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Volume 1 Article 6

1-1-1979

Social Science and Environmental Design: The Translation Process

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This essay was originally printed in the *Journal of Architectural Education,* September 1977.

Social Science and Environmental Design The Translation Process

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Both educators and practitioners have voiced considerable frustration concerning the application of behavioral research to environmental design. This "applicability gap" is evidenced in themes of annual Environmental Design Research Association (EDRA) conferences as well as in the more general environmental design literature. The "gap" has been discussed and decried and strategies have been proposed to eliminate, narrow or bridge the gap. There have been optimistic statements that we are now "beyond the gap" along with pessimistic warnings that we have stumbled into the gap.[1]

The purpose of this paper is to discuss the nature of the applicability gap and some of the reasons for its existence. The concept of "translation" is proposed as one strategy for narrowing the gap, and the role of translation techniques within the overall design process is considered. Several criteria for successful translation are developed and applied to some examples of translation in student work at Kansas State University.

Knowledge and Action

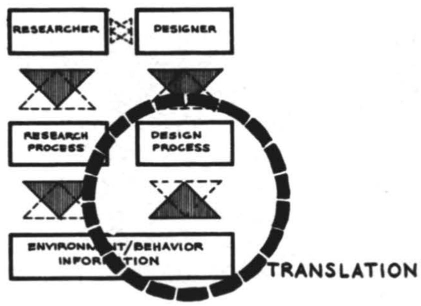
Problems of research application are not unique to environmental design. Difficulties in relating knowledge to action have been a recurring theme within the social sciences themselves. Social psychologist Kurt Lewin argued in an early work that "serious good will (must) be translated into organized, efficient action. Research that produces nothing but books will not suffice."[2]

The applicability gap is a persistent and prevalent phenomenon with both positive and negative implications. For example:

1) rapid application of questionable research findings leads to immature programs and policies which fail in their objectives. The fact that social science is not immediately applicable in design may encourage closer study, evaluation and screening of research for design.

2) The bulk of environment/behavior research will continue to be done by traditional social science disciplines because of a shortage of design-educated researchers. Their research information is likely to continue to be communicated in a form not likely to yield direct design relevant information.

3) Much of environment/behavior research is not situation



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specific and research findings are discussed as general conclusions. It is difficult for the practitioner, who may lack translation experience, to adapt these general conclusions to fit specific building types of settings.

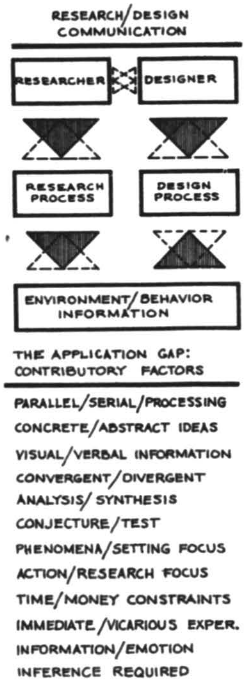
4) Few significant applications of knowledge in other fields have been made just because the information was in an already "useable" form. A great deal of sifting, integrating and testing of information by highly creative individuals has been necessary prior to the formulation of significant new applications. This phenomenon is also true of the design research field. Unquestionable information will not consistently be placed at the feet of the practitioner ready for application.

For these reasons it is suggested that the application will be with us for some time to come and that we ought to learn to live with it. This requires that both researchers and designers be able to translate research information into design criteria. If translation techniques are to assist in bridging the application gap it seems appropriate first to examine in greater detail those factors which contribute to its existence.

The Application Gap

One of the factors contributing to the "applicability gap" is the problem of researcher/designer communication. This communication process can be conceptualized under the following framework: the *participants* in problem identification and solution; the respective *processes* in which each is engaged and the nature of the *information* passed between them *(fig. 1).* Although participants, process and information are highly interrelated, some components of this communication process are more amenable to change, in response to problems of application, than others. Designers' abilities to modify the nature of the research process is quite limited. However, some impact can be made upon the design process by the appropriate sequencing of research-based information to be utilized in this process. Thus, the concept and techniques of translation are focused throughout the design process.

Ostrander analyzes the basic differences between the preferred modes of communication of researchers and designers in terms of a three-dimensional model.[3] The first axis of the model, "media," argues that designers prefer visual information while researchers prefer verbal information. A second axis deals with an abstract-concrete dimension of cognitive style in which designers are more familiar and comfortable with the abstract.



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DECISION SEQUENCES IN THE DESIGN PROCESS

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The third axis, "affective tone," ranges from "informational to emotional" with researchers preferring the informational, designers the emotional.

These differences result in a stressful and threatening situation when a designer/researcher collaboration is attempted. Defensive reactions such as sullen silence, evasion and apology may be seen on the parts of both parties. (figure 2)

Ostrander's proposals for the solution of problems of miscommunication take on two forms: *inter-personal* and *informational.* Inter-personal relations may be improved by a greater recognition and tolerance for differences in professional objectives. For example, the designer tends to be synthesis and product oriented while the researcher tends to be analysis and theory oriented.[4]

Informational solutions involve expanding one's range of modes of communicating, learning the merits of alternative modes, and combining modes to create redundancy in information presentation.[5] For example, Korobkin states that "Social science research will affect design only if it can produce information that can have significant impact on an architect's images."[6] Moreover, Kaplan argues that presenting information visually and spatially through highly simplified two-dimensional models, may also help to engage the user in an effective participatory design process.[7]

The Design Process

Solutions to problems of researcher/designer collaboration may also take other lines of attack, more rooted in the nature of the environmental design process itself. This section examines the process of environmental design, identifies some common misconceptions regarding the design process and provides insights into design process strategies for coping with the application gap.

Design is often characterized as a process beginning with "definition" and "analysis," and terminating with "decision" and "implementation." The early steps of the process, the programming phase, are viewed as simply information gathering, with significant decision-making delayed until the initiation of physical design. However, the decision-making sequence, from formulation to implementation, is actually cycled through many times throughout the design process. During program development, site selection and building design, each decision builds on the preceeding one[8] *(fig. 3).* Similarly, Lewin characterizes social planning as "a spiral of steps," with *each step* moving from the establishment of goals, and the implementation of successive steps of the overall plan.[9]

If the design process is viewed as only a single decision sequence, and the role of research as simply providing answers, then much of the value of social science research in the definition of objectives and the evaluation of decisions is lost. Hillier et al extensively critique the "analysis/ synthesis" concept of design and dispute two widely held beliefs: "first, that the role of scientific work is to provide factual information that can be assimilated into design; second that a rationalized design process would . . . proceed by decomposing a problem into its elements and synthesizing a solution. . ."[10] As a consequence, designers are then left to make their own links with research by assimilating 'facts' and by evaluating them without priorities or strategies of application. Thus, surrounded by piles of information gathered during the problem of formulation phase, designers find themselves surprised and angry to learn how difficult it is to make sense of and utilize such information once physical design begins.

The same "inductive fallacy" has also been discussed in more general terms by Millikan.[11] Reviewing the often difficult relations between behavioral science research and the making of social policy, Millikan suggests that collaboration has been difficult and non-productive because of misconceptions on the parts of both researcher and decision-maker. Fundamental among the misconceptions of the policy-maker is "the assumption that the solution of any problem will be advanced by the simple collection of fact. This is easiest to observe in governmental circles, where research is considered identical with 'intelligence'." Millikan contends that the true value of social science research is to "broaden, deepen and extend the policymaker's capacity for judgment," rather than simply providing answers. Similarly, Hillier et al argue for the sorts of environmental research that will enable the designer to "structure" the problem and then find "a route through it."[12]

Furthermore, not all decisions are made concurrently. Larger scale and more abstract decisions typically are made prior to smaller scale and more concrete ones. For example, one probably decides whether the operating philosophy of a multi-service senior center will be based upon age-integration or age-segregation before selecting the site.

Criteria For Translation

This brief discussion of the application gap and the design process suggests the necessity for translation as a means of structuring design problems to enhance social scientist/designer communication and collaboration. We propose three translation criteria to assist in preparing research information for the designer.

First, information must be *imageable*. Imageable information appeals to the designer's preference for the visual and concrete over the more verbal and abstract. Verbal material likewise can be imageable if it evokes a clear jargon-free picture of the concept at hand through analogy, simile or metaphor. This criterion is similar to Howell's notion of redundancy: using a combination of verbal and visual modes to present research information to designers.[13]

LOCKED FINGER EXTENSION MAKES FIST POSITION PAINFUL OR IMPOSSIBLE

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PALMAR PINCHING USES PADS OF THUMB, INDEX FINGER AND USUALLY THE MIDDLE FINGER

A COMMON DEFORMITY CALLED ULNAR DEVIATION (DRIFT)

LOCKED FLEXION CONTRACTURE PRODUCES A FISTMAKING POSTURE THAT IS OFTEN STIFF OR IMMOVABLE

Fig. 4 illustrates the criterion of imageability in the programming and design of a prosthetic device to enable an arthritic elderly individual to open a "poptab" beverage can. This student designer communicates both verbally and visually the problems of the arthritic hand. Alexander's pattern language is a more generalized example of imageable information for designers.[14]

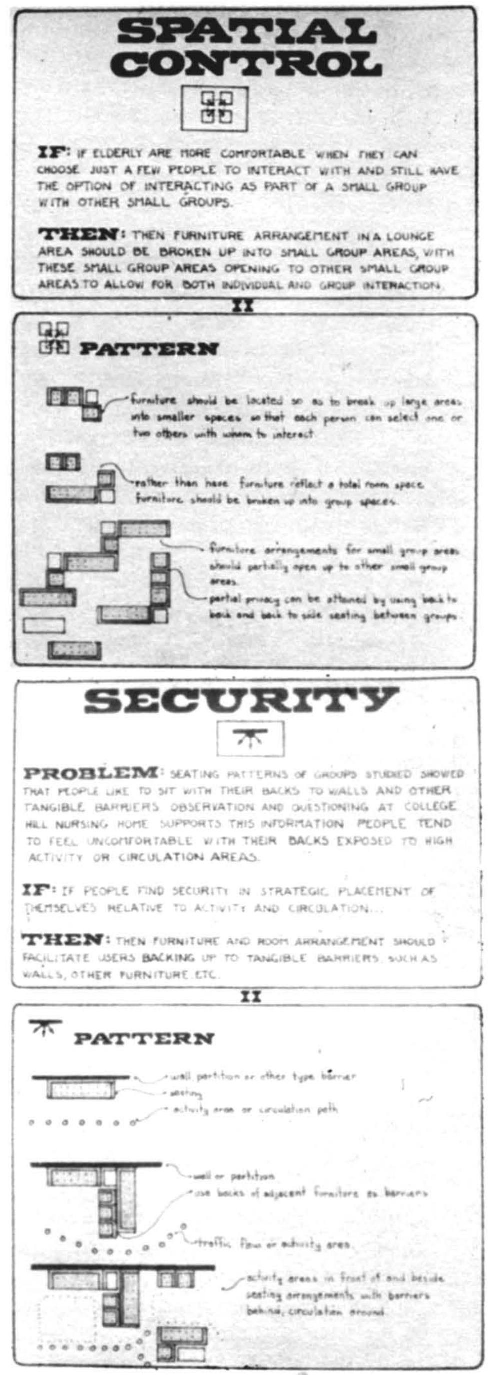
The second translation criterion is that information must be *testable.* Given Lewin's notion that the decision-making process is a spiraling and interactive series of steps from problem formulation to implementation, information must be in a form which allows for "internal" evaluation against some agreed upon yardstick before implementation is attempted.

The cause/effect format is a useful model in this case: *if* I design the building in this way, *then* people will respond that way. Environment and behavior information phrased in this manner allows for comparisons with past experience, overall theories of design, other research findings and with simple intuitive judgment. A building program based on if/then statements allows the entire building to be viewed as an hypothesis to be tested by its users over time.

If/then statements were developed as a part of Alexander's pattern language but they have not been used extensively in building programs. A related, although less prescriptive technique, is the "performance specification" discussed by Brill.[15] *P-specs* are statements which identify the precise characteristics desired in a product or building without regard to the specific means for achieving those characteristics. While not explicitly stating environment/behavior relationships, this technique provides a yardstick for the designer during various stages of the decision-making process to select the alternative that best satisfies the required performance.

Figs. 5, 6 illustrate the criterion of testability as well as that of imageability. While programming the re-design of a lounge in a nursing home*(fig. 5),* this student designer developed if/then statements, patterns and abstract design solutions for two environment/behavior concepts. These design assumptions were synthesized into the redesign of the lounge and subsequent testing for validity by user/behavior evaluation. *Fig. 6* is an environment/behavior analysis of the student government office at Kansas State University. If/then statements and design solutions were developed for four environment/behavior concepts. These solutions were then synthesized into an actual re-design of the office space.

The third translation criterion is that information must be appropriate to a *variety of levels* of the problem. For example, the decision whether to integrate younger age groups into a senior center clearly requires information at a different level than whether to use non-skid floor surfaces in the restrooms. This criterion is simi-



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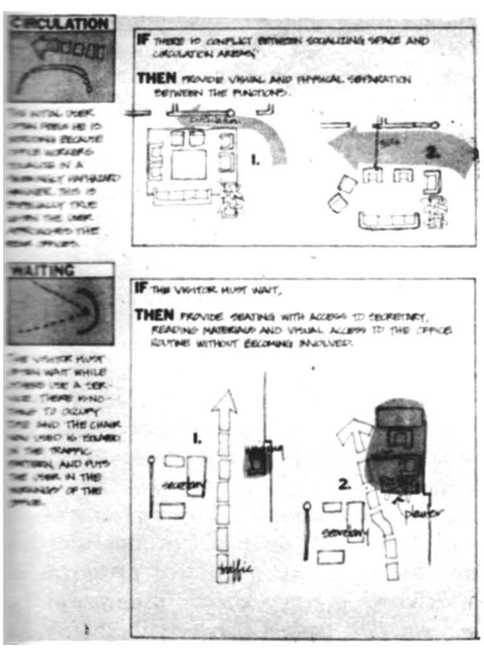

lar to Howell's suggestion that design information be organized on a variety of levels to aid in retrieval at the appropriate time.

Fig. 7 illustrates the criteria *testability* and *level*. While programming the design of a toy for an infant, this behavioral scientist developed P-specs and specific design criteria for various levels of the problem.

The translation criteria outlined above are but a beginning in bridging the application gap and creating environments which are more responsive to user needs. Systematic evaluation of the effectiveness of these translation techniques is a necessary next step. Howell suggests that process evaluation must always commence with awareness of who the audience is that will benefit from the knowlede gained in the evaluation, egg planners, designers, educators, manufacturers or management.[16] The process under evaluation must then be carefully monitored to account for the information passed through various individuals during different stages of the design process.

Our experiences, however, suggest that social/behavioral information can successfully be integrated into environmental design education right now. If the critical role behavioral information plays in design is clearly recognized and the design process is structured from the outset in a way similar to that outlined in this article, such social/behavioral knowledge as currently exists can be successfully translated and utilized.

LEVELS OF DEVELOPMENT

Performance Criteria

The infant of six weeks preceives his/her environment differently than the six month old. An effective device must be able to be responded to on several levels of development simultaneously.

Design Specifications

1. The device must be visually and physically accessible to the six week old who's head is in the tonic neck reflex position (approx. 45°) and the six month old who's head is usually at midline.
2. The hitting and swiping of the early infant must produce the opportunity for visual tracking. The near adult grasping abilities of the six month old must also produce stimulation from the device. 30
3. An effective device must provide high edge contrast and emphasis on primary colors (particularly red and blue) for the early infant and patterns of increased complexity for the older infant.

SAFETY

Performance Criteria

Any device created to respond to the two previous criteria also be free of physical hazards and not require constant supervision.

Design Specifications

1. Design the device so that it can be attached to or suspended from the infant's bed. The infant bed is an area that usually does not require constant supervision and the majority of the infant's time is spent in the bed.
2. The device must not have sharp edges or pieces that can be separated, exposing edges.
3. Elements must be of appropriate size and shape that they cannot be swallowed or restrict breathing.
4. Materials that will not chip or separate and colors that are non-toxic and resistant to fading must be used since virtually everything within reach is brought to the mouth for sucking or chewing.

SENSORY STIMULATION

Performance Criteria

Everyone, even the young infant, becomes bored by stimuli that appeals to only one sense or lacks variety. An environmental modification device that addresses this problem must produce a variety of sensory stimulations of changing degree.

Design Specifications

1. The hand must be able to activate the device, producing sounds, movement and visual patterns.
2. Involuntary contact with the device as well as controlled manipulation must both produce stimulation of the senses.
3. Different types and degrees of contact with the device must produce different combinations of sounds, movements and patterns.

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12. Bill Hillier, et al, op cit.

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16. Sandra C. Howell, op cit.