thermodynamics, acoustics, statics, dynamics, chemical behaviour of substances, alloys, about effects of sanctions in the future, about material flows, energy balances, social behaviour, economical management, etc. But just the trial of finding out about what effect a certain measure will have in the future meets with basic limitations. The explanation models turn out to be constructs of an ordering brain in the face of chaotic processes (Bunge), chains of consequence can not be known in their infinite branchings (Rittel), and perception is subject to strained brain activity of the subjects (Neisser). So knowledge about this is all the more regarded controversially.

The crucial statements of the designer are on the fact that a product, a detail, a technique, a colour, a material should assume this or that shape. Knowledge particles of a factual or explanatory kind can be used as supporting or doubting arguments in such a deontic debate. The debate arises due to the basic lack of objectifiable, sufficient reasons for such decisions. Deontic statements are connected to the aesthetic stance of the designer, with stylistic preferences, his attitude towards his clientele, towards the user of his products, with his responsibility towards his surroundings, in short terms his value system in the broadest sense.

Now one could suppose that he would ú with some self-clearness ú be able, quasi as a concrete self-referential outpour of this value system, to draw his deontic statements from it. This assumption is wrong. Rather, he works in a social context. He works professionally as a contractor for a client supplying a target group. Both of their value systems are ú assuming a sufficiently exact approach ú different from his own. His own value system, too, is neither given a priori nor static, but rather has developed and changes with time. Both the origin of should-be imaginations as well as their changing and their particular features in a concrete case of a product design process are results of social exchange processes in the shape of external or internal discourses, in which a designer is always involved, be it as a recipient or rebel in his socialization phase, be it as discussion partner in a round table conversation with a sales manager, product manager, company head, finance department, technician, etc. Apart from the immediate, concrete exchanges, these discourses also cause the designer to be in those diverse chaotic fires of information particles, grasping, repulsing, contributing in different arenas, which include e.g. the feuilletons, the cultural products of painters, musicians, writers, dramaturges, television commercials, video clips, life-style pages of magazines, professional journals and exhibitions. He works in a social context, in which the predominant part particularly of the should-be knowledge is produced in the first place, in which, where questions about appliances and the application of techniques are concerned, questions as to their acceptance arise in addition to those about possibilities; in which, in the face of a plethora of analysed data the question is asked how much significance should be attached to them, how they should be interpreted, what relevance they should have concerning a design decision.

The predominant part of the knowledge used in design is a social construct. At first, this causes a certain perplexity, since if all preference system are given equal legitimacy, nobody can say whether the other party does not know better what "should" should be. It is exactly the situation Rittel invented the sharpened word of the "symmetry of ignorance" for.

The social sciences as they are postulated by critical theory, offer methodical help. Habermas introduces the possibility of arguing for and against attitudes, with the prospect of reaching statements than actually are able to sustain "truth". (Habermas 1972, S. 91).

He does this in order to be able to tell bigoted individual interests ú in the case of designers one could say: their own idiosyncrasies ú and general ones apart, in order to hold the power of the valid argument against a

principle-oriented subjectivism and relativism. Discourses are the appropriate method of unfolding the persuasive power of the good argument in normative questions.

As Habermas demands for the development of action-directing norms for modern societies, Rittel develops the concept of argumentation for the processes of design. Communication in the discourse and argumentation should be the procedure to generate and process knowledge. In this way, one gives priority to the concept of a communicative efficiency versus an instrumental and scientific concept of efficiency (Reuter 2001).

Argumentation does not only enflame at target questions, but also ú this is shown by the way discourse processes in design usually proceed ú at factual and explanatory claims (see: remarks about effect structures and perception, Reuter 1999) and at instrumental and conceptual questions. (Which joint will last longer? What is "good form"?). In this case it is not important whether such argumentation between different partners is conducted explicitly and in direct speech, or whether it takes place inside the head of an individual designer. By arguing with himself he simulates the arguments of external persons. (Rittel 1988)

Discourses do have a structure. Stands are taken in disputed questions. Arguments support or assail positions. Those "knowledge particles" originate from a variety of areas of knowledge and interest. As an answer to instrumental questions, e.g. a sealing problem, arguments can originate from physics, chemistry, from the financial sector, from technology, or they can appear as a juridical objection, aesthetic aspects or aspects of environmental compatibility.

The previous considerations show a special profile of knowledge in design: it is uncertain, controversial, incomplete, problem-related, and not disciplinary, with a particular classification and an argumentative evidence. Furthermore, they point at some other attributes of generation and fabrication of knowledge. If knowledge is in each case generated relating to a particular problem, then it is not well-ordered in one place or with one single person; neither is it complete. Thus procedures of searching (who knows what, where about what?) and finding ú a kind of "information scouting" ú are required as well as the evaluation of discovered knowledge and its selection under aspects of relevancy. It becomes evident as well that designing means making decisions based on incomplete knowledge; discourses end due to temporal, financial or pleasure shortages or at the point where argumentations seem to stagnate; then there still is the impossibility of knowing the infinite effects, too. Finally it becomes apparent that even though there is a partial set of design knowledge, which is ú taking into account the usual half-life values of knowledge ú firm, even though proficiencies exist that can be practised, large parts of design knowledge concern the processes of its production, its appropriation, its application and transformation. These are teachable basics of design, as well.

We could now conclude our theme and retain the method of arguing in the free discourse as a primary way of producing and fabricating knowledge in design, side by side with the scientific method which plays a less significant part. But every free designer knows how "free" the discourse really is in some day-to-day situations occurring in his daily practise, and how little weight the better argument may carry in a particular case ú apart from the question who decides on it. The category of power cannot be ignored while considering the generation and fabrication of knowledge in design.

3.3 Power and knowledge in design

There is sufficient empiric evidence to support the thesis that in the end, power and not the rational argument decides. An actor prevails over arguments, no matter how good they are, for the simple reason that he holds and exercises power to benefit his particular interests.

The fact that designing means developing products that have a forming influence on the behaviour and the environment of human beings in future times, can be interpreted as an aspiration to power, which Nietzsche claims is the propulsive motive behind all actions. To be consistent within such a theory, the good argument would only count as one of many possible means to put through one's own intentions against the resistance of others. In this way, we would to all intents and purposes conform with Weber's 100-years old definition of power and to the (whose?) dictum that knowledge is power. This is not the place to develop structure, logic, efficacy, forms and legitimation of power (compare Reuter 1989). However, Foucault's statement that discourses are embedded in social structures, that social structures display power structures, which for their part also form discourses arising in the social constellation, is critical to the completeness of a theory of argumentative generation and fabrication of knowledge. There are prohibitions, rituals, taboos by which discussion of certain themes is prevented, or they are treated on a limited scope, or replaced with others (Foucault). In design as well, it is individual persons or groups, schools, magazine publishers, teachers, critics, certain elites of cultural work and of the so-called good taste who impose such restrictions, who decide on the questions of who is a good designer, what belongs to the impossibilities or to the highlights. Typically, the access to such discourses as well is limited. One has to go to great length to be able to take part in it and to add weight to one's argument; the same argument which does not have any effect if used outside of the setting in which the struggle for power takes place.

Habermas, who phrases communicative acting and resolving conflicts by discourses on a high level of abstraction as a basic principle of finding standards in modern societies, consequentially demands ideal conditions for these discourses. He phrases them as "contrafactual" (Habermas 1981). The possibility of finding "truth" in a discourse can only be realised if it is totally devoid of power structures. This normative theory bears two advantages. Firstly, it can ú being normative ú not be refuted with facts. And then it represents, through its radically normative aim, an ideal prototype whose effect is especially strong when ideal conditions cannot be achieved in a given situation.

In the same enlightening but moreover pragmatic tradition, Rittel has placed the emphasis on argumentation as the way to solve problems, yet he refrained from formulating a claim to truth or the demand for ideal conditions in a discourse. Especially in power situations, Rittel puts his stakes on the power of arguments, which for themselves ú being effective in a subversive way ú develop power by not dealing with legitimate use of power and therefore are able to successively dissolve it.

The interaction of discourse and power is subject to a variety of other examinations (Reuter 2000, 2001). A conclusion from the factual influence of power to the above mentioned processes of knowledge fabrication in design may be made: One is advised ú in order to avoid being pushed onto the sidelines because of methodical-scientific correctness or argumentative purism ú to annex the technical and argumentative competence as well as the mechanisms and techniques of power to the body of professional knowledge in order to be able to act successfully.

Concluding remark

Design is a separate way of human activity, which can be compared to other activities in a comparing manner, but it should not be fused to them in the comparison. Accordingly, knowledge in the design process is separated, too, including the way it is produced, organised, estimated and fabricated. This knowledge is one of the basics of design.

Other basics of design include the constant theoretical self-ascertainment in combination with singling out its distinctive features, the analysis of the logic used in its thinking, the concepts of underlying, action-promoting rationality, its ethic orientations, the methods of designing and in some softer meaning all those competences which enable one to perform as a designer (such as creativity, discernment, representation and communication). It is a kind of knowledge that does not refer to the techniques used inside a product, but rather to the way a designer handles knowledge ú one could also call it second-degree instrumental knowledge. Competences can be learned and taught up to a certain degree by training, experience and analysis of their structure. Yet they should be treated differentially and separately as a special class of instrumental knowledge.

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(Literaturbezug und -angaben noch zu überprüfen, da beim Schreiben nicht zur Hand)

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