

Tomonori Toyama
Aspects of Design Semiotics
Studies of Design Semiotics as a Design Methodology

The following is a further development on the articles "Advantages of Charles Peirce's Semiotics for Design Science" and "Basic Problems in Design Semiotics" in *Seisan-Kenkyu*, Vol. 28, No. 12 (monthly journal of the Institute of Industrial Science, University of Tokyo).

Even if present design methodology appears not to be sufficiently developed as a science, it does not necessarily follow that designing is unscientific. The difficulty consists mainly in its explanation because designing has a close relationship to human thinking. It is hoped that design semiotics will extend the efficiency-span of design methodology through its approach which is, to use Charles Peirce's term, the logic of the Triadic Relation (1965: 2.242) wherein something (i.e. a Sign) mediates human activity and its object. In this sense design semiotics could be seen to be a development of systems engineering based on the diadic relation of man-machine systems. Accordingly a design object (which I call an architecture) is understood as a sign complex and its transformation representing human thinking.

1. Basic Semiotics as a Science of Design

The meaning of the Japanese word "KIGŌ" in its usual usage (corresponding to "sign" in English) is not so wide as the meaning of "Sign" as defined by Charles Peirce (1965: 2.228, 2.242). The definition of KIGŌ in one of the best Japanese dictionaries, the *KŌJIEŪ*, is as follows: 'a general term of letters, characters, etc. representing a particular thought; specif., a class of characters as opposed to letters; language is also regarded as a kind of KIGŌ'. If we look up the word KIGŌ in any old-time dictionary, we will find only the words 'a class of characters or symbols'. In fact, before the Meiji era (1868–1912) people usually used the word "SHIRUSHI" instead of KIGŌ. The word SHIRUSHI still signifies extremely varied things: seals or impressions, tally sticks, marks, omina, evidence, effect, notice, flag design, symptom, etc. — all of which are represented, in their specific meaning, by different ideograms. For instance, we cannot find the word KIGŌ in the *KOJIKI* (the first significant work of Japanese classical literature) but we often find the word SHIRUSHI in varying significance. I have not yet found the exact time when ordinary people started to use the word KIGŌ in addition to SHIRUSHI. However, we may assume this to have occurred most likely at the time when European mathematics and chemistry were introduced to Japan at the end of the 19th century. Signs and symbols in mathematics and chemistry were often called KIGŌ, whence the word spread. As the word KIGŌ was adopted, the use of SHIRUSHI became to be more or less limited to signifying something like the characters +, -, x, ÷, etc. At the present time the significance of KIGŌ as that of its English counterpart "sign" has been extended by modern semiotics.

The universality of Peirce's sign definition is of great advantage in the application of semiotics to design. In designing we use various kinds of design tools: language, diagrams, drawings, scales, dimensions, modules, standards, charts, graphs, models, regulations, etc. According to Peirce's definition (1965: 2.228, 2.242), we can regard all of them as Signs because of their function and performance within the Triadic Relation of a Sign. Designs and design objects are, in turn, signs and form Triadic Relations in their design situation and environment. Thus, we can construct a logic of design based on the Triadic Relation of a Sign found in design thinking and design activities. If a sign were to be limited to language alone, Dynamical Interpretant, Normal Interpretant, and Dynamical Object (Peirce, 1965: 8,343) being omitted from semiotic consideration, the logic of design must become a very limited one. I am of the opinion that Ogden and Richards' "reference" (1972: 9) corresponds to Peirce's "Immediate Object" (1965: 8.343), for Ogden and Richards explain the "true symbol" as a symbol which correctly records an adequate reference (1972: 102), and it is difficult to put in the same category the "reference" recorded in a symbol and the "Interpretant" which is the performance of a sign. I also think that Ferdinand de Saussure's "signifié" and "signifiant" (1975: 99) correspond to Peirce's "Immediate Object" and "Immediate Interpretant" (1965: 8.343) respectively. At the present time only Peirce's semiotics covers the whole of design phenomena.

Peirce's semiotics is based on dialectic categories leading to his definition of Sign and its classification. This is another reason for the universality of his sign concept which is of considerable advantage in its application to design semiotics. A contemporary Japanese philosopher, Shunsuke Tsurumi, compared Peirce's sign concept to measurement of thoughts (1950: 86). According to Peirce's sometimes inconsistent usage of his categories, we can find several sets of categories in design phenomena: 1) stages of conception — stages of design process; 2) correlates of conception — aspects of design objects; 3) relations between the correlates — factors of briefs of design objects; 4) characteristics of the correlates or the relations — elements of design solutions. It is also of some importance to design semiotics that Peirce's categories refer to evolutionary thinking which is of the same order as the design process through which mere ideas, qualities, or possibilities are come to life and form new environments. This is assured by the "Interpretant" which is also a Sign in its capacity to some possible Interpretant (Peirce, 1965: 2.228, 2.242) and which can be separated into Immediate Interpretant, Dynamical Interpretant, and Normal Interpretant (1965: 8.343).

I have been beginning to study Peirce's semiotics as a basis of design semiotics because of its abovementioned universality, though much more studies of other semiotic theories and of the history of signs and sign concepts and their relationship to design and culture will be necessary.

2. Semiotics as a Guide to Designing

At the first stage design is a plan which a designer creates by means of design tools. Such a plan is distinguished from an actually designed object (i.e., particular housing, product, etc.). Objects of production activities are the actual manifest form and the design acts as a mediating Sign. In regard to its use the particular actual manifest form in turn acts as a Sign. Therefore in design situations we find three Triadic Relations and three kinds of Signs, namely, design tool, design, and designed object.

These three combine into a chain of Triadic Relations (which I call a *sign sequence*) – Fig. 1.

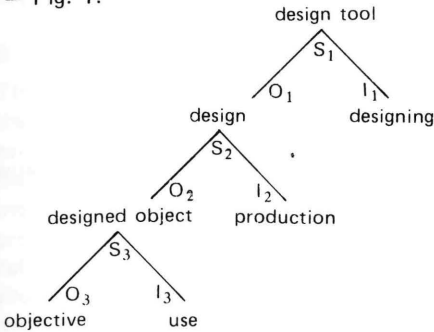


Fig. 1 A sign sequence in design situation

In this sequence the lower two Triadic Relations explain a design object. This suggests that it will be useful as a guide to designing to detect Triadic Relations and to arrange them into a sequence. We can discover several kinds of sign sequences other than that given in Fig. 1: Fig. 2 represents the process by which an Interpretant creates another new Interpretant; Fig. 3 represents the case of changes in the Object of Fig. 2; Fig. 4 represents a semiosis to evaluate an alternative design by measurement; Fig. 5 represents a semiosis of design tools which extract, embody and process design information. Some of these sequences may be equal to Prof. Bense's "Zeichenoperation" (1967: 10), though more examination is needed to qualify this comparison.

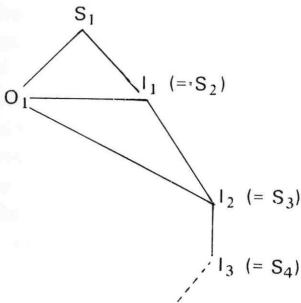


Fig. 2 Sign sequence of Interpretants to an Object

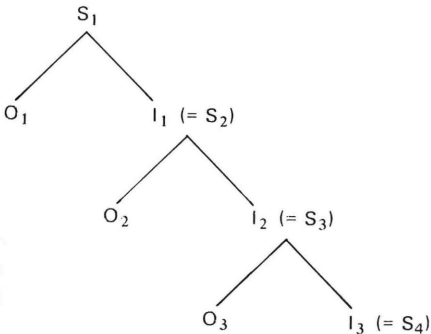


Fig. 3 Sign sequence of Interpretants to different Objects

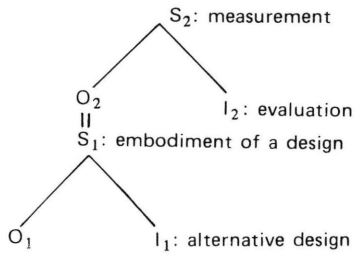


Fig. 4 Sign sequence of the evaluation of an alternative design

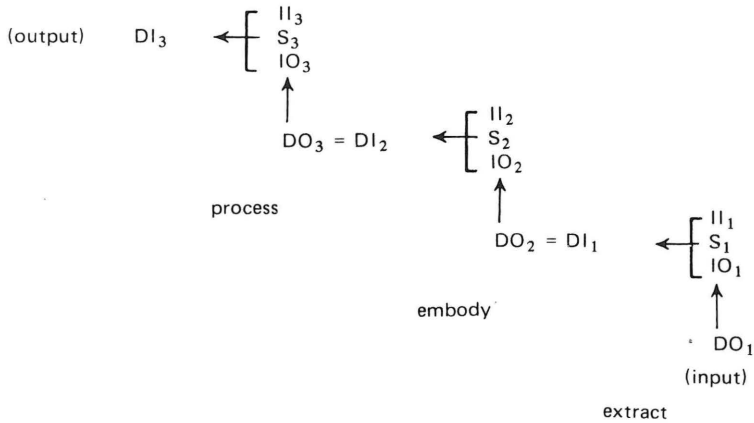


Fig. 5 Sign sequence of a semiosis of design tools (DO = Dynamical Object, IO = Immediate Object, S = Sign, II = Immediate Interpretant, DI = Dynamical Interpretant)

In such sequences a Sign is a vehicle of design information which architects and designers develop from Firstness to Secondness and Secondness to Thirdness (Peirce, 1965: 8.328). But such a generation of a Sign is only one aspect of their activity; designers often degenerate a Sign in their design activities such as simulation and decision making. Generation and degeneration are very important characteristics of *design information*. Design information differs from the usual concept of information which is almost the same as "knowledge" and can be calculated by the bit.

Collection and typification of the sign sequences and their development into transformational rules will lead to some *module* of design thinking. Previously (1977: Part One) I established the tree structure (comp. Fig. 1 and Fig. 3) of the design process: if we find a Triadic Relation in a design situation, it is an element of another Triadic Relation on a higher level. In this sense the Triadic Relation may be a universal module in design thinking. Some variant modules, however, may also be found through detailed studies of designing.

For these studies I have a tentative working hypothesis: guiding activities in the semiosis of designing may be articulation and categorization which could lead to serial categories as, for instance, "Form, Composition, and Function" and "Function, Performance, and Module". These two serial categories are analogous to Peirce's,

and are set up for the purpose of explaining the two types of present design concepts, i.e. user's design concept and designers design concept.

3. Semiotics in Design Practice

The present user participation movement in Japan has been brought about by the distortion following the intensive economical progress in the Sixties. This situation eventually exposed the self-conceit of architects and designers, in other words, the disunion of the three Triadic Relations of design situations (Fig. 1). Although housing systems should develop (freely) in housing environments, the present systems provided by the Japanese housing industry have been considered solely in economical terms. They are forced on the users and the users are asked to conform. In this situation the self-conceit of architects and designers is replaced by the interest of the capital. On the other hand, user participation has tendency to make housing systems develop. But in most cases the people concerned have no adequate channels of communication among themselves. In this situation, I think, it will be helpful and clarifying to regard the housing system as a sort of sign system which develops through mutual learning processes.

In the case of user participation in the development of the region of Kiba in Tokyo, there had been a stalemate for several years between the inhabitants of the region and the metropolitan government, before we, an independent group of researchers, took part in it in 1975. We found that it was necessary to raise or develop a form of communication between the two sides in order to establish Triadic Relations. But both sides had difficulties to communicate. Although the inhabitants did have ideas concerning the redevelopment of that region, they could not communicate them to the authorities. We therefore asked the government for data and presented the inhabitants' group with a semiotic table as a guide to develop the conceptualization of their ideas. The semiotic table was designed simply according to Peirce's categories: the horizontal axis consisted of Firstness, Secondness, and Thirdness; the vertical axis of Dynamical Object, Immediate Object, Sign, Immediate Interpretant, and Dynamical Interpretant (Fig. 6). This table separates the inhabitants' ideas into hope, question, and proposal and develop those ideas. After sufficient development the progress of the inhabitants' concepts will be represented on the table.

HOPE ⇕ QUESTION ⇕ PROPOSAL	objective	means	method	reason	effect
	objective	cause	inquiry	reason	answer
	objective	means	method	reason	effect

Fig. 6 Semiotic table for the inhabitants

I have a triadic science-evolution-model which consists of Description, Structure, and Logic Phases. Such a semiotic project as described so far can be expected to serve as a *measurement* of design thinking and design activities throughout all phases of this model: as a tool of description, as a modular structure, and as a logic.

It can also be expected to facilitate the measurement of architects' and designers' responsibility in design practice. In Japan the designer's responsibility, as well as that of the architect, has not sufficiently been established mainly as a consequence of unclearness about their function. In fact, if we try to describe design thinking in Japan we will instantly encounter great difficulties. It is difficult for Japanese people to understand the function of the architect and the designer. Which makes their opinion inefficient in social context. This may be because they have not endeavored to establish their own responsibility in the social system, because of their tendency to rely on their skills which are largely unknown to the general public. A fact that is accelerated by our lack of communicative channels to make their function clear to everybody. If we can develop a way, e.g. through semiotics, of describing their function and clarifying its structure logically we can also make clear the limit of their responsibility which lies in their role as specialists. This might bring discomfort or disadvantages for architects and designers, but it is obvious that the revolution of design in present socio-technological systems cannot be achieved by the architect and designer alone. Architects should not be almighty any longer.

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Summary

The concepts and orientations of the studies on design semiotics as a design methodology focusing on three problems, namely, general semiotics as a science of design, semiotics as a guide to designing, and semiotics in design practice. Peirce's semiotics is adopted mainly because of its universality, and developed into the theory of sign sequence which is a chain of the Triadic Relation of a Sign. These studies lead to the establishment of modules and to a logic of designing and are ascertained through application to design practice such as user participation.

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