CHAPTER 10

DESIGN MAPPINGS: DESIGN RULE DERIVATION AND USE

1. Mappings and their Inverses

Theory supplies statements that are analytic and categorical, while design needs statements that are conditional and prescriptive. How then do the latter derive from the former? An analytic statement is of the form: if a is true, then b is true. It asserts that the truth of a makes b also true. As the conclusion of an analytic theory, it asserts that a causal relation exists between the two truths, or that the truth of a causes b to be true. From this statement, if a then b, (which is its short form), one can easily derive the statement: if you want b to be true, then make a true (if b then do a is its short form). There is no complicated issue here. It is also clear that one cannot properly derive the rule: if you do not want b to be true, then make a not true. From theory to a rule of behavior is one simple step. If however, the theory contains other statements involving a and b and maybe c and d, then the step from one analytic conclusion to a design rule becomes a little more difficult.

Suppose the theory has two conclusions as follows:

1. If a then b
2. If a then c.

One can still derive the action or design rule which states that if you want b then do a (if b, then do a). But what if the one wants b to be true and c to be not true? Now the first part of the derived prescriptive rule that is relevant is: if b and not c. From the theory it is clear that to follow this with do a is not possible, that is, it is a bad rule, because following it will produce b and c, which is not wanted, and will not produce b and not c , which is wanted. If the two conclusions were all the theory we had, then no action rules of use to the actor who wanted b and not c could be derived from it. This actor may now return to the theory and work on expanding it. A new conclusion might be:

3. If k then b.

Now, of course, from the theory we can get the prescriptive rule if b then k. This addresses the need for b, but does not do anything for the need for not c. The theory is still not adequate for the needs of the action taker. One can get a rule of use from the theory, but one cannot get all the rules from it that one wants to.

Suppose the theory had the two following conclusions:

5. If a then b
6. If m then not c.

From this one can derive two rules that are useful to the actor who wants b and does not want c, that is, wants not c:

If b do a

If not c do m.

As a last simple case, imagine the theory to have the two conclusions:

If a then b

If k then b.

The actor is interested in b. Two rules may now be derived:

If b do a,

If b do k.

Now the actor has a choice and realizes that doing a or doing k is not a matter of indifference to him. The theory is not adequate for his needs.

When a theory has a large number of analytic and categorical conclusions of the if-then kind, it is a rich source for prescriptive statements or rules of behavior. But the more the conclusions there are in the theory, the larger the combinations of these which may be used to derive rules. From conclusion to rule is no easy step. Our theory does have many conclusions at each step from structure to performance and from there to outcome. It is not easy to use the theory to derive the design rules we seek.

2. Deriving Rules of Structure Design

The theory developed earlier has many conclusions at each stage. It is also a partial theory, in that conclusions are simple ones with only one or two of the many possible variables included in any one conclusion. There are very few of them that have complex forms, such as, one which states: if a and b, then c and not d, for example. Most conclusions are unitary ones that say if a then b. Even so, combinations of conclusions may yield design rules not obtainable