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3 LESSONS FROM DESIGN

FOUR QUESTIONS ABOUT DESIGN

In this chapter, we will use four questions to guide us on a quick run-through of contemporary design practice. In answering these questions, we will encounter salient aspects of design, as they have been described and explained within design research. Then we will briefly dwell on the anatomy of design, creating an overview of design practices that helps position the particular practices we will focus on in the rest of the book. In the last section, we will draw five key lessons from these design practices. These lessons inform the frame creation approach that will be introduced in chapter 4. But first: the four questions.

WHAT IS DESIGN? MISUNDERSTANDING DESIGN

The reader will have noticed that in speaking about "design practice" in chapter 2 we moved far beyond the prevalent interpretation of "design" as merely the creation of beautiful things. The design professions have developed dramatically over the last twenty years, and design practices have matured into a real alternative to conventional problem-solving strategies. Unfortunately, the way design is presented in popular culture and in the media doesn't do justice to the new reality of contemporary design practice. The design professions themselves have not worked very hard to dispel the old, self-servingly romantic, mysterious, and heroic images of the designer. For the purposes of this book, we need to clear up a few common misconceptions before we can begin to describe what design really is.

Design is not just about creating beauty
In many design professions, a pleasing visual aesthetic is important but is just one factor among many that need to be taken into account in the creation of

the design. In my own field of product design, designers are torn between the requirement to create a product that is technically viable and ergonomically sound and displays marketable value and the need to make it visually attractive. The idea that design should always be about the creation of something beautiful has deep historical roots: the very first professional "industrial designers" were needed because the first manufactured homewares produced during the industrial revolution were often overdecorated monstrosities (Heskett 1985). Until that time, before the advent of mass production, middle-class culture had been restrained in its tastes by the costs of craftsmanship. Ornaments were expensive, and thus were a status symbol owned by the few. But manufacturing suddenly made ornamentation very cheap, releasing a veritable flood of curls and patterns on every available surface. Manufacturers kept heaping it on, believing the more, the better. The 1853 world's fair in London (held in the spectacularly modern Crystal Palace) was the first venue that brought these fruits of industry together, and the result was shocking to the beholder. The criticism in the world press was appropriately scathing. The exhibition served as a wake-up call for the need of a new aesthetic for industrial products, and spawned the profession of industrial design. Despite all the years of evolution away from these early form-focused beginnings, the image of beautification still accompanies the popular notion of design. As Foucault (2002) has shown, although ideas might follow one another in quick succession, the underlying "discourse" in society changes only very gradually. He was talking about mental health, but he could have taken design as an example.

Design is not all about ideas

This is another great and intransigent myth, and to be honest, it is one that the design professions have been reluctant to dispel. The popular notion about design is that it works like this: client gives brief to designer, brilliant idea is born, client is happy, designer becomes rich and famous. This virtually never happens. Only novice designers who haven't yet developed the skill and amassed the experience to work in a much more deliberate way will have to rely on "the idea" to save them, resorting to the superficial scattergun approach of brainstorming to hopefully catch it (Lawson and Dorst 2009). Such a trial-and-error process is time-consuming, confusing, and hugely inefficient. When creativity techniques like brainstorming are used in a professional design context, it is always in a very specific manner, to explore solution possibilities within a constrained setting (see Sutton and Hargardon 1996; Sutton and Kelley 1997). Professional designers do not focus on the generation of "the idea":

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they approach problems in a very strategic, deliberate, and thoughtful way. This approach involves a lot of hard work, where inspirational ideas are helpful but never yield a complete shortcut to a quality solution. Yet the myth of the wonderful, magical, "divine spark" idea that suddenly occurs to the brilliant mind of the incredibly gifted has been quite irresistible to designers, and many of them when interviewed will readily reinforce this image. Unfortunately, it is too good to be true.

Design is not irrational

There is nothing "soft" or vague about designing. Despite a deceptive playfulness in the conceptual phase of a design project, design ultimately needs to be rigorous in its approach if it is to deliver results for the real world. An essential part of the design process is making educated guesses when proposing solutions; yet these guesses will be tested later on in the project, if not by the designer then by the confrontation of the design with reality itself. The best designers are all very strong analytical thinkers with an original and playful bent of mind. Exercising judgment based on a clear analysis is an integral part of the design disposition (Lawson 1994). People sometimes see design as irrational because designing is not a completely objectifiable, closed form of rationality: design is inherently open-ended, as there is always more than one solution to a design problem. Design is not about creating "solutions" in the same sense that we create solutions to mathematical equations, as absolute truths in an abstract world. Designers create proposed solutions that can be judged on a sliding scale of better or worse relative to the needs of stakeholders. To ensure the relevance of their proposals, designers have developed elaborate phase models and work processes to deal with the inherent ambiguity in their practices, building in checks and balances wherever they can. To quote Nigel Cross, paraphrasing Hamlet: "Yes, they are quite mad—but there is method to their madness" (Cross 1996).

Design is not mysterious

We actually know a lot about design: the activities it consists of, the sequence in which these activities often take place, the abilities needed to be a good designer (Cross 1990, 2004), and the path of development of these abilities (Lawson and Dorst 2009). Systematic design research has been around since the early 1960s, and there is a flourishing design research community that has amassed a wealth of knowledge. There is much more to be discovered, and the design professions themselves are presenting a moving target for research by continuously reinventing themselves (Dorst 2008, 2013b). Yet there is now a

core body of knowledge about design that is largely beyond contention. The reader should be assured that although this book will use design in unconventional ways and stretch it beyond the limits of the traditional design disciplines, we will be building on a solid knowledge base that has been amassed over all these years of design research. It is this strong foundation that gives us the self-confidence to build bridges to other disciplines that have become interested in design practices.

Not all design is good design

In pointing out the value of learning from "design practice," we do not mean to suggest that all design is good or that all designers are equally skilled in these design practices. As in any profession, there is also superficiality and mediocrity in design—and many designs that make up our human-made world are hard to defend, even inexcusably awful. What we will be focusing on here is the practice of a select group of top professionals in the field.

WHAT IS THE PLACE OF DESIGN IN THE GREATER SCHEME OF THINGS? DESIGN AS A FORM OF REASONING

The case studies in chapter 2 show the strength and possibilities that a design-erly approach can bring to a wide variety of problems. As we've seen, it is very fruitful to look at problematic situations in a way that moves beyond conventional problem-solving approaches, and to consider these problem situations *as if* they were design problems. The designers and artists who were involved in the YD/ and DOC projects somehow regarded these very complex problems differently from the people who had tried to solve them before. But what, then, is the core reasoning pattern they apply when they design? Is it really that different from conventional problem-solving?

This is a fundamental question which cannot be answered by giving examples alone. We need a bit of logic to help us attain a much deeper understanding of the reasoning patterns behind design practice. We need to step back and suspend the "rich" descriptions of design that make the case studies such a good read, and take the question of design reasoning back to its very basics. Formal logic can provide us with a simple group of core concepts that describes the reasoning patterns behind design and other professions. This "poor" description of design helps us to understand whether design is different from other fields, and provides us with fundamental insight about the value of introducing design practices into other professional fields.

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To penetrate to the core of design thinking, we look at the way fundamentally different kinds of reasoning are described in formal logic, in particular, the way Roozenburg and Eekels (1995) have taken the classic work of the pragmatist philosopher Peirce into design research. At the very simplest level, we can consider the world to exist of "elements," such as people and things, and connections between these elements, captured in a "pattern of relationships" that we can observe through the interactions of these elements, and the "outcome" of a process in which the elements have interacted. This is very abstract—but as an example, we can look at the original problem situation of a complex case study like Kings Cross and see all the *elements* in the situation (the police, the various groups of youngsters, the clubs, the physical characteristics of the public space) interact with each other in certain patterns that define stable relationships—patterns of interaction which in this case are leading to an unwanted *outcome*, the problems of drunkenness and violence. This three-way distinction between "elements," "patterns of relationships," and "outcomes" gives us enough conceptual tools to analyze the four basic reasoning patterns that humans use in problem-solving, and to show that design reasoning is really very different from the other three. We will analyze these ways of reasoning by simply comparing different "settings" of the knowns and unknowns in the basic equation,

WHAT) **+** **HOW**) leads to **OUTCOME**

(elements)   (pattern of relationships)   (observed phenomenon)
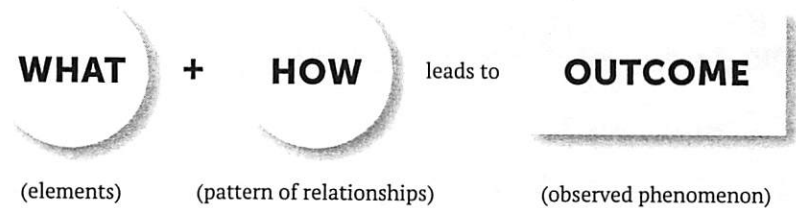
The four basic ways of reasoning that we will compare are <u>deduction</u>, <u>induction</u>, (normal) <u>abduction</u>, and <u>design abduction</u>.

Deduction—solid reasoning from cause to effect
At the start of a process of deduction, we know the "elements" in the situation, and we know "how" they will interact together. This knowledge allows us to reason toward an outcome. For instance, if we know that there are planets in the sky, and we are aware of the natural laws that govern their movement

within the solar system, we can predict where a planet will be at a certain time. The calculations to support this prediction are very complicated, but in the end reasoning deductively toward a prediction is not problematic. With our knowledge of the elements in the situation and the pattern of their relationships (as defined by the laws of gravity), we know enough to safely deduce the outcome. Our forecast can be verified by observations, confirming that we have considered all the players in the situation correctly and have a sound grasp of the pattern of relationships through which the sun and the planets in the solar system interact. Of all the reasoning patterns we humans have at our disposal, deduction is the only one that is rock-solid. In terms of our simple equation, the starting position for deductive thinking looks like this:

$$ \text{WHAT} \;+\; \text{HOW} \quad \text{leads to} \quad \text{???} $$

Induction—discovering patterns
Matters begin to look slightly precarious in the next reasoning pattern, induction.

$$ \text{WHAT} \;+\; \text{???} \quad \text{leads to} \quad \text{OUTCOME} $$

At the start of the reasoning process, we again know the "elements" in the situation, and—if we take the planets as an example—we know the outcome of

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their interactions in the sense that we can observe their movement across the night sky. But suppose we do not yet know the laws of gravity, the pattern of relationships that governs these movements. ... Can we use our observations of the movement of these planets to formulate such a law? We can't logically deduce such a law from observations. But we can observe the movement of the planets, and create meticulous descriptions. Those descriptions can inspire us to think deeply about the underlying patterns that could cause this behavior. The formulation of laws that explain this behavior is fundamentally a creative act, where the pattern of relationships is dreamt up and proposed.

Induction is crucial in the progress of science: astronomers propose different working mechanisms ("hypotheses") that could wholly or partially explain the observed phenomena, and test them by using the hypothesis to predict future outcomes, and check whether the hypothesis is true by matching it with observations. In the formulation of these predictions, we can again use the solid reasoning pattern of deduction: knowing the elements in a situation, and proposing a pattern of relationships between these elements, we can do our deductive calculations and predict where a planet will be in the future. Then we can wait until that moment arises, observe the planets again, and check whether the prediction was correct or not. If the planet is indeed where the hypothesis said it would be, we can cautiously say that the proposed pattern of relationships could be true. If the planets are not where the hypothesis projected them, the astronomer will have to come up with another possible theory of how these planets interact, and again use the power of deduction to test the new proposal. The progress of science comes from endless discussions between scientists who challenge and prove false each other's hypotheses until there is agreement that a certain proposed pattern of relationships is probably "true," because it matches current observations.

Detectives work in much the same way, or at least they do in novels: there is a group of "elements" (the suspects), and there is the undeniable fact of the dead body (the outcome of an unknown process). To find out what happened, the detective needs to create scenarios about how the murder might have happened, and scrutinize them through deduction (would this scenario of interactions have led to the murder, and the position of the body in the exact circumstances in which it was found?). This is pure induction, a creative act—even though Sherlock Holmes adamantly denies this creativity, claiming that it is all "deduction, my dear Watson." But by deduction alone, Sherlock Holmes would never have arrived at the scenario which exposes the murderer. Like detectives, scientists seem embarrassed being caught creatively guessing how something might work,

and tend to claim authority by presenting their work as purely deductive (Kuhn 1962; Latour 1987). But it really isn't, and it fundamentally can't be.

Deduction and induction are the two forms of reasoning that we have at our disposal to predict and explain real-world phenomena, and they have driven our understanding of the world immensely. But deduction and induction are not enough if we want to *make* something. If we want to create valuable new "things," as in design and the other productive professions, the basic pattern of reasoning is called "abduction." In abduction, we set out to create a new "what"—a new "element" for the problem situation—so that the interactions in the system lead to a desired outcome. Abduction comes in two forms. In both forms, we already know at the beginning of the process something about the outcome of the equation; that is, we have an idea about the value we aim to achieve with the creation of the outcome.

Normal abduction—solid problem-solving, based on experience

??? + **HOW**   leads to   **OUTCOME**

make
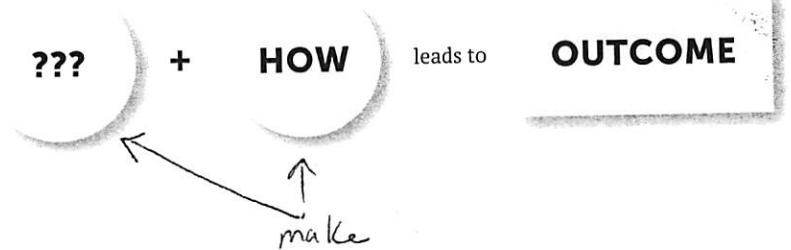
In normal abduction, we know the result, the value we want to achieve through the desired outcome, and also the "how," a pattern of relationships that will help achieve the value we seek. The missing element is a "what" (an object, a service, a system), which still needs to be created. For example, faced with an undesirable situation of late-night violence in Kings Cross, we can choose to work within the established pattern of relationships for crime reduction, and send more police into the area in the early hours of the morning. Or we could—still within the same pattern—set up a training program for security personnel in which they learn to spot possible offenders more quickly. This is often what we do, create a solution within a fixed pattern of relationships. In this type of abduction, the degree of innovation will be limited because the problem-solving process doesn't question the "how," and therefore excludes the creation of

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new scenarios. Normal abduction is the reasoning pattern behind conventional problem-solving—using the tried and tested patterns of relationships to reach a solution. And this should not be dismissed: often the patterns of relationships that have been developed over many years of problem-solving efforts are more than adequate to deal with the problem situation at hand. But sometimes this type of routine reasoning doesn't lead to the desired value anymore, and we will have to think about the problem again. That brings us to the second type of productive reasoning, design abduction.

Design abduction—two unknowns lead to a process of creative exploration

Typical situation for designers:

??? + ??? leads to **OUTCOME**

analagous designs
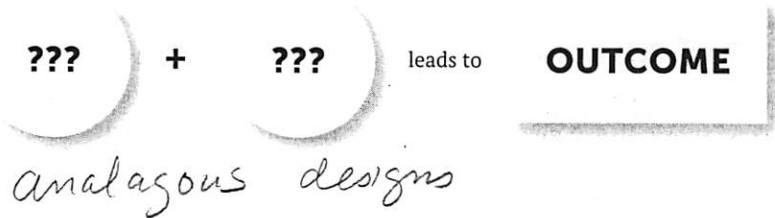
In design abduction, the starting point is that we *only* know something about the nature of the outcome, the desired value we want to achieve. So the challenge is to figure out "what" new elements to create, while there is no known or chosen "how," a "pattern of relationships" that we can trust to lead to the desired outcome. Thus we have to create or choose both a "how" and a "pattern of relationships." As these are quite dependent on one another, they should be developed in parallel. This double creative step requires designers to devise proposals for both the "what" and the "how," and test them in conjunction.

An example can help to clarify the difference between the two types of abduction: say that the *outcome* we want to achieve is an energy rush when coming to work in the morning. In normal abduction, we would also already know the "how," say that this is to be achieved through coffee—and we might even have a proposed method of brewing coffee (dripping, squeezing, using steam) so we can start developing a "what," engineering the machine to make the coffee for us. In design abduction, on the other hand, we would only know the goal (quick rush of energy before work) but not know how to achieve it. Hence, if we go for coffee, we would still need to choose a brewing method, create a design for a machine, and then judge whether this would do the trick

The outcome is based on a designer's imagination

(Is it quick enough? Is it economical? Is it environmentally OK?). If none of the coffee machines we can think of will satisfy the criteria, we might need to start considering other ways of creating the energy rush.

To sum up: this comparison establishes the design professions as thinking fundamentally differently from fields that are predominantly based on analysis (deduction, induction) and problem-solving (normal abduction). But this distinction is not as clear-cut as it may seem from this logical analysis. In the real world, design practices involve a mix of different kinds of thinking—including inductive and deductive reasoning and normal abduction—that are the fundamental building blocks of conventional problem-solving. But there is a real fundamental difference, too—the nature of design abduction that sets the design practice apart from those of other disciplines. The heart of the distinction between design and conventional problem-solving can be illustrated by comparing two problem situations (Hatchuel 2002). Picture a group of friends on a Saturday night. The first problem situation is that they are "looking for a good movie to see," and the other scenario is that they set out to "have a good time." Hatchuel argues that the first situation can be dealt with through conventional problem-solving, but that the second requires design abduction. He lists three important differences between these situations. The first difference is that the design abduction situation includes the expansion of a key concept by which the situation was initially framed ("a good time"). This reasoning process requires a design process instead of a one-off choice of which movie to go to, from a limited set of alternatives (the movies that are playing that evening). There is no dominant design for what a "good time" would be, so imagination is needed to arrive at a definition. A second difference is that the design situation requires the design and use of "learning devices" to reach a solution. These "learning devices" include (thought) experiments and simulation techniques, in this case imagining different scenarios for going out. Third, designing the understanding and creation of social interactions is part of the design process itself. The group of friends needs to develop a way to imagine a solution, to share this view with one another, to judge the solution, and to decide which way to go (and experience shows that this process is not always easy). The process that these friends are going through undoubtedly includes stretches of conventional problem-solving, but it also contains these other "design" elements.

Converge & diverge

Synthesize

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WHAT MAKES DESIGN HARD? PROBLEMS AND PARADOXES

Many issues that we encounter in our daily lives and professional practices never reach the status of "a problem." If the issue is quite simple and we have an obvious scenario in our repertoire to deal with it, we just get on with it and act. A "problem" occurs only when we either do not know how to progress or our chosen way of working gets us stuck. Then we have to stop and think, devise and critically consider options, perhaps be strategic and create multistep plans, do scenario planning, etc. Problems occur when something blocks our normal flow of how we deal with the issues in life. This "something," the counterforce, is bound to have its own background and rationale—at the core of really "hard" problems is a paradox. The word "paradox" is used here rather loosely, in the sense of a complex statement that consists of two or more conflicting statements (Dorst 2006). All the statements that make up the paradox are (possibly) true or valid in their own right, but they cannot be combined for logical or pragmatic reasons. There are three ways forward. The first option is to choose one side of the paradox and let it take precedence over the other. There is also the option of compromise, where negotiation might lead to a decision that sits near the halfway point between opposing needs and views. The third way forward in these tough paradoxical situations, where there is a real clash of views, standpoints, or requirements, is to redefine the problem situation. Designers do this very well. In her book *Ethics in Engineering Practice and Research*, Caroline Whitbeck (1998) remarks, "The initial assumption (within moral philosophy) that a conflict is irresolvable is misguided, because it defeats any attempt to do what design engineers often do so well, namely, to satisfy potentially conflicting considerations simultaneously" (56).

This observation is borne out by the case studies in chapter 2—somehow, the designers and young artists managed to wriggle out of confounding problem situations that had, in some cases, already existed for a very long time, and created a position from which the problem situation could be steered toward a solution. This accomplishment is in stark contrast to a conventional problem-solving approach, where the problematic situation cannot be redefined because the way the solution must work (the "how," its "pattern of relationships") is already fixed. This is the serious limitation of the normal abduction used in conventional problem-solving. The conventional problem solver only has the options of giving one side of the paradox precedence over the other or creating a compromise between the two positions.

The challenge of dealing creatively with paradoxes is one of the aspects that makes design so fascinating and captivating. Unresolved paradoxes can

capture our attention to the extent that we cannot help thinking how to resolve them. Paradoxical problem situations inspire the creative imagination, much like the famous koans that are used in Japanese Zen training to provoke people to defy rationality and free their minds. While koans are beautiful and poetic, the challenge to come up with a sensible response can also be intolerable (Van de Wetering 1999). The mind-boggling nature of paradoxes and the difficulties they cause for our everyday thinking skills also make paradoxes a fascinating intellectual toy for linguists, logicians, and mathematicians (Hofstadter 1979). But that is not the way we want to talk about paradoxes in this book. Here we deal with real-world paradoxes that are caused by conflicting values and needs on the problem side, or by the incommensurability of design outcomes on the solution side.

In real-world situations, paradoxes are particularly formidable when the needs, interests, and "object worlds" (Bucciarelli 1994) are rationalized by different stakeholders. These perceived rationalities become a problem when a personal or institutional worldview is seen as the only one possible, making life hard for the problem solver, who is caught in the middle. Yet as Whitbeck has observed, designers can somehow deal with these knotty problems. In the Young Designers project on Integrated Living (case 5), the care organizations unquestioningly believed that part of their responsibility was to protect the mentally handicapped people in their charge. And they rationalized this "responsibility to protect" to include "complete control over their environment"—even if this meant isolating the mentally handicapped in their city residences. This result is, of course, completely at odds with the government objective of integrating these mentally handicapped into society. By being isolated, the mentally handicapped are further removed from companionship than ever (in the old days, they would at least have had each other to talk to) and are very far from being able to lead "normal" and "rich" lives in society. The paradox is complete. But one can see where some assumptions of the care organizations could be questioned, "cracked open," and investigated. Does "care" really mean "protect," and does "protection" really mean "control"? The government side of the paradox also needs to be unlocked: What are the assumptions that informed the ministry's thinking, in particular the presumed need to integrate mentally handicapped people in society? Are these assumptions valid? And what are the ministry's preconceptions about the role the care organizations would be playing in the new situation? Revealing the core paradoxes provides designers with an entry point for examining these assumptions.

[Handwritten margin note, left side: "revealing paradox as a way to "crack" a problem."]

*[Handwritten note, bottom: "** What are our cultural assumptions?"]*

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HOW DO DESIGNERS APPROACH A PARADOX? ON FRAMING

WHAT + **HOW** leads to **OUTCOME**

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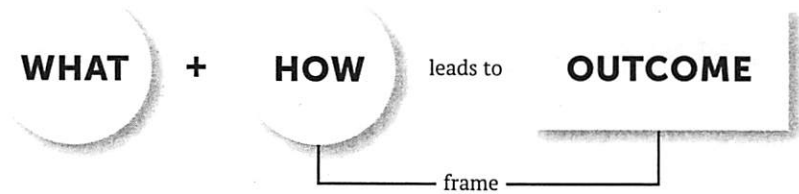
In questioning the established patterns of relationships in a problem situation, design abduction creates both a new way of looking at the problem situation and a new way of acting within it. This comprehensive new approach to the problem situation is called a "frame" within design literature (see Schön 1983, and appendix 2). Expressed in terms of the concepts in our logical formula, a frame is the proposal through which, by applying a particular pattern of relationships, we can create a desired outcome. If we go back to the earlier example, the problem of creating an energy rush at the start of the work day, then the choice of a chemical stimulus (caffeine) as a way to feel energized is the frame, the approach to the problem. But this problem might be reframed by proposing that there are also social ways of being energized (by an inspiring conversation), or by delving deeper and saying that what we really are looking for is not so much the energy rush, but a level of concentration—in which case, meditation would be a way to achieve the clarity of mind that is otherwise achieved by drinking coffee. *What is really the goal?*

We call the act of proposing such a hypothetical pattern of relationships "framing." Framing is the key to design abduction. The most logical way to approach a paradoxical problem situation is to work backward, as it were: starting from the only "known" in the equation, the desired value, and then adopting or developing a frame that is new to the problem situation. This framing step is intellectually similar to induction: after all, we have seen that in inductive thinking a pattern of relationships is also proposed and tested. Once a credible, promising, or at least interesting frame is proposed, the designer can shift to normal abduction, designing the element that will allow the equation to be completed. Only complete equations with "elements," "pattern of

relationships," and "desired outcomes" in place can be critically investigated, using the powers of observation and deduction to see if the "elements" and "frame" combined actually create the desired outcome.

In our Kings Cross example, strengthening the law enforcement approach didn't result in a desired outcome. But the metaphor of the "music festival" introduced a whole new set of relationship patterns (about access, crowd management, the creation of a benign atmosphere, etc.) that could be applied to the Kings Cross situation, and led to the introduction of new elements in this public area (such as signage, Kings Cross guides, public toilets). We can only learn whether the metaphor of the "music festival" is fruitful by implementing these new elements that flow from this frame, and observing whether the desired outcome of a more peaceable and less violence-prone nightlife in the area is achieved. Until it is thus tested, the proposed frame is just a possible way forward. *an ~~these~~ "anecdote"*

Earlier research into design practices (appendix 2) has shown that designers indeed spend a lot of time reasoning from desired outcomes via frames to possible design solutions, and go back again to reframing the problem when they suspect the design solution is inadequate. This reasoning pattern leads to the above-mentioned phenomenon of designers playing around with ideas, tossing up possibilities (proposals) for frames, relationships, and solutions in what may look like a childishly playful hit-and-miss process. Yet in doing so, design practitioners try out and think through many possibilities, building up an intuition about what frames might work in the problematic situation before they pursue one in greater depth. We have seen in the case studies of chapter 2 that designers naturally think beyond the current context (often much to the surprise of the other stakeholders, as in the "integrated living" case study). Designers realize that a real-life paradox is completely contradictory only in a certain, predefined *context*. Strategies to move forward from a paradoxical situation are based on the investigation of this context, exploring the assumptions that underlie the paradox.

This is a process of thinking around the paradox rather than confronting it head-on. The solution is not within the core paradox itself (which is stuck in closed definitions), but in the broad area of values and themes in the context surrounding the paradox. The richer this context, the more chance that fruitful avenues can be found to move forward. Thus, the very same properties of problem situations that are so challenging to conventional problem-solving—the open, complex, networked, and dynamic nature of contemporary problems that

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was mentioned in chapter 1—actually provide a rich field of opportunities for people with a designerly bent of mind. They need this richness to create a new approach from which solutions are possible.

In creating a frame, or a novel standpoint from which a problem can be solved, a design practitioner will say: let's suppose we use this particular pattern of relationships (in Kings Cross, the pattern was a "music festival") and see if we can achieve the outcomes we are aiming for. As Einstein once said, "A problem can never be solved from the context in which it arose." Apart from the obvious circularity of this statement (if the issue could be solved in its original context, it would probably never have registered as a problem), there is some wisdom here as the statement highlights the need for a problem solver to look at the context in which the problem was formulated. By looking at a broader context, the designers in these cases could frame the issues before them in a way that made the problem situation amenable to solution.

AN ANATOMY OF DESIGN PRACTICES

Design is a very broad field. In this book we are just looking for those elements of design practice that are potentially useful for dealing with open, complex, networked, and dynamic problem situations. Before selecting salient practices, we need a brief anatomy of design. Below, the core categories of design activities (figure 3.1) and the levels in design thinking (figure 3.2) are used to lay out the huge variety of design practices. *, what about research? empathy? under-stand?*

First of all, design practices are shaped around five general activities, starting with (1) the *formulation*, or identification, of the issues in a problem arena, which are then often framed in a new manner. (2) The *representation* of problems and solutions (in words, sketches, and sophisticated visualization techniques) allows the designer to develop his or her ideas in conversation with these representations. Designers tend to use multiple representations in parallel, where each representation highlights certain salient features of the solution that is under development. (3) The *moves*, or design steps taken, in manipulating the problem and creating solutions can be entirely original, part of the designer's repertoire, or in line with common design practices. (4) To keep a design project on track, there is an almost continuous *evaluation* going on. Early on in the project, this evaluation necessarily has an informal and

FORMULATING *understand*

UNDERSTANDING — IDENTIFYING — FRAMING

REPRESENTING *ideate/ prototype*

EXTERNALIZING — CONVERSING —
USING MULTIPLE REPRESENTATIONS

MOVING *reframing*

CREATING PRIMARY GENERATORS —
KINDS OF MOVING — MOVING THE PROBLEM

EVALUATING *- testing*

OBJECTIVE / SUBJECTIVE REFLECTING-IN-ACTION —
JUDGING ON 3 QUALITIES — SUSPENDING JUDGMENT

MANAGING

REFLECTING-ON-ACTION — BRIEFING —
PURSUING PARALLEL LINES

Figure 3.1
The spectrum of design activities (after Lawson and Dorst 2009).

subjective nature—later, the evaluations can be much more formal and objective. (5) Still, design projects are a challenge to *manage* because they are a mixture of a problem-solving process, creative freedom, and a learning process that is driven by reflection on action. Management challenges are exacerbated by the fact that the project brief is in continuous flux: as the possible design outcomes crystallize, the aims of the project can change.