

*New, revised and
enlarged edition*

UNDER-

Kees Dorst

STANDING

DESIGN

175
Reflections
on Being a Designer

THE DESIGNING DISCIPLINES

'Design' as such does not exist, not as a single discipline that you can clearly define or point to. This makes general discussions about 'Design' muddled from the start. What do you mean when you say 'Design'? It is even not very helpful to consider the fields of Architecture, Engineering, Graphic Design and Product Design as categories of design practice. The kinds of design work within any of these fields do not have that many traits in common, although they do display a family resemblance.

It is much more useful to choose a variety of criteria to discern different modes of designing, than to draw lines between the design professions as if they were separate species. The lines between the disciplines have always been vague and they are blurring rapidly. For instance, in all the main design disciplines, there are branches that look very much like my own profession of product design: in architecture it is the design of building systems, in mechanical engineering it is the development of small, mass-produced machines and in graphic design, the development of company logo's and house styles. Thus, it is quite common for designers to defect from their original design discipline and move to an adjacent design field.

One can think of many other criteria – besides professional categories – to use to discern types of design practice. In this chapter, we will use a number of criteria which are based on variables that do seem to directly impact the nature of design work. These variables are: the constrained nature of design problems, the structured or unstructured nature of the design knowledge needed to solve these problems, the costliness of prototyping and the amount of integration required because of the stresses of mass production. We will then look at the peculiar traditions and rituals of a design profession, and the role a designer plays during the whole process of bringing a new 'something' into the world. Both these 'softer', cultural aspects can also be extremely influential to the working reality of a designer.

CONSTRAINT

Some design problems are much more 'open' than others. They require the designer to play with concepts and ideas through a wide range of possibilities before settling on a firm direction. This takes a great deal of conceptual juggling skills. You propose ideas, look at them critically, and reconsider them. This is done repeatedly, making gradual improvements as you learn more about the problem.

Closed design problems are more like puzzles. You try out solutions, and the feedback you get from evaluating your design is immediate and clear. The assessment might even directly point the way towards a better solution. If a piece of the jigsaw puzzle doesn't fit, you know you'll have to search for something that has a slightly different shape.

Puzzle solving has its own strategies. Start where the problem is the most constrained, where there are the least choices or possibilities for error. For a jigsaw puzzle, that would be the border or the corners. Or you start with pieces that show a clear, unique image. And you always end by filling in the biggest uniformly coloured surface (the sky). However, this does not imply that this is always the fastest way, or that other solution strategies are impossible or wrong. It might also be more enjoyable to solve the puzzle in a random, browsing way.

There clearly are different skills involved in the 'idea juggling' of the open design problem and the 'puzzle solving' of the closed problem. It could possibly involve completely different types of designers. There is creativity and inventiveness involved in both, although designers often don't see it that way. It is a misconception that is kept alive by both parties. The 'creatives', who deal with more open design problems, tend to look down on the 'non-creative' closed problem solvers. And some 'closed problem' designers confirm this by downplaying the creative side of their profession. As the industrial designer Richard Stevens observed: *'A lot of engineering design is intuitive, based on subjective thinking. But an engineer is unhappy doing this. An engineer wants to test – test and measure. He's been brought up this way and he's unhappy if he can't prove something.'*

KNOWLEDGE STRUCTURE

The thinking tools available to designers depend heavily upon the knowledge structure of the disciplines that play a role in the design project. In some technical domains it is possible to reason from problem to solution in a relatively orderly way. We know a lot about the 'laws of nature', and there are some slightly more iffy 'laws of technology' that really help iron out a solution. It is even comparatively easy to translate between several technical domains (like mechanics and hydraulics) because both domains share some of the same variables.

However, this does not apply to, for instance, the fields of aesthetics and form-giving, where the knowledge base is extremely weak. It consists of some psychology, some art theory and some craftsman's knowledge of what can be done with forms, colours and textures. All of these sub-domains are completely unconnected. For every new design they have to be combined by the designer, on the basis of personal preference, taste and style. People who have tried to unite these particular subdomains on a general, non-personal level, have only come up with pseudo-theories. Several Bauhaus teachers have developed theories of form and colour which contain statements like 'squares are inherently blue'. It is easy to ridicule this, but it was an honest attempt to develop a theory of aesthetics that was every bit as solid as science or technology.

Sometimes you just wish this was possible. In conversations with clients, it is always reasonably straightforward to explain why a technical construction has to be the way it is, but it is almost impossible to convince some people of the suitability of a certain form. You suddenly have to defend your design against the clients' own personal preferences and taste. If you are really unlucky, they have already taken the drawings home and shown them to their partner who has taken a course in Home Decoration. While working in a product design firm we got around this problem by introducing the word 'formtechnical'. When asked to defend a certain detail of a design, we would say that it was 'formtechnically sound'. Just pretending to have a solid (technical) basis for a decision was enough to avoid endless discussions.

MASS PRODUCTION

The nature of a design problem is heavily influenced by the number of units of the design that has to be manufactured.

If a design has to be mass-produced, this puts an enormous emphasis on the efficiency that must be attained in the design. Integration of functions becomes vital. For mass production, you want the smallest possible number of parts (assembly is particularly expensive) made with as little material as possible, to perform a maximum number of functions. This means that it pays to use production techniques that use expensive moulds to make complex forms, as long as those complex forms really fulfil a lot of purposes. The fact that mass-produced designs are often very simple is actually a very poor indication for the complexity of the design process that led to it.

The limitations of mass production have fathered their own aesthetics. The aesthetics of doing much with little, of achieving much with the simplest possible means. Some designers can achieve great heights because of these kinds of limitations. In the last century, graphic designers of the Soviet Union and Eastern Europe developed a startlingly eloquent graphic style, making subtle compositions with large graphic elements because the printing techniques did not allow for much detail and sophistication. After the fall of the Wall, that style has gone.

The issues of absolute simplicity and integration are matters you don't have to bother with when only one item or a small series will be made. It's no use going to great lengths to integrate all kinds of functions into one part. Just design simple parts that will do the job, and get someone to put them together. Efficiency is still paramount here, but it is a different kind of efficiency: you keep the design and engineering costs low by *not* going for wholesale integration. A completely different way to design.

ROLES OF DESIGNERS

An important distinguishing characteristic of a design practice is the specific role the designer plays in the complete process of creation. Some architects or designers are cast in the role of the 'creative', and hand over their design concepts to technical people to iron out their construction. Others have a much more integrated approach, and actually use the technology of construction as a source of creativity.

It's hard to say which approach is better. But these organisational choices (the division of labour within a company) does have a pervading influence on the resulting design. In 'The Soul of a New Machine', Tracy Kidder describes how the project leader of a development team that is going to design a new computer, looks at the latest model of the competitor. In analysing the design, he describes it as 'bureaucratic' because two parts that could have been integrated were clearly developed separately. And the project leader decides to develop a more efficient, integrated solution by assigning both design problems to one, larger team.

Every work division creates a point of contact between people or parts of an organisation. And despite all the good ideas of how to manage these interfaces by introducing 'multidisciplinary design teams' or 'concurrent engineering', they remain a huge managerial problem. Who talks to whom about what, etc. The management sciences have been oscillating between task division and integration – especially after the shock that the Japanese dealt to Western companies with their highly successful products that grew out of more integrated development processes.

Since then we have learned that this is one of those problems that don't have one solution: both integration and task division have their pros and cons. The unsuccessful search for the one best choice has resulted in the constant reorganisation of design functions within companies, from divided to integrated and back again. Which is a bad situation all by itself. The answer to this dilemma may not lie in the organisation of the design department at all. It may lie in the **commitment of the project management to create an open atmosphere where information can flow freely between all those that need to be involved.**

SUCCESS

When is a design project a success? This is a deceptively simple question. In the management sciences, success is traditionally associated with speed ('time-to-market'), efficiency and Return On Investment ('shareholder value'). But some years ago, a couple of management scientists became uneasy about this definition of success. They decided to ask the people who should know, the managers, which of the development projects in their firms they judge to be successful. In these interviews they found to their surprise that there are actually two disparate kinds of projects that managers call a success, for very different reasons.

Some projects are deemed successful because they provide a great learning experience for the organisation. These are potentially really messy projects, full of friction between the parties involved ('creative abrasion', as it is called in lovely management speak), false starts, trial and error, and considerable overruns in time and cost. From a distance, one would say that this is the kind of projects that any manager would frown at. But the learning experiences were apparently deemed so valuable by the managers that for these projects, their 'normal' criteria of speed, efficiency and financial gain moved into the background. These 'learning projects' are appreciated as successes because they can be the starting point for other, less innovative projects, in which the lessons learned are 'milked' and translated into hard cash. These 'Cash Cow' projects themselves are judged purely on their speed, efficiency and financial merit.

This is an interesting observation: management scientists have traditionally selected the 'best practices' that they analyse and parade before us as shining examples of successful design on the basis of the amount of money made on a project. In doing so, they have inadvertently focussed on the second kind of project. But these routine projects cannot exist without the other, much more messy 'learning projects' where innovative design should roam freely.

DESIGN AS A SOCIAL PROCESS

Nowadays, designers rarely work alone. It has become almost impossible for a single designer to possess all the necessary knowledge and skills to develop a complicated design. You usually have to cooperate with other designers and consult specialists from various fields.

This means that design has become a social process, whether we like it or not. Designers need to interact with groups of people that have different ways of looking at the design problem and the design solution. These people do not only bring their knowledge to the design project, they also bring their own viewpoints, expectations and ambitions. Because they represent widely different aspects of the design, and come from completely different knowledge fields, these groups often have trouble understanding each other. Yet for the design to succeed, it has to perform well within all these different worlds (financial, technical, ergonomical, aesthetical, etc). There is no single overriding perspective that encompasses all aspects of the design problem and solution. Because of this, designing becomes a process of negotiating a consensus among all the participants who have differing interests in the design.

People who have been trained as creative designers may not be particularly suited to lead such discussions. They may be much too involved with the developing design idea to act as an independent chair in such a negotiation process. **The separate discipline of design project manager has arisen to fill this need for someone who can really make the design team work together. Now that design has become a social process, designers will need to become skilled negotiators.**

DESIGN AS A GAME

Design is a game with very few rules. Design problems are extremely complicated, so we must use all our wits and creativity to solve them. The results are what counts, and we will use any means to get us there.

Any design problem is a challenge, which you can master by experimenting with various views of the design problem and the many roads toward a solution. You have to choose your line of attack early on in the project, always on the basis of too little information, so it automatically becomes something of a gamble. Then you try it out, get nowhere and have to use your creativity to take on the problem in a different way. A new gamble, that may pay off – or not. And a new challenge to make it work this time.

Any self-respecting designer (and aren't we all) will also raise the stakes by adding all kinds of personal goals to the design brief. You want to make the design what you think it should be, something special. You challenge yourself by aiming high, by being as ambitious as possible. Because you have inserted your own goals, you become personally attached to the project, desperately wanting to make your ideas work. How far can you get in realising your ideal? In most of the design firms I know, the lights are on until 11 pm every night. It's a sure sign that someone in there has become attached to his ideas, and can't stop playing the game of design... It is pure fun, exciting and exhilarating. And when a good idea that you have put a lot of energy into is finally adopted, it really feels like winning. Designing is highly addictive.

Collaborative

THE RESOLUTION OF CONFLICTS

Many design problems cannot be solved within the context in which they have arisen. And if they actually cannot be solved at all, they have to be **resolved**. The way designers deal with the paradoxes and conflicts in a design situation is considered to be rather special, and a core quality of good design.

The problem is that the conflicting statements in a design situation tend to trap you in a strange thought-loop that it is really hard to get out of. For instance, the conflict could be that your design should be clearly visible and available to the user at one moment in time but should preferably *not* be visible a moment later. But physics tells us that matter doesn't just disappear. What can you do? Design something that is comparatively small, and unobtrusive? Paint it in camouflage colours, make it fold down, or inflatable? All of these are compromises, *sub-optimal* solutions that try to find a position within the conflict that is acceptable.

The resolution of a conflict is something radically different. **It calls for a complete redefinition of the problem situation.** It challenges us '*...to do what designers often do so well, namely, to satisfy potentially conflicting considerations simultaneously*'. To attain the resolution of conflicts in a design problem, the designer has to take the long way around: not attacking the problem head-on but dancing around it, playing with different ways of looking at it. If you manage to step out of the ways of thinking that gave rise to the conflict, and find a fresh and *productive* perspective to the design situation, then the conflict resolves itself. It just is not there anymore!

MOULDING THE DESIGN SITUATION

Imagine a group of friends getting together on a Saturday night. Let's then first give them the problem to go 'looking for a good movie in town'. And then give them a second problem, to set out and 'have a party'.

The first situation is considered to be 'problem solving', the second situation is considered to be a real design project, because there are three important differences between these two situations. The first difference is that the design situation includes the definition of the pivotal word or a possible expansion of the meaning of that concept (What is 'a party'? What do the different people involved *mean* by 'a party'?). There is no dominant design for what a party should be, so imagination needs to be applied at this very fundamental level. A second difference is that the design situation requires the design and use of (thought) experiments in order to get to a solution ('Shall we go to a club...?'). Thirdly, in design you have to develop tools to reach a solution, such as ways to discuss issues or arrive at decisions ('Let's vote on this, guys...').

The problem solving that involves in the 'movie choice' scenario is very simple by comparison. List the available movies, agree about the criteria ('Not too scary', 'No, I've seen that one already') and choose. Selecting can be hard enough, but it does not *require* a creative leap and inventiveness that it takes to mould the design situation. Design undoubtedly includes moments of problem solving, but it also contains other, more complex processes.

YEARNING FOR NOVELTY

Designers set out to innovate, to cover new ground. Nevertheless, in nine out of ten cases a new design is a creative combination of concepts that have existed before. It is already difficult to create anything novel in this sense, let alone making something that is completely new to the world. This inability to create completely novel designs can easily lead to frustration and cynicism. If cynicism reigns, design can become an uninspired cut-and-paste profession. Many of these mediocre designs will be good enough to be dubbed successful, if the market accepts them. Design then easily degenerates into being a cheap trick.

Novelty is an elusive target to aim for. Maybe it should not even be aimed for directly – if it occurs, it is often the result of a personal journey of discovery.

To avoid frustration, it is important not to burden yourself with the target of achieving Novelty in every project. But you should strive to always do things that are new to you, irrespective of the novelty-value they might have for the rest of the world. In doing things that are new to you, it is quite possible that you will sometimes 'reinvent the wheel'. This may even be necessary – only if you come up with an idea yourself will you really understand it, get a handle on it and realise what you can do with it. The longer and more intense your journey of discovery, the further you will be able to wander off the beaten track, and the greater the chance that you will eventually achieve Novelty in your designs.

Whether you actually achieve Novelty then ultimately also depends on many other things: the design challenges you get, the people you work with – and on something called pure luck.

WHEN ALL ELSE FAILS

Design problems can be acutely paradoxical. The different stakeholders (producers, buyers, users, society) of a design project often have contradictory needs. This can make life very difficult for designers, saddled with the task of creating something which will somehow satisfy all these parties.

And as a designer you do not have the luxury of choosing one side of the paradox over the other – you have to create a solution in such a way that the paradox is resolved. This is actually what stakeholders expect from designers, to be magicians that conjure a simple design that satisfies everyone!

Surprisingly, this is often possible.

But sometimes a paradox is so fundamental that it just cannot be resolved, no matter how hard you try. **Returning** to the brief, you have to negotiate with the parties **involved**, explain your predicament and convince them to lower their **ambitions** a bit. This, of course, is not what they want to **hear and it** involves a good deal of persuasion. **You have to convince them on the basis** of an extensive analysis of the **possibilities** that they really have to lower their aims to arrive at any solution at all. But it remains a tricky situation. **In most stories, the messenger isn't the one that lives happily ever after.**

WHY DESIGNERS DON'T DOCUMENT THEIR PROJECTS

A design problem is a situation of tension, of unattained aims and unresolved conflict. This tension is the force that initiates and drives design. At the end of a design project this tension is more or less relieved.

Once a design problem is resolved, it disappears from the mind of the designer. This is very much like any form of problem solving. The philosopher Ludwig Wittgenstein has stated that: *'... 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.'*

Design, however, does not take place in the pure and abstract world of philosophical thought. The world in which we design is much too complicated, contradictory and changeable to allow for such a complete resolution. **There is always room for improvement, and although design projects end, a design itself is not stable – it will change over time.**

These changes are much harder to make when there is no record of why the design was put together in the way that it was. The later 'improvements' might disturb the design, and effectively destroy its coherence. Because of the difficulty of making changes, there is always pressure on designers (from their employers) to document their work in great detail. Designers tend to resist this – during the project they want to continue designing, and anything remotely like bookkeeping is often against their nature. After the design project, the documentation task becomes very difficult – designs are tangled webs of decisions which are so closely dependent on one another that it is impossible to find a logical point to begin the explanation of the how and why. **And the resolution of a design problem makes it hard to imagine that certain things were problematic at one time.**

INSIDE DESIGN

HOW TO

...?



CYCLES WITHIN CYCLES

The natural way to tackle any problem, including a design problem, has been described in a little model called the problem solving cycle. The model states that you should first analyse a problem, then create a solution (this is called synthesis). The next step is to simulate the behaviour of the solution to see what it does, and then evaluate the solution. This is a cycle, because after the evaluation, you can decide to go through the process again if you are not completely satisfied, or start a new cycle to tackle a different problem.

This is just natural behaviour: it is how you solve all practical problems in daily life. Design is no exception. A design project can be seen as an accumulation of hundreds or thousands of these miniscule problem solving processes.

In a design project these problem solving processes are nested: you have small, local cycles that take a couple of seconds, and bigger ones that take days or months, which consist of many smaller cycles. Each design phase is a cycle of its own.

This even holds true for the complete design project, which can also be seen as one huge cycle of analysis-synthesis-simulation-evaluation. In this mega process, analysis **includes** orientation on the problem, seeking relevant information through **research** and making a problem statement and programme of requirements. Synthesis includes several rounds of **idea generation and analysis**. Simulation includes making drawings and possibly the production of a prototype. The evaluation of the final design and the project as a whole can plant the seed for the next project.

THE LIMITS OF PLANNING

It is difficult to plan a design project. You never know how hard it will be **to gather the necessary information, or how much time it will take for good ideas to surface, and you never know how often you will have to 'iterate': to go back to an earlier stage of the design project because you have reached a dead end.** It is impossible to predict and plan design. Notwithstanding all these uncertainties, you still need a plan, otherwise the whole design process spins out of control.

In planning design, you need to ascertain at which moments decisions must be made. Design decisions are based on information that is never going to be complete – and there is always a tendency to keep gathering information and postpone decisions. The same is true for the development of design concepts – they are never going to be complete to the finest detail before you have to choose between them. Planning can help force the necessary issues at the right time, so that the whole process will keep moving forward.

• **A design plan must be dynamic.** As the uncertainties about the course of the project gradually diminish, you constantly need to adjust the planning accordingly. Most designers do this by working with a general plan that is more or less static, setting the major deadlines for the delivery of (intermediate) results. This is the basis for the detailed planning that only covers the week, or weeks, ahead. This short term planning is important because it specifies the workload of the designer, and protects a designer against unrealistic expectations and pushy project leaders or account managers who have promised too much to the client (the very dynamic 'Oh yes we will do it right away' types).

If the design project runs into grave difficulties, the general planning will have to be adjusted in consultation with the client. The short term planning has to be kept realistic at all times: nothing is more demoralising than an impossible planning.

PERSONAL AGENDA

There are many reasons for becoming a designer. Some people want to see their ideas turned into reality, others become designers because they see it as a way to express their innermost selves, or are motivated by higher ideals (to make the world a better place). In fact, all reasons are valid, as long as they are strongly felt and personal. However, some of these motivations may be more prone to frustration than others.

Design schools are not easy, and the students whose inspiration is too weak will not make it. In any crop of first year design students, there are a few who just chose design because they were attracted to the visual aspect of it, and see it as a 'nice' study. This is seldom enough to muster the resolve to finish.

Design schools look deceptively innocent, in a 'back to kindergarten' kind of way. But students soon discover that becoming a designer is hard work: the constant flow of design assignments is, by itself, quite enough to fill your days to overflowing. If you don't apply yourself and work hard on these design assignments you can still probably get by, but you will not learn much, and the whole study becomes pointless.

And becoming a design professional is not a comfortable process either. It involves intense personal development. You have to be able to deal with criticism of work that is close to your heart since you had put a lot of time, effort and ideas into it. You have to present and defend your own opinions about design. It is not the kind of study where you can safely hide behind books and are only judged by exam results. **There is nothing anonymous about becoming a designer. A lack of enthusiasm will sooner or later come to the surface and make it that much harder.**

On the other hand, if you chose right in opting for design, you will get a broad education where you learn to keep learning and to enjoy confrontations that will aid your personal development. This is the kind of quality that the artist Joseph Beuys referred to when he was asked about how he taught his students: *'I try to teach (painting) in such a way that if one of my students later decides to become a plumber, he will be a good plumber.'*

UNCERTAINTY

The outstanding structural engineering designer Ted Happold said: *'I really have, perhaps, one real talent - that is that I don't mind at all living in an area of total uncertainty.'*

This is a sobering thought for the people who drive across his bridges.

What does it take to be a good designer? Are there any personality traits that really help or hinder a designer's development? At my university, we explored these questions by observing design students as they worked on a task and interviewed them about their design behaviour. **It turned out that the students who came up with the worst designs all had one trait in common: they had come up with a solution right away, because they felt nervous without any design proposal.**

This makes you realise that design is a very risky profession. As a designer, you work on a complex design problem, possibly for months on end, without really knowing for sure that you will succeed in creating a satisfying solution. This generates a certain tension, a restlessness. It is a bit like tightrope walking. Some people naturally like this creative tension, and are attracted to it. These are not just thrill seekers - good designers use this tension as a source of energy, to make something special which they couldn't have done in a more relaxed situation.

But this kind of tension doesn't agree with everyone. Some like a safer world. The design students who have what psychologists call a 'low tolerance for uncertainty', tend to concentrate on their first solution and improve on it, instead of going through the uncertainty associated with a complete phase of idea generation. They never get around to producing interesting designs. We all know that initial ideas are often not the best ones.

BRAINSTORMING

The most popular creativity technique, brainstorming, aims to 'loosen the mind' to put forward wild associations which might lead to approaching the problem in a different and interesting way.

In a brainstorming session it is important to create an open atmosphere where people feel free to just throw in their ideas and associations. Anything goes, because it might spark some interesting connections. People are encouraged to build upon the ideas of one another, so the chain of thought profits from the various association patterns in the minds of the participants. The one restrictive rule in a brainstorming session is that people are not allowed to criticise each other's ideas. A fresh and mad idea is a brittle thing, that can be dismissed quite easily as being unrealistic or strange. A critical remark will immediately halt the flow of ideas. The whole session aims to get as many ideas as possible, good as well as bad.

Brainstorming is often used in isolation, as a trick to generate new ideas, but used in that way it is of questionable value to a design project. These sessions easily lose direction and might only result in completely unworkable ideas. Brainstorming sessions are really meant to be part of a multi-step process in which ideas are generated and selected. This begins with a special session that focusses on creatively analysing the design problem. This is crucial, because the impulse for innovation is in the assignment. Only assignments with open possibilities which contain some compulsion to make something new, will lead to novelty in the design.

That is why designers always try to meddle with the design problem, and also why design competitions are always won by the designers who did not really stick to the brief.

SITUATED CREATIVITY

In a study I did into the creative behaviour of product designers, there were some issues in the design assignment which, with the extra information provided, could easily be combined into a product idea.

All of the designers picked out these four issues in their exploration of the assignment, amongst the many other issues to which they had to attend. All nine experienced designers combined these same loose bits of information into the same idea, which they then reported as an original idea, a key concept in their solution. The designers were very enthusiastic about their concept, and were convinced that they were going to beat any competitors with this fresh approach. They experienced it as an emotional kick, a real 'aha' event.

It is interesting that they all seemed to think that their idea was original. Indeed it was original, in the sense that it was different from the existing product - it was also original and new to each individual designer. But the re-occurrence of the same idea, independently, in the minds of all nine designers suggests that it might have been an 'easy' step in originality - that certain kinds of information within the problem data brought up similar 'creative' concepts. Ideas are not always as original as they seem. It is worth checking where they came from.

INVOLVEMENT

It is important to get as close as possible to the subject of the design assignment. Design is a complicated problem solving activity where our first-hand experience, and the intuition that this creates, deeply influences the countless almost implicit decisions you make while designing.

It is a bit pompous to talk about the 'soul' of a design, but the personal involvement of a designer in what he designs is a great source of quality. My own most conscientious designs are some medical equipment I made after helping care for a family member at home. Not the most spectacular designs, but made with a very intimate knowledge of the needs and wants of people in such a situation. No hastily gathered 'research' can beat that.

The real core of a designer's thinking is always based upon his or her engagement and personal concern with the design, which comes most readily from the designer's own direct experiences. Of course, you cannot ask design students and designers to go looking for direct personal experiences for every new design project. But they should try to get into personal contact with people who have been in such a situation, and try to learn from their experiences. We can't remove ourselves too far from direct human experience and still create relevant designs. Head, heart and hand should all be involved in design.

EMPATHY

Empathy is the ability to project your personality into another person, to imagine 'standing in their shoes'. It is as close as we can get to really understanding someone else, and to appreciate what the other person is going through.

The ability to empathise is a real gift for a designer: it enables you to feel what future users of the design will experience. This feat of the imagination yields an incredible amount of information that can be taken into consideration before the design, or even a prototype, is made. It improves a design much more than any token 'usage scenario' or 'user research'.

And empathy can also be a great help in communicating with the stakeholders of the design project, such as the client and the production manager. If you are able to change standpoints, you can become aware of what drives them before a presentation meeting, and get an idea how they are going to react to the design. It might even help you to imagine how such a person sees you, as a designer presenting this design concept. This could help avoid or avert misunderstandings that often seem to accompany design projects. But of course, you should take care not to lose your own point of view in the process.

A third way in which I have seen empathy play a role in design, is that you can imagine that you are your design. Normally it is considered a fallacy to ascribe feelings and emotions to objects, but in design it can be useful to do so. OK, imagine you are your design. Where are you? What do you see? What is around you? Do you feel warm or cold? This provides a lively picture of the situation in which your design will exist. Some design schools and designers act out the use of the design.

To develop this empathic ability, you have to be a very good observer of people, so that you will start imagining what it would be like to be them. Being an avid caricaturist also helps a lot. If there is one lost cause that I would like to champion, it would be teaching caricature drawing in every design school. Most design students are completely oblivious to their fellow human beings, and just design for themselves. They miss a lot.

'THE QUALITY WITHOUT A NAME'

It is surprisingly difficult to pinpoint what constitutes a 'good' design. It has something to do with the way the design enriches our experience, and how we can relate to it.

Creating this kind of value, this human quality, is much more subtle than just making an object that does not break right away. We all know what are considered good examples of design in our particular field, be it a fine building, an excellent machine, product or good graphics. But what makes them intrinsically 'good'? This is a question that brings us closer to the realm of art than we normally are, and maybe nearer than we want to be.

A designer can easily avoid these difficult issues by just making mundane stuff that functions and looks attractive. But we know that there are higher values to aim for, also in design. To make things that people will not only use, but like, and perhaps grow fond of. **We know that some designs really affect people, and can be inspiring and moving at the same time.**

To achieve this quality, we must aim higher than just functionality or blind self-expression, towards a deeper (more universal) human value. This may sound vague and metaphysical. But I hope you recognise that there is something like Quality with a capital Q. Some objects manage to be intelligently made, practical, and good to relate to. They combine head, heart and hand in a striking fashion.

MOTORCYCLE MAINTENANCE

In 'Zen and the Art of Motorcycle Maintenance', Robert Pirsig describes how he drives through the US on a motorcycle, and how he lovingly keeps resetting the engine to the circumstances, tinkering with it and adjusting it.

He carefully works with his machine to get it just right, and describes the patience it takes as well as the pleasure it gives. Small repairs become creative challenges, and make him fonder and fonder of his own machine. Meanwhile he ponders the meaning of Quality, and the attitude of his fellow travelers toward technology. They see technology as an artificial and alien thing which interferes with people's lives and estranged them from a pristine and happy 'natural' state. They are of course immersed in technology, but hate it and do not know how to deal with it.

Meanwhile, Pirsig adjusts his motorcycle to be in tune with the road and the weather, and enjoys the quality of life you get from being in harmony with your machine.

DRAWING

Drawing is important in design. Not so much as a medium for making pretty pictures, but as the medium for visual and spatial thinking. You don't just draw an image that you already have in your head, you invent and construct images by drawing.

This makes sketching one of the key skills for a designer. And again, not so much the brilliant execution of complete images, but the production of ugly little sketches that help you think about your design. The kind of sketches that only you yourself will ever understand. Designers develop various kinds of drawing that have different levels of data. These range from a 'visual shorthand' when dealing with the general principle of an idea or design concept, to more elaborate sketches which are needed to figure out the form of the design, and on to complete sketches that are really meant for communication.

If you master all these sketching levels, you will command a visual language that is every bit as powerful as the spoken or written word.

The infamous 'writer's block' has its counterpart in the visual realm: the fear of blank sheets of paper. Most of us recognise this: you are all set to start sketching ideas... and nothing comes. In my own experience, just putting pen to paper and drawing a random line helps to break the spell. Just start, and your thoughts will develop. The act of drawing will clarify your thought.

However, there are many different styles of designers. Some are avid drawers, others make models or manage to design almost exclusively with words. Whatever you do, you need a medium in which you are fluent, so that you can put down your developing design ideas. If you cannot express your design, you cannot evolve your ideas.



EMERGENCE

The design tools we have been talking about are all based on getting your goals and priorities straight, by using functions or frames, and to guide your design process from there by using analogies or explicit design strategies.

However, design is more anarchic than that. In the heat of working on a design challenge it may easily happen that the set of proposed solutions suddenly develops a will of its own, suggesting the next steps to be taken, or even a complete solution. Things start to cohere and 'come together' in an almost automatic way. A solution emerges from nowhere.

This requires some openness to the possibility that a solution or idea might suddenly materialise, ready made, without anyone putting it in there. Many designers have reported this, for instance the furniture designer Geoffrey Harcourt: *'As a matter of fact, the solution that I came up with wasn't a solution to the problem at all. I never saw it as that... But when the chair was actually put together, in a way it solved the problem quite well, but from a completely different angle, a completely different point of view.'* What a designer needs in this situation is some creativity in recognising the solution, a readiness to look at the design in yet another way once it is finished.

Design literature is full of stories like these – some true, some probably spurious. But it is certainly true that, for instance, many products that have been designed for the handicapped have morphed into something else and found applications in major market segments. This chaotic element of design nicely undermines much of what is said in this book, which is all aimed at solving the right problem by coming up with the right solution. That is so exciting about design – you never know.

SIGN LANGUAGE

Design teams do not, of course, just use words to communicate. They use drawings, gestures and **body language** as well. This has caused problems for the development of **Collaborative Design Systems**. These computer systems support the communication of designers at different locations so that they can work together as a team.

Recently co-designing has become more and more important, since production is often done in countries with lower wages, while the design itself is still being made in the richer countries, closer to the markets. This means that design information has started to travel digitally across the world. Impressive computer systems have been developed which allow multiple designers to work on a drawing simultaneously – to gesture and point things out to one another with hands that are virtually suspended over a work surface.

These computer systems have become the ultimate design playthings, with cameras and fast connections which give the impression of really being present at the other location. However, recent research has shown – counterintuitively – that the narrower channels of communication actually result in better design work, because the designers are forced to be as specific as possible, and to cut down on the vaguer forms of design speak.

Even with these systems, though, the conventional wisdom still applies that distributed design teams need to be physically brought together at least once, to get to know each other, **in order to cooperate** successfully. If they know each other they will be **better equipped to pick up** the weaker signals that are so important in **design communication**, like the hesitation before an answer. This is particularly important in the case of cross-cultural design. It is impossible to design together if you are not acquainted with each other's cultures. The best way to give and receive criticism is very different in East and West.

TEAM ROLES

Design education has traditionally focussed on training individuals. But these same individuals will have to cooperate in design teams once **they finish** their studies. There is an obvious need to develop cooperative **working** skills, and a deeper question about the profile of the designers that are currently being educated. For teamwork you need design specialists who have a profound knowledge of one aspect of the design field. What you do not need are broadly educated 'universal' designers. A team of generalists will just get into each other's way. In team situations, you also need a special brand of designer that can act as project leaders.

A project leader has many roles to play in a design project. For one, he has to coordinate the planning and division of the tasks. That is not easy because **design tasks** are manifold and **very different in nature** and length. **What often happens** is that the designers with the **shortest** task will start **bothering the others** with their results. **As a consequence**, the designers with the **longest** (and often hardest) task will **be the ones that** are most often interrupted. It is also difficult to figure **out beforehand** which tasks will need the results of others to get under way, and what will be the longest chain of these dependencies. This 'critical path' ultimately determines the length of the design project.

Tasks are often assigned to team members in coherent roles, which they will **perform for** the duration of the project. For example, one person will be the '**information handler**', another will guard the design's essential requirements, a third collects ideas. We know that in the heat of any design project, all of these tasks will run together, with concept ideas typically causing the requirements to be refined or modified, which in turn creates a need for more information. But as long as it is clear who does what, these discussions will remain clear and efficient.

What you want to avoid in design team work is a situation in which several designers are actually doing the same task, together, and keep disagreeing with each other's moves at every step. Then design teams can be much slower than just working alone.

INNOVATION MANAGEMENT

The innovation process has many steps, from the development of a new company policy and strategy, to the consideration of the product portfolio, down to the nuts and bolts of the design process and the introduction of the design to the market. This process is often mapped as a linear scheme with boxes and arrows, like an extended version of a design process.

The difficulty in these larger innovation processes is that, in contrast to design processes, which tend to take place within a design department or design agency, the different stages of the innovation process are done by different people at different levels in the company hierarchy. And the roles of the departments relative to one another are not fixed: they need to change dramatically in the course of the innovation project. Marketing, for instance, should move from an initial qualitative analysis of opportunities and threats to the creative role of exploring new markets. This prompts another analysis to set the product-market criteria, which moves into developing a marketing plan for the product. And in between are a number of design-driven phases where marketing is in a vague consulting role (and should, by the way, not keep shooting down concepts by constantly saying 'this will not sell').

The design role changes from the initial support of the policy making process (providing concrete ideas that help visualise the different policy options), to providing general design concepts as input for exploratory market research. Once that is done design takes the lead in developing the definitive design concepts, which have to be tested and embodied in close cooperation with the marketing and production people.

Needless to say, these different roles that require such various amounts of engagement and responsibility are difficult to play in one and the same project. The one time you are a creative visualiser, the other time a consultant, then the lead party responsible for the core of the project. Making a mistake in the role you play, for instance pushing a favourite design concept while the market is still being explored, can be counter-productive.

DESIGN MANAGEMENT

A company needs to express itself in a coordinated way. This used to be modestly called house-style management, which involved things like the style of business cards and printed letterheads. House-style management would typically include the production of big fat house-style manuals full of rules to be zealously policed.

But lately companies have realised that a strongly expressed identity may grow to be a 'brand', and be seen as an almost human entity by the market. Brands can be a very effective platform for market communication, and are considered valuable money-earners in their own right.

But how do you make a brand? Building a clear picture of a company is something of a holistic enterprise, which involves many departments: Management, Marketing, Publicity, Graphic Design, Product Design and possibly Service Development. To get all of them to express a coherent message requires a lot of coordination. This difficult task has given rise to a comparatively new discipline: Design Management.

Design Managers operate between all the above departments, shuttle-wise. They guard the expressed identity of the company and develop its brands by steering the work in the departments. They try to be the glue that holds together the companies' self expression.

They exert a far-reaching influence on the 'creative departments' of a company, based on the importance of company identity and branding. The 'creative departments', including the design department, don't always like that. Their reflex is to always struggle to maximize their design freedom. But there are advantages to having a strong design management too. As a designer, you may notice that companies with good design management are much easier to work for efficiently. They do not need to use your design concepts to discover what they really want.

FORGOTTEN STEPS

Considering how much time and effort (including hugely expensive consultancy hours) is spent on the formulation of company policy and strategy, it is surprising to see how little effort is made to translate these general policy statements into concrete design briefs in a valid way. People become enchanted with policy statements and forget to translate them into reality.

Design briefs tend to be based on some general idea that has emerged from nowhere, accompanied by a statement that this product-to-be will help attain company goals. Clearly, there is a step missing here.

To really make a well-considered connection between policy and design, you need to enter a kind of pre-design process, a creative analysis of possible design directions and preliminary (qualitative) market research. The goal of this process is to determine what general features the product should possess to reach its market goals, and to further the ambitions of the company.

You have to creatively translate the company policy into a design brief. This can be done without first designing the product. The translation process results in rather vague product descriptions, like we need a 'something' with these and these properties. This is a blurry statement, containing some basic ideas and general specifications, which should leave plenty of room for the designer. Still, designers do not always appreciate this. They see it as part of their job to question all the assumptions behind a design brief, and try to squeeze out as much freedom as they can.

But there are many advantages to designers if the translation has already been made. A well-executed translation of policy into design brief can give confidence that the designer is working on the right product. Right for the market, and right for the company. There are few more thankless jobs in this world than that of a designer working on a design that is based on an ill-conceived design brief. The product will inevitably fail, or fail to live up to expectations. And in the end the designer, as the most visible contributor to the product, will be blamed for its failure.

SKUNKWORKS

As a designer, you are involved with just one of the processes that will lead to a new activity of the company. There are other things that need to be developed in parallel: the organisation of the company might have to be changed, the market has to be scanned and addressed in novel ways, the production and distribution has to be adapted, sometimes overhauled completely. There are many vital connections between these changes in product, market, organisation and production, and overlooking one of these links can put the whole innovation in jeopardy.

People have tried to control the innovation process by first developing it at a kind of test site, outside the main organisation. The official term is 'skunkworks'. By using such a breeding ground, you can at least avoid having the development problems and implementation problems all at the same time. This special innovative cell can also be used to train the people who will implement the change within the 'real' organisation. This works reasonably well, although the breeding grounds tend to become much too innovative, and drift too far away from the main company to be of any real influence. Skunkworks then become little satellite companies all by themselves. They are fun, though. The ultimate playgrounds for designers.

ROLES FOR DESIGN

Design can play a role in shaping the future of our society. The larger processes of societal change are often seen as inevitable, almost as natural processes that beset humanity. And it is true that these processes are difficult to start, stop or steer. They are also much too complicated to design directly: they involve complex technical, social and cultural issues over long periods of time. It is hard to imagine what a country will look like in twenty years.

Yet, these large scale processes can be moulded. In Holland right now there is an issue of agriculture disappearing from some parts of the countryside, to be replaced by 'nature'. There are pilot projects underway to see how this transition will work, what the change will mean to the community and how the more intensively concentrated forms of agriculture can be redesigned (as industries, not as farms) to avoid a negative impact on the environment. Our influence on the landscape is total. Therefore, we need to start thinking about it as a design problem. This does not mean that we can design the future completely, but it means that we have to use design thinking to avoid the unwanted consequences of our decisions.

The solution-focussed strategies of designers are incredibly valuable for raising the right issues and making scenarios of things to come. Design is not just about the creation of things, it is a way of thinking that can help to shape the future.

DESIGN VERSUS THE REAL WORLD

While design is related to our hopes for the future, it must also combat defeatism about where we are heading. Humanity is realising the global scale of its impact. We have reached the limits of our planet.

Visionary designer and design educator Victor Papanek published 'Design for the Real World', back in 1971. In this book he criticised much of the consumerism he saw around him, and in projects demonstrated how one can design things that are better for the world: improved quality, longer lasting, and addressing the real needs of people. As an example he pointed to a whole array of low budget products that were especially designed for the developing world. Not naive, well intended designs for 'those people down there' but clever products that are better suited to the local circumstances.

He also recognised that as a single designer you are powerless against major developments like the depletion of fossil fuels. But the fact that such problems are so overpoweringly huge doesn't mean that the solution may not lie in many small design improvements. Papanek passionately urges his readers to make their profession part of the answer to these problems. This brings a whole new set of criteria to any design project. Of course it is easier to ignore this appeal, and to remain part of the problem.