

## COLLABORATION FROM A COGNITIVE PERSPECTIVE SHARING MODELS ACROSS EXPERTISE

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### ABSTRACT

*Environment-behavior problems must draw on diverse disciplines and perspectives. For experts with such differing backgrounds to collaborate effectively requires many skills that are rarely included in their training. The paper focuses specifically on the content-specific mental models that are inherent in expertise and on the necessity of sharing such models to achieve successful collaboration. Communicating such well-learned, intuitive frameworks for seeing a problem involves much more than producing a glossary of terms for team members to study. The paper discusses some ways to achieve this difficult task both in the context of a specific team effort, and in the larger perspective of training future collaborators.*

"The Gap" has been a persisting concern of the EDRA-community throughout the organization's formative years. The "Coming of Age" celebration marks an appropriate time to reflect on ways to bring together the practitioners and academics, the designers and researchers, those that do and those that theorize. There are many factors that continue as potential barriers to bridging across these traditions. Fortunately, there are also success stories. The focus of this paper is on some insights and guidelines, drawn from a cognitive framework, that may reduce the size of the gap and facilitate collaboration.

Collaborative arrangements come in many types with projects of widely differing sizes and purposes and with a range of relationships among the team members. The context for collaboration assumed here involves individuals with distinctly different background training, jointly pursuing a common goal that has a distinct application as a significant component. In many instances, some of the team members may work together over an extended period of time on a variety of projects. In other cases, the collaboration is for a specific task.

Collaboration can be difficult, vulnerable, and fragile. This is not particularly surprising when one considers that people with different perspectives need to reach some common resolution. The various team members are likely to have different personal agenda, working

styles, and ways of relating to others. They may be easily intimidated or intimidating; they may be impatient, obscure, or arrogant. Guidelines for enhancing collaboration thus frequently entail attention to group process skills as well as value clarification and empowerment. In a book specifically addressing the subject of collaborating, Gray (1989) discusses five "capacities" that must be developed to achieve common ground: "channeling conflict constructively, maximizing joint gains, reaching agreement about risks, institutionalizing collaborative processes, and training leaders."

Each one of these capacities is important to the collaborative process, as are the interpersonal dynamics of the group and the institutional signals about whether collaboration is sanctioned. However, even in settings where these factors are not major barriers, collaboration may still fail. A team that has clear and shared goals, support from the pertinent organizations, and great proficiency with the ways of conducting themselves may nonetheless find itself at a loss when it comes to the content domains of their effort.

Sharing content requires a different set of considerations; these are the focus of this paper. To understand why this process is difficult it is useful to look at some of the problems inherent in being an expert. The discussion then turns to ways to facilitate the sharing of knowledge and concludes with some implications for educating future collaborators. If team members can

"conscious attention to group process in staff seminars and planning; provision of adequate time for reading; preparation of glossary of selected terms with carefully developed definitions" (Blackwell, 1986). Such advice, however, fails to recognize that what needs to be explained involves much more than the words; the words are a shorthand for a way of seeing.

A further manifestation of the perceptual qualities of expertise involves the fact that one is ordinarily not aware of one's perceptions and, therefore, of the ways in which they may differ from those of other people. "Perceiving feels natural to the perceiver. In most cases it feels effortless, ordinary, routine. Experts characteristically do not know that they see differently from anyone else — indeed, they feel that they see simply what's there, what anyone else not blinded by preconceptions would also see" (S. Kaplan, 1977).

Thus while experts may be quick to "see" the problem, they see it from a particular perspective. In fact, it may be more difficult for them to grasp the problem from any other perspective. Expertise thus makes it possible to see more in a given situation, but at the same time an expert fails to see aspects that are "common sense" to another. Writing in the context of foreign policy, Laski (1930) pointed out that experts "tend to neglect all evidence which does not come from those who belong to their own ranks." While this characteristic may appear to be little more than arrogance, it might as appropriately be thought of as a reflection of the narrow focus that easily comes with expertise.

Experts thus have important knowledge and perspective to bring to the collaborative arrangement, and at the same time their expertise can make collaboration difficult. The solution to this dilemma cannot be that everyone become expert in everything, nor that one ignores expertise altogether. Ideally one would understand just enough about the perspective or mental model of each team member and have each of them understand one's own perspective. "Just enough" is a fuzzy amount. The next section discusses some characteristics of mental models that should facilitate the process of sharing different ways of seeing.

## SHARING MODELS

Mental (or cognitive) maps have provided a useful framework for a considerable amount of environment-

behavior research. Image and environment (Downs and Stea, 1973) appeared in EDRA's infancy and Environmental knowing (Moore and Golledge, 1976) was an outgrowth of sessions at two EDRA meetings in the early 70's. Perhaps because of the "map" imagery, mental models have often been applied to spatial knowledge, and indeed, Tolman's (1948) original use of the cognitive map term was spatially based. The notion of a mental map, however, is by no means limited to the spatial domain. As we have used the concept (e.g., S. Kaplan, 1973, 1977; S. Kaplan and R. Kaplan, 1978, 1982), it provides a way of understanding how any knowledge domain is acquired, stored, and accessed.

Any field of expertise represents a knowledge domain and thus experts have well-developed mental models of their fields of knowledge. Such models include the basic concepts of the field as well as the approaches traditionally taken to explaining these concepts. They include modes of inquiry as well as modes of verification. Facts and theories, tools and methods, are all part of the models that are shared by members of the same expertise area.

Clearly experts in different areas will have distinctly different mental models. Petrie's (1986) discussion of the necessity to share models across disciplinary lines to accomplish interdisciplinary research is just as applicable to our discussion of collaboration: "if disciplines do differ in their cognitive maps, then quite plainly until these maps are shared by the interdisciplinary participants, they will be unable to see the relevance of their colleagues' points of view to the problem at hand. If they do not learn the other disciplinary maps, at least some of the discussion will be necessarily misunderstood for it will be processed in terms of the participant's own map which may not be the same as that of the person who offered the comment in the first place. Thus learning at least a part of other disciplinary maps is a necessary condition for turning multidisciplinary work into interdisciplinary work."

## Some Basic Principles

The experts' mental models developed in the course of considerable training and experience. While the necessity for individuals who are jointly engaged in problem solving to share mental models may be evident, it is nonetheless a challenge to achieve such mutual understanding in a relatively short amount of time. The discussion here of mental models (or cognitive maps) is

simplicity in the same gradual way the expert had. To help the learner gain usable understanding it is essential to avoid the intricacies and intriguing details of a concept and to focus on a highly simplified version.

**Concreteness.** Concrete examples are a powerful aid to learning. This is especially true when dealing with a learner with whom one does not share the abstractions of the underlying categories.

**Multiplicity.** One cannot tell from a single example what a concept involves. Multiple examples help communicate the breadth of the concepts and help the learner recognize which characteristics are more and less important.

Thus multiple simple examples are a powerful aid to building the simplified but serviceable cognitive map that collaborative settings require. It is, however, no small challenge for those who serve as teachers. Quite in contrast to their accustomed mode of functioning, they must withhold a great deal of information and avoid displaying the enormous riches of knowledge they have available.

The goal, after all, is that team members not only understand that others have a different perspective but that they also have enough of a sense for these perspectives that they can draw on them. We have used the notion of a "portable model" (S. Kaplan and R. Kaplan, 1982, 1989) to refer to such a simplified yet coherent cognitive map. It is portable in the sense that one does not need to locate it in a reference volume; it is right there within easy reach in one's own head. If the material is that portable, there is a greater likelihood that it can be remembered and that there is a sense of ownership.

Teaching, especially in the collaborative context, is further facilitated by creating a situation that is high in feedback. Without such interaction among team members it is difficult to assess whether the basic elements of the model are understood and to evaluate when additional small pieces can be added. The feedback function is, at the same time, one of the key aspects of being an effective recipient of information. In the capacity of student, the team member is trying to create a portable model of the other members' perspectives. This is facilitated by asking questions, trying out models and checking whether they are appropriate approximations.

Being a student in such situations requires a willingness to admit one's ignorance and to show that one does not understand. One must not be easily threatened by the apparent wisdom of the others; they, in turn, are far less wise about the other areas of expertise.

## EDUCATING FOR COLLABORATION

The problems of discipline-based education and the importance placed on expertise make collaboration more difficult. A critical turning point in understanding these barriers came for two of us, faculty members in psychology, when we started to discuss a potential project with a colleague in landscape architecture. At one of our meetings he asked what seemed to him a rather general question. (It is too long ago to remember the specific question, but it concerned why people do some "silly" thing.) As psychologists at a world renowned university our answer came quite quickly: "Oh, you should speak to so-and-so about that; he has done work in that area." At another meeting, our colleague expressed curiosity about another topic. Our response was quite similar, except that a different local expert was suggested as a useful resource person. The process was repeated once more before we came to realize the folly of our approach. To our colleague we represented the field of psychology; the fact that the field consists of numerous specializations was our problem, not his. In any event, if we were to establish a useful working relationship we had to be willing to be generalists. We had to give all of psychology away (Miller, 1969), not just the portion that identified our niche within our discipline.

The EDRA domain is concerned with problems involving the simultaneous considerations of many pieces. Solutions that are addressed to parts of the problem can easily aggravate other parts. If we could train our students to achieve understanding of the interrelationships among these pieces we will have accomplished a great deal. But, unfortunately, it would not be enough. An added difficulty involves the changing nature of the world and the consequently changing nature of the problems to be solved. Our goals, therefore, must include ways of teaching flexibility, of helping our students learn that learning and teaching is part of a continuing process.

Two principles are offered toward achieving these goals:

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*Coming of Age*

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