

pairing. Studies of expert and master designers suggest that this framing ability is crucial to high-level design. Ideas can be described as the moments when there is a sudden “click” between a view of the problem and a possible solution. Once problem and solution fit together nicely, the result takes on an unassailable quality: a structure emerges that is simple and coherent and that integrates all the demands that had occupied the initial, messy problem arena. This is a moment of complete design elation, to see the abandoned explorations, worries, and chaos of the past months, days, or weeks all disappear into a neat solution idea. To quote Wittgenstein, reflecting on his creative practice as a philosopher:

We are aiming at ... *complete clarity*. But this simply means that the philosophical problems should *completely disappear*. The real discovery is the one that makes me capable of stopping philosophy when I want to. (Wittgenstein 1963, PI 133; emphasis added)

2 DEVELOPING PROBLEM SITUATIONS

Design practice can be described validly as the coevolution of problem and solution: expert design practices have as much to do with reformulating the problem as with the generation of suitable solutions. As I remarked earlier, the “design thinking” movement, which focuses on the ability of designers to generate solutions, might be leading us astray. If we want to learn from expert designers, we need to follow their example and shift our attention to the study of problem-related knowledge, skills, and strategies. And the coevolution model, as presented above, is only the beginning. It is based on behavioral studies in a laboratory setting (Dorst 1997) where designers dealt with a simple design task (see appendix 1). This provided an impoverished view of design practice, as the situation and time constraints forced the designers to find new frames very close to the given problem situation. As we will see, more significant reframing of the problem happens during free-flowing design practice, where expert designers essentially develop the problem situation itself. The possibility of developing problem situations radically shifts the scope of design practices: until now, we have considered the desired outcome (desired functionality or value) to be unalterable in describing design abduction. But expert design practice shows that even the desired outcome can mutate with the adoption of a new frame, enabling designers much more freedom to step away from the initial paradox. Research on expert graphic designers has shown that they use a multitude of practices to develop problem situations, and shift the intended outcomes of the design project (Paton and Dorst 2011). The designer thus has