ARCHITECTURE AND THE SOCIAL SCIENCES
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Abstract

Studies in design methodology have occupied most of the attention given to problems of design teaching in recent years. These studies have dealt with the process of design in a rather narrow area, which has re-inforced the tendency to consider the teaching of design as an independent activity from other parts of the course in schools of architecture. Consequently, any attempt to bring together material in contact with design and studio work has taken place on a personal scale, and failures have been put to lack of aptitude or interest. The present study has been made as a result of curiosity and interest in the teaching of other courses, in the attempt to bring to the student some understanding of the nature of that work, of the process of decision-making, and of the factors involved in the choice of the general area of building. It is possible to study such a situation in a systematic fashion, and the results of this study will be used to indicate the nature of the general area of building.

These points provide an outline for a research on the application of a conceptual framework devised as the basis for a course in architecture. The principle of reference in the framework e.g., relation, structure, model and system, are briefly defined to allow for discussion of the possibilities and shortcomings of the framework. The paper concludes with observations on the experiment and a statement of some of its implications for the teaching of social sciences in schools of architecture.

Teaching of design and social sciences

The experienced architect might be convinced that his conception of architecture takes account of a multitude of factors, among them social factors. But it can hardly be argued that the structure of our curriculum in schools of architecture either manifests or generates a properly integrated conception. Integration depends on the relationship of the courses around the design module to the design. The increased awareness of the need for courses in social sciences calls for a clear view of this relationship. The effectiveness of a course depends on this relationship and does not automatically follow from its general reference to architecture. In the absence of an effective use in the design process any reference to social sciences can amount to little more than an isolated rationality in the form of analysis, or even rationalisation.

The questions involved in such misapplication of information go beyond frequent cases of sheer misconception or 'pure enthusiasm', although as Hardy has pointed out they have affected use of social theory in architecture to a large extent. (Hardy, p.146)

The more fundamental reasons lie in the dynamics of the design process where some information can be accommodated and not others. Architects must respond to design实际情况, and the questions involved in such implementation. The prime aim of this report is to provide a context for exchange of views in these questions. The major premise is that these questions can be explored formally rather than as questions of opinion.

The problem of social sciences in design can be distilled to another and from one form to another e.g., from sociology to architecture; and from pure to applied is not a new problem. Early developments in science exemplify this transference in its various aspects. Converging developments among the sciences during the 17th century give examples of this process. Nowadays such interdisciplinary communication forms a major part of our intellectual activity in science and in the arts. The result of this process in science has led to an accumulative body of common information - general theory. In the arts the process has stayed within the limits of individual experience. So far as a problem is limited to a few individuals it might be quite satisfactory to leave it at this level, but in today's educational context it is of a large enough scale and of sufficient importance to merit systematic studies. If such studies are possible, aimed at developing generally applicable methods. Any such study would have to be based on a clear view of the flow of information in the design process and the structure of information in different disciplines.

Design requires the use of concepts, as well as atonic data. It cannot take place merely as a result of the accumulation of facts and correlations between facts. The rule of concepts in this process is similar to the rule of hypothesis in the development of scientific theories. The attempt to treat the design process solely on the basis of facts finds its counterpart in science in the 17th Century attempts by Francis Bacon to develop theories based on an orderly arrangement of evidence. (Bacon, p.539) or to similarly mistaken views that scientific measurement for its own sake can lead to hypothesis. (Hume, p.83)

Design does not involve a deterministic process. It cannot be treated as an abstract discipline. It is a process which relies for its actualisation on contexts within other fields. It involves logical and a-logical decisions, and objective as well as subjective information. This diversity in the types of relevant information, and process of decision making is characteristic of all creative fields. (Fig. 1)

The sources of objective information are obviously the scientific fields. We shall discuss the conditions for use of this information under two criteria:

1. state of information
   a. pure
   b. applied

2. structure of information
   a. data
   b. concepts

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Diagram 4 shows how any total design process involves the recurrence of both these sub-processes. (Fig. 4) Information in data form can be incorporated in the analytical stages. But to affect the design fundamentally, it must form a part of the conceptual framework, which can be seen as an hierarchical structure of concepts.

Communication between two fields takes place at different levels of this structure and depends on some degree of interaction between them.

Absence of such a structure in a field causes a gap in systematic communication between two fields which cannot be bridged with the subjective content of understanding and experience. The high lights the need for a conceptual framework in any attempt at systematic communication between two fields.

Procedures for attempts to formulate such a framework in architecture are centred around an entity - the work of architecture - and its qualities, rather than on concepts and relationships which would meet the interdisciplinary function. This is a common characteristic of all fields in their initial stages of formal development. One of the fundamental variables in this development is the mode of communication ranging from personal to inter-personal, disciplinary and interdisciplinary levels. This mode may be taken as an index of formalized development of a field. Clearly any subject must reach some degree of formalization before it will lend itself to rigorous teaching.

A framework which could meet the interdisciplinary function would need to accommodate two types of relationships;

1. Inter-disciplinary
2. Intra-disciplinary

The following points can be listed as secondary conditions for such a framework:

1. Its terms of reference should be clearly and rigorously defined. They should not allow for vagueness.
2. Its terms of reference should make distinction possible between allowable and non-allowable discourses, (distinction between areas which can and cannot be properly discussed).
3. It should be stated in terms of the basic and not the composite concepts of the field.
4. It should clearly define the relationship between the basic concepts of the field, independence, dependence.

Conditions such as these were used, more or less in this form, as a guide to the structure which is presented in the following section as a test case. The structure was developed as the basis for the first year architectural course subsequent to studying an interdisciplinary study group concerned with relevance of concepts in mathematics to architecture. The principles of reference were relationship, order, component, structure, form, complexity, model and system. These terms were defined in their philosophical sense rather than their accepted architectural usage. The former dominated the latter. Exercises were devised to ensure a clear understanding of their significance in order not to rely on a merely verbal acquaintance. These exercises replaced what is normally regarded as a basic design course.

The following are brief definitions of the principle terms:

ORDER
A relation between two or more components. A set of terms has all of which it is capable. (Bussell p. 29.)

COMPONENT
That part of the form which can generate a new form under a given ordering principle. A form may be defined in terms of several groups or components. A component is itself a form.

STRUCTURE
The combined patterns of ordering principles in a form.

FORM
A pattern perceived as a total entity (a real form). Only analytical forms are capable of exhaustive description. A form is a set of total data, but by its components and structure is an analytical form, e.g., a group of numbers. Form increases in complexity with the increment in the number of its different components and ordering principles.

COMPLEXITY
Is defined in direct proportion to ordering principles and components. A form may be conceptually complex but perceptually simple. Complexity is related to the level of description and has no independent value.

MODEL
An abstraction of a form related to one or more aspects of it. A description of a form is a model of a form. Any ordering system corresponding to a form is a model of that form. No model of a form is identical to the form. Only analytical models are capable of exhaustive description. Any model can itself be regarded as a form (Fig. 5).

SYSTEM
A network of inter-related components within given boundaries. Extensive definition of this term was left to elaborate works on systems theory. Any model as defined above is capable of being considered as a system.

Due to limitations of this paper the comments on the various aspects of this experiment must be limited to a few points:

It allows for inclusion of precise as well as imprecise, numerical as well as non-numerical - the quantified and the non-quantified - information, it would be possible to evaluate this framework in terms of the general systems terms of reference. (System, structure, relation, state of system etc. Mesarovic, pp. 1-23.)

In a field such as architecture where most problems are not critical within numerically precise limits it is important that the framework should be capable of dealing clearly within such imprecision.

It was possible to recognize the fallacy of a design framework which by intention or default developed on subjective grounds. The model, however, avoided these circumstances to treat design as experimental investigations based on the implementation of analytical models resulting from the analytical stage. Information from other disciplines such as environmental design, structural mechanics of sociology form the contents of the analytical models. Thus design becomes a teaching medium for parts of these subjects as well as means of developing a valid approach to problem solving. This is a variance with the presently practiced conception of design exercises. The most relevant observations to the present discussion were as follows:

1. The instructors and the students, found that it required conscious effort to maintain the holistic approach in discussing the developing of the design. The urge to repeat existing idioms and obvious solutions often led to disregarding the point that the problem was not a traditional architectural design problem.

2. Little of the information from the other courses could be directly used within the proposed framework. They dealt with single variables and lacked the necessary holistic approach.

3. The implications of the second point for the curricula given to schools of architecture are clear, especially those courses such as social sciences for which there is yet a pattern to evolve.

Critical views of social sciences suggest that in their present stage they do not lent themselves to as much interdisciplinary contribution as one would expect.

In view of developments in general systems theory, one might look to them as a ready source of solution. But as we have demonstrated in the case of architecture this is not merely a case of restructuring old information. The following comment by Walter Ryckey points to one dimension of a common dilemma:

The greater part of current discussion of systems in architecture is embarrassing to say the least and is out of date in the light of modern systems research in other disciplines. Though there is a fair amount of superficial and incorrect use of the terminology (it is almost de rigoer to mention "boundary maintenance", input-output, "Cybernetic concepts" etc. feedback, and the like), the underlying concepts show little advance over the mechanical equilibrium model of earlier centuries. (Ryckey p. 7.)
Stage 1

Areas in 'A' are not subject to logical discourse, e.g., poetry.
Areas in 'B' are subject to logical discourse, e.g., fields of science.

Stage 2

Stage 3