the key skills required for creative design. Indeed it may even be the case that a creative reframing of the situation allows for a new view in which the various lines of thought can be incorporated into one single higher level set of ideas. The ability to think along parallel lines, deliberately maintain a sense of ambiguity and uncertainty and not to get too concerned to get to a single answer too quickly seem to be essential design skills.

Evaluating

1 Objective and subjective evaluations

Right back in Chapter 3 we looked at some proposed maps of the design process and found them all wanting in some way. However many of them included a phase of evaluation which surely must be there in design. Not only do designers generate alternatives between which choices must be made but also they must know, rather like an artist, when to stop. Cleary then designers must have evaluative abilities. In some aspects of design this can be considerably aided by technology when numerical criteria can be set, for example the energy consumption of a building. However as we saw in Chapter 5, design characteristically involves making judgements between alternatives along many dimensions that cannot be reduced to a common metric. Designers must then have a very particular evaluative skill enabling them to feel comfortable about arriving at such tricky judgements. I know many excellent design critics who are not all necessarily very good designers themselves. As with all the factors summarised in this chapter, some designers are better than others at some of these skills. One often for example finds in a school of design students who will go on to become highly creative, respected and high achieving original designers, nevertheless being usefully taught by tutors who perhaps themselves have never reached such productively creative heights themselves but who are excellent critics.

Designers must be able to perform both objective and subjective evaluations and be able to make judgements about the relative benefits of them even though they may rely on incompatible methods of measurement. Indeed designers may develop their own particular tools for evaluating designs against the criteria that are often important to them either because of the kinds of objects they frequently design or because of the guiding principles they have developed.

2 Suspending judgement

Undoubtedly one of the skills that a designer must have here is to also be able to suspend judgement to allow creative thought to flow and ideas to mature before they are subjected to the harsh light of penetrating criticism. Extremely talented and creative designers are not always very helpful when teaching students as they sometimes fail to appreciate just when and how to do this for a particular student and instead just impose their own ideas and process. Knowing when and how to evaluate as an individual, in groups, and design teams is a core design skill. It may not be the glamorous part of designing but getting it wrong can be very damaging to the process.

Reflecting

1 Reflection in action

Since Schön introduced the idea of the 'reflective practitioner' there has been much more recognition of the importance of this concept of reflecting upon actions. In design at least this seems to be open to two interpretations which we might call 'reflection in action' and 'reflection on action'. The concept of reflection in action is already covered here by combining our formulation, moving and evaluation activities. With such a model the designer is more or less continually reflecting on the current understanding of the problem and the validity of the emerging solution or solutions.

2 Reflection on action

Reflection on action can be seen as higher level activity in which the process is monitored rather than the state of the design. Such a concept clearly involves a mental 'standing back' and asking if the process is going well or might be steered differently. Again the concepts of recognising situations, knowing that certain approaches may be useful in those situations and having a set of skills to carry these approaches out all come into play here. The design constraint model introduced in Chapter 6 may offer some assistance here, as may the model introduced in this chapter. Thus reflection on action can be seen as a combination of asking which problems have been examined and which have been neglected, and then of asking if the processes involved in representing, formulating and moving have all been brought to bear on the case. Again this is a skill and an attitude that is not necessarily easily acquired or remembered.