THE VALUE OF DESIGN RESEARCH

REFLECTION-IN-ACTION: DONALD SCHOEN RECONSIDERED

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ABSTRACT

In his seminal and highly influential book The Reflective Practitioner *(1983) Donald Schön defends the thesis that a gain of knowledge in professional practice is achieved by reflection-in-action. In his example of teaching architecture, Schön characterises designing as a reflective conversation with the materials of a situation. The designer is making a move in the design process that causes changes which, in turn, talk back and provoke a response by the designer to the situation's back-talk. Schön calls this procedure a reflection-in-action. By this, in the course of the design process, a web of design moves develops which is based on consequences, implications, appreciations, and further moves. By discussing Schön's ethnographic findings in relation to his theoretical conclusions, I want to show in my contribution – from a philosophical point of view - how Schön offers a valuable approach to understand ways of producing knowledge in design-based disciplines and how this position offers a starting point to develop an epistemology of designing.*

Keywords: epistemology, knowledge, practices, Schön, reflection-in-action

1 INTRODUCTION

From epistemological point of view, designing is a major knowledge-generating activity in the design sciences (comp. Cross 2006: 97-99) broadly conceived as architecture, engineering, and design – just as it is experimenting in the natural sciences. Both, designing and experimenting, use specific techniques and procedures in order to gain insights which can turn out to be highly significant for their respective disciplines. Whereas the epistemology of experimenting became an intensively debated topic within philosophy, the epistemology of designing is barely noticed yet. However, a philosophical discussion of this matter would be able to stimulate the discussion not only within philosophy of technology, but also within the design sciences.

An early contribution to these questions was Donald Schön's seminal and highly influential book *The Reflective Practitioner* (1983) – though unnoticed in philosophy. His educational background being in philosophy, Schön focused in his later works on design questions. By discussing Schön's ethnographic findings in relation to his theoretical conclusions, I want to show in my contribution how Schön offers a valuable approach to understand ways of producing knowledge in design-based disciplines and how this position offers a starting point to develop an epistemology of designing.

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2 THE CONCEPT OF REFLECTION-IN-ACTION

In his book *The Reflective Practitioner* Schön defends the thesis that a gain of knowledge in professional practice is achieved by reflection-in-action. In his example of teaching architecture, Schön characterises designing "as a conversation with the materials of a situation"(Schön 1983: 78) which "[i]n a good process of design […] is reflective" (ibid: 79). The designer makes a *move* in the design process that causes changes. By this, the situation "talks back"; it provokes a response by the designer to the situation's back-talk. Schön calls this reaction a *reflection-in-action*: "In answer to the situation's back-talk, the designer reflects-in-action on the construction of the problem, the strategies of action, or the model of the phenomena, which have been implicit in his moves" (Schön 1983: 79). In the course of the design process, the designer is "spinning out a web of moves, consequences, implications, appreciations, and further moves". For Schön, each move is a *local experiment* embedded in the *global experiment* of "reframing the problem" which sets the direction for the inquiry. This constitutes a shared "generic process" that underlies the various practical cultures not only in architecture, but also in any other professional practice.

In order to better illustrate his epistemology of practice respectively epistemology of reflection-in-action, I want to give a brief account of one of his case studies. In chapter three Schön gives a detailed survey of a studio "crit" which can be found in a similar way in many architectural schools. In brief 20 minute review, the teacher, Quist, analyses the work of one of his students, Petra, who is stuck with a design problem. Her task is to design an elementary school; a more detailed design "program" had been handed out at the beginning of the semester, including details of the site on which the school should to be built. The crit, as it is described by Schön, is an analysis of the current design problem and a successive development of a solution. Petra already developed some preliminary ideas how to shape the building and how to align the different rooms. However, she is unable to apply these arrangements onto the building site, a slope.

Petra brings early sketches to the meeting [fig. 1a, 1b], and, while talking, Quist examines the design situation by placing a sheet of tracing paper over the existing sketches and begins to redraw the design. The re-drawing is not a simple copying but a variation and exploration of the given, closely interlocked with verbal comments. Schön explains: "His words do not describe what is already there on the paper but parallel the process by which he makes what is there. Drawing and talking are parallel ways of designing, and together make up what I will call the *language of designing*." In this "language of designing", as a mixture of verbal and non-verbal symbols, the sketching gets more and more weight during the conversation. "Whether Quist and Petra speak in words or drawings, their utterances refer to spatial images which they try to make congruent with one another. As they become more confident that they have achieved congruence of meaning, their dialogue tends to become elliptical and inscrutable to outsiders" (ibid: 81). The historian of technology Eugene Ferguson described these kinds of drawings as "talking sketches" which he advocated as a central means of communication between technical people. He points out: "Those talking sketches, spontaneously drawn together on during discussions with colleagues, will continue to be important in the process of going from vision to artefact. Such sketches make it easier to explain a technical point, because all parties in a discussion share a common graphical setting for the idea being

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debated" (Ferguson 1992: 97). Hence, it is crucial for an analysis of the design process not only to take verbal comments into account, but to concentrate above all on sketches and drawings as the material of the situation.
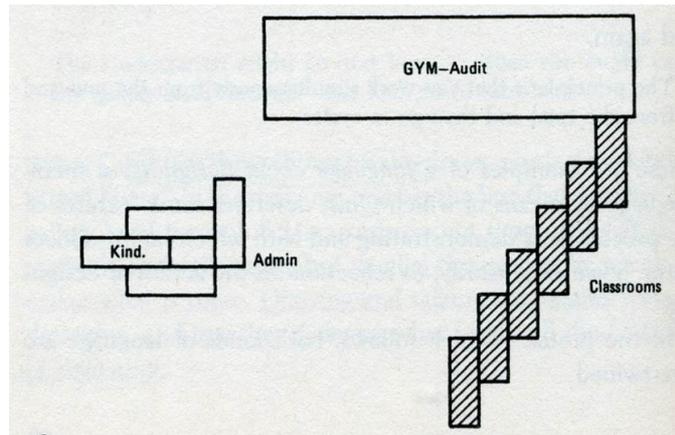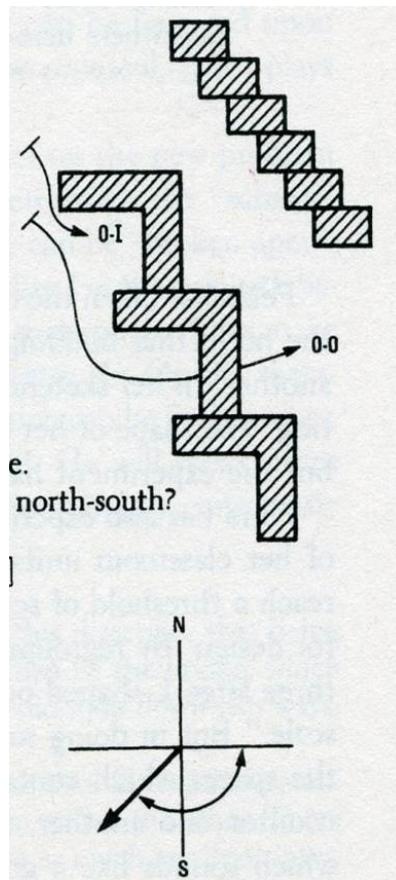

Fig. 1a Protocol of the peliminary sketches, stepped arrangement of the classrooms. Source: Schön 1983: 82.

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Fig. 1b. Protocol of the peliminary sketches, angular arrangement of the classrooms. Source: Schön 1983: 83.
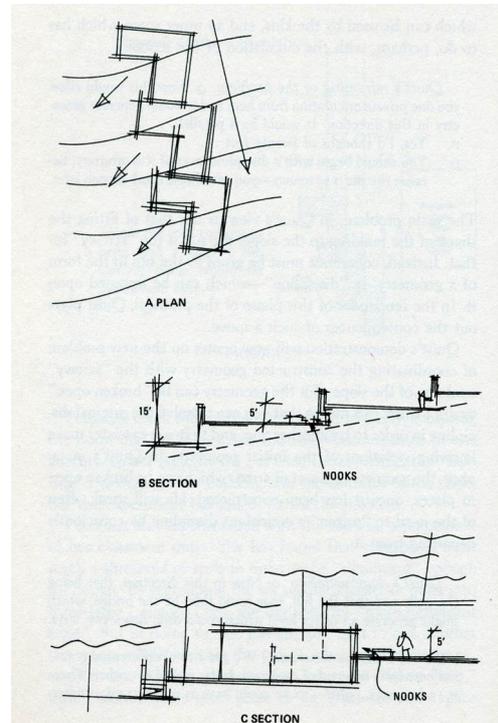
Fig. 2a Protocol of the design solution developed in the "crit", sections. Source: Schön 1983: 86.

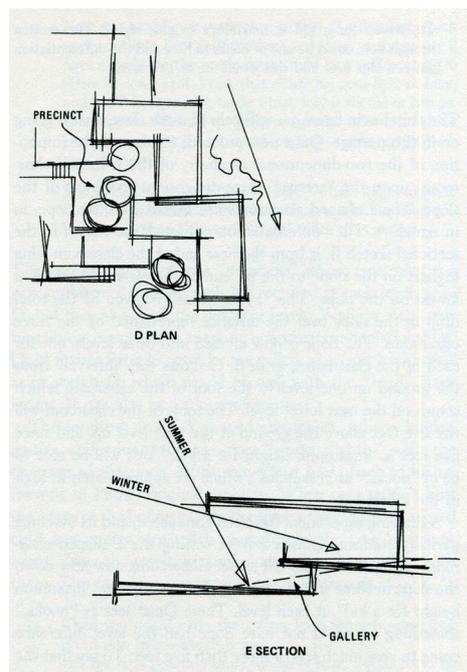## Reflection-In-Action: Donald Schön Reconsidered

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Fig. 2b Protocol of the design solution developed in the "crit", groundplan and illumination study. Source: Schön 1983: 86.

After Quist got an overview on the problem situation, he starts a "reframing of the problem" (ibid: 85). His advice to the student is as follows: "You should begin with a discipline, even if it is arbitrary, because the site is so screwy – you can always break it open later" (ibid). He proposes to start with the geometry of the hill and to observe how it can correspond to the different levels of the building. Hence, instead of trying to fix a chosen arrangement of rooms on the site and of trying to reconcile different demands all at once – this is where the

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student failed – Quist suggests investigating the curbature of the hill. Starting at this point, suddenly novel perspectives and ideas arise. The inclination of the hill allows for split levels of the building [fig 2a, b] and to design "nooks" for the children.

3 POINTS OF DEPARTURE: EPISTEMOLOGY OF DESIGNING

In his analysis of a design situation, Schön investigates the tutorial of a learning person. One might object that this constellation is rather artificial and does not correspond to "real" design constellations. Hence, the findings might be questioned as not being representative for design processes in general. On the one hand, these limitations of the research methodology should be taken seriously. On the other hand, Schön's research perspective offers advantages compared to other empirical approaches (as there are e.g. protocol analysis, experimental testing, ethnographical observation, retrospective interviews, historical case studies). Firstly, the "crit" is also a common method in many architectural offices in order to support the design processes (Farías 2013). This renders the investigated design situation less alien to design process. Secondly, the teacher-pupil-relationship makes design moves explicit through the medium of a dialogue. Design decisions are question, discussed, and evaluated in a very fundamental way; we find valuable meta-reflexions and a mature diagnosis of the design problem – procedures which would otherwise remain hidden to the observer. Thirdly, the one-sidedness of the research methodology can be counterbalanced by linking Schön's findings to other studies. As this cannot be done within the limited range of a conference paper, I will take Schön's findings as reliable generalizations for the sake of the following argument.

Adressing designing as experimenting has become a common classification – not least due to the writings of Schön. Which reasons gives Schön for this claim? Briefly, it is grounded in his observation that the results of moves in the design process are often unexpected and unintended. For Schön, the deeper causes are to be found in the complexity of design processes. "There are more variables – kind of possible moves, norms, and interrelationships of these – than can re-presented in a finite model" (Schön 1983: 79). As a consequence, the individual move is unpredictable and leads to surprising results which in turn, need to be interpreted and evaluated by the designer. Based on this analogy, Schön develops his thesis that designing is equivalent to experimenting. He grounds his claim in an elaborated typology of local and global experiment, as well as "exploratory", "move-testing", and "hypothesis-testing" experiments (Schön 1983: 145-147).

But is his claim justified? In order to find the right answer it is important to distinguish two levels of Schön's argument. On a basic epistemological level, Schön is right to claim that designing is a process of reflection, of finding insights, of acquiring knowledge. In order to achieve this epistemic ascent through designing, we find a systematic usage of techniques, methods, and tools. However, on a conceptual level, Schön is misled when he equates designing with experimenting. Without going in too much detail, I want to give the main arguments for this. First of all, there is an ontological difference between designing and experimenting. Experimenting explores the existing whereas designing explores the non-existing. This ontological difference has a number of epistemological and methodological consequences: 1. The reproducibility of the experiment opposes to the singularity of the design. 2. There is no "otherness" (specific for experiments) to test the evolving design;

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nevertheless, there is no arbitrariness of the design and the design is no fiction (as the realization of an artefact is intended). 3. The rightness of the evolving design cannot be directly approved; the empirical adjustment primarily takes place in a very late phase of the design process. At this stage the design needs already to be working and fitting. 4. Hence, the primary testing materials are "representations" and intrinsic test routines as the search for mistakes through construction aids, coherency of the design, consistency with knowledge repositories, anchorage in know-how, relevance of parameters, and range of the design solution. 5. In order to achieve this, we find a high number of image-based and model-based epistemic strategies such as e.g. reduction of complexity, variation and comparison, identification of parameters, development of criteria of assessment, externalizing and explicating.

However, although Schön is wrong in his striking claim that designing is a kind of experimenting his work is much more than a mere historical source. That fact that designing is not experimenting gives way to a much stronger claim: designing proves to be an epistemic praxis in its own right. Hence, in my concluding remarks I want to point out how fruitful Schön's thoughts can be for the development of a contemporary epistemology of design. It is especially his focus on practices which set the direction for such an undertaking. As an *epistemic praxis* designing is not only a process which leads to novel artefacts but also knowledge. To achieve this, we find specific practices and tools, techniques and procedures in order to purposefully acquire insights about that what is to be designed.

4 CONCLUSIONS

The timeliness of Schön's thoughts lay in his concept of design as a reflective conversation "with the materials of a situation" (Schön 1983: 78). Schön explains: "He [the designer] shapes the situation, in accordance with his initial appreciation of it, the situation 'talks back,' and he responds to the situation's back talk" (ibid: 79). What we find here is an iterative thinking process between the design materials – sketches, drawings, or plans – and the designer. The latter is continually modifying and varying these materials, they show unexpected results, "talk back", and hence, stimulate new thoughts. The design scenario opens up, new possible design moves come into focus. As the exploration of a design regularly takes place in a team, designing becomes a cognitive process between individuals, artefacts, and tools. This makes Schön an early forerunner of what is nowadays discussed under the catchwords of "embodied" or "situated cognition". As the psychologist and philosopher Nancy Nercessian puts it: "Explanations of human cognition on the situative perspective use the notion of *attunement to constraints and affordances,* adapted to Gibson's (1979) theory of perception. On the situative adaption, an *affordance* is a resource in the environment that supports an activity, and a *constraint* is a regularity in a domain that is dependent on specific conditions" (Nercessian 2005: 27). Such a conception of the design process clearly shows that (design) cognition is not taking place exclusively in the head of one isolated designer who simply draws on paper what is ready laid out in his mind. Rather, cognition here shows as a complex relation of individuals and situations.

Asking for the affordances and constraints of the reflective conversation in design processes, Schön's hint to the "material" dimension is illuminating. If we take seriously what media theory tells us about materiality, we have to investigate the potentials and conditions of design tools and instruments, how

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they have an impact on the results and how they 'inscribe' in the outcome. We need to take the mediality of the tools and instruments, procedures and techniques employed seriously. The epistemic constraints and affordances of sketching, drawing, or modelling turn out to be a focal point when we want to investigate the knowledge generated in processes of designing. Hence, the epistemology of designing can only be adequately understood if we learn more about these ways of thinking, their specific forms of model-based reasoning (Nersessian & Patton: 2009) and image-based reasoning. An answer to these questions will not only provide us with an epistemology of designing, but also give challenging impulse for a theory of thinking in general.

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