motor car is a wonderfully sophisticated design solution to the problem of personal transportation in a world which requires people to be very mobile over short and medium distances on an unpredictable basis. However, when that solution is applied to the whole population and is used by them even for the predictable journeys we find ourselves designing roads which tear apart our cities and rural areas. The pollution which results has become a problem in its own right, but even the car is now beginning not to work well as it sits in traffic jams! This is a very dramatic illustration of the basic principle that everything we design has the potential not only to solve problems but also to create new ones!

The design process

1 The process is endless

Since design problems defy comprehensive description and offer an inexhaustible number of solutions the design process cannot have a finite and identifiable end. The designer's job is never really done and it is probably always possible to do better. In this sense designing is quite unlike puzzling. The solver of puzzles such as crosswords or mathematical problems can often recognise a correct answer and knows when the task is complete, but not so the designer. Identifying the end of design process requires experience and judgement. It no longer seems worth the effort of going further because the chances of significantly improving on the solution seem small. This does not mean that the designer is necessarily pleased with the solution, but perhaps unsatisfactory as it might be it represents the best that can be done. Time, money and information are often major limiting factors in design and a shortage of any of these essential resources can result in what the designer may feel to be a frustratingly early end to the design process. Some designers of large and complex systems involving long time-scales are now beginning to view design as continuous and continuing, rather than a once and for all process. Perhaps one day we may get truly community-based architects for example, who live in an area constantly servicing the built environment as doctors tend their patients.

2 There is no infallibly correct process

Much though some early writers on design methodology may have wished it, there is no infallibly good way of designing. In design

the solution is not just the logical outcome of the problem, and there is therefore no sequence of operations which will guarantee a result. The situation, however, is not quite as hopeless as this statement may suggest. We saw in Chapter 6 how it is possible to analyse the structure of design problems and in Part 3 we shall explore the way designers can and do modify their process in response to this variable problem structure. In fact we shall see how controlling and varying the design process is one of the most important skills a designer must develop.

3 The process involves finding as well as solving problems

It is clear from our analysis of the nature of design problems that the designer must inevitably expend considerable energy in identifying problems. It is central to modern thinking about design that problems and solutions are seen as emerging together, rather than one following logically upon the other. The process is thus less linear than implied by many of the maps discussed in Chapter 3, but rather more argumentative. That is, both problem and solution become clearer as the process goes on. We have also seen in Chapter 6 how the designer is actually expected to contribute problems as well as solutions. Since neither finding problems nor producing solutions can be seen as predominantly logical activities we must expect the design process to demand the highest levels of creative thinking. We shall discuss creativity as a phenomenon and how it may be promoted in Part 3.

4 Design inevitably involves subjective value judgement

Questions about which are the most important problems, and which solutions most successfully resolve those problems are often value laden. Answers to such questions, which designers must give, are therefore frequently subjective. As we saw in the discussion of the third London Airport in Chapter 5, how important it is to preserve churches or birdlife or to avoid noise annoyance depends rather on your point of view. However hard the proponents of quantification, in this case in the form of cost-benefit analysis, may argue, they will never convince ordinary people that such issues can rightly be decided entirely objectively. Complete objectivity demands dispassionate detachment. Designers being human beings find it hard to remain either dispassionate or detached about their work. Indeed, designers are often distinctly defensive and possessive about their solutions. Perhaps it was this issue above all else that gave rise to the first generation of design methods; designers were seen to be heavily involved in issues about which they were making subjective

value judgements. However, this concern cannot be resolved simply by denying the subjective nature of much judgement in design. Perhaps current thinking tends more towards making the designer's decisions and value judgements more explicit and allowing others to participate in the process, but this path too is fraught with many difficulties.

5 Design is a prescriptive activity

One of the popular models for the design process to be found in the literature on design methodology is that of scientific method. Problems of science however do not fit the description of design problems outlined above and, consequently, the processes of science and design cannot usefully be considered as analogous. The most important, obvious and fundamental difference is that design is essentially prescriptive whereas science is predominantly descriptive. Designers do not aim to deal with questions of what is, how and why but, rather, with what might be, could be and should be. While scientists may help us to understand the present and predict the future, designers may be seen to prescribe and to create the future, and thus their process deserves not just ethical but also moral scrutiny.

6 Designers work in the context of a need for action

Design is not an end in itself. The whole point of the design process is that it will result in some action to change the environment in some way, whether by the formulation of policies or the construction of buildings. Decisions cannot be avoided or even delayed without the likelihood of unfortunate consequences. Unlike the artist, the designer is not free to concentrate exclusively on those issues which seem most interesting. Clearly one of the central skills in design is the ability rapidly to become fascinated by problems previously unheard of. We shall discuss this difficult skill in Part 3.

Not only must designers face up to all the problems which emerge they must also do so in a limited time. Design is often a matter of compromise decisions made on the basis of inadequate information. Unfortunately for the designer such decisions often appear in concrete form for all to see and few critics are likely to excuse mistakes or failures on the grounds of insufficient information. Designers, unlike scientists, do not seem to have the right to be wrong. While we accept that a disproved theory may have helped science to advance, we rarely acknowledge the similar contribution made by mistaken designs.

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