CUMULATING KNOWLEDGE: AN ELABORATION AND EXTENSION OF CROSSAN, LANE, & WHITE'S FRAMEWORK FOR ORGANIZATIONAL LEARNING

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Despite its recent growth, the organizational learning literature still lacks a fully developed theory. Drawing principally from the innovation literature, we elaborate the organizational learning framework recently developed by Crossan, Lane and White (1999). Our main contributions include incorporating: a) attending processes, to enhance the framework's capacity to show how the environment relates to strategic renewal; b) championing and coalition-building, to describe key socio-political processes that help to understand which learning feeds forward; and c) encoding and enacting feedback processes, which parallel the integrating and interpreting feedforward processes specified in the original model.

Theory development has been a challenge for the field of organizational learning. While important contributions toward this end have been made (e.g., Argyris & Schön; 1978; Crossan, Lane, & White, 1999; Cyert & March, 1963; Daft and Weick, 1984; Nonaka, 1994), a generally-accepted and fully-developed theory has proven elusive. Crossan et al. (1999) suggest that this convergence has not yet occurred because different researchers have applied organizational learning concepts to different domains. Huber (1991: 108) calls for research "in organizational learning that is cumulative and integrative," echoing others who suggest that developing theory in an area like this demands cumulating convergent knowledge in the literature (e.g., Bacharach, 1989; Whetten, 1989).

Our goal to help remedy this situation is consistent with the recent contribution Crossan et al (1999) have made towards "advancing a theory of organizational learning," and we accept their invitation, and their deliberately unfinished organizational learning framework, as starting points for our endeavor. Put in terms of this framework, unlike much research which highlights new learning to feedforward into the literature, our goal here is to attend to and exploit what is already known and feed that knowledge back toward a more cumulative theory of organizational learning. In particular, we will be drawing from the innovation literature to elaborate the Crossan et al (1999) organizational learning framework.

Generally, we believe that most work in organizational learning has not taken full advantage of insights and findings in the related organizational innovation literature (for exceptions, see Glynn, 1996; Cohen & Levinthal; 1990, Attewell, 1996) and should invest greater effort in building and improving upon existing models rather than advancing new ones (e.g., Huber, 1991). As such, the potential for new knowledge and theory creation through connectivity (Bacharach, 1989) or borrowing perspectives from other fields (Whetton, 1989) has not been tapped into sufficiently. The theory-building in this article can be considered a "knitted" effort (Kalmar & Sternberg, 1988) in the sense that it draws together a number of ideas from the organizational learning and innovation literatures while building upon a recent framework proposed for organizational learning.

More specifically, we offer three distinct contributions that extend and flesh out a recent theoretical formulation of organizational learning advanced by Crossan et al. (1999). First, we describe the role of attending processes to provide a link to the environment that is missing in the

framework. Second, we identify championing and coalition-building as two socio-political processes that are essential to feed forward (exploration) learning. And third, we propose that encoding and enacting are the missing feedback (exploitation) processes of learning between organization, group, and individual levels.

The paper is divided into three parts. We begin with a brief review of the Crossan et al. (1999) framework. Then we describe each of our three main elaborations to their framework, and develop a series of corresponding propositions for future research. We conclude with a brief discussion of implications for theory and research.

A FRAMEWORK FOR ORGANIZATIONAL LEARNING

Crossan, Lane and White's (1999) framework for organizational learning is concerned with strategic renewal. Building on March (1991), the authors conjecture that such renewal requires both the exploration of new learning and exploitation of what has already been learned. The authors argue that: (a) a tension exists between assimilating new learning (exploration) and using what has been learned (exploitation); (b) organizational learning is multilevel—i.e., individual, group, and organization; (c) these three levels are linked by social and psychological processes; and (d) cognition and action are interpenetrating phenomena.

They go on to describe four processes that they believe are key for understanding multi-level organizational learning: intuiting, interpreting, integrating, and institutionalizing (see Figure 1 for Crossan et al.'s original diagram). Individual intuiting feeds forward new ideas to groups who in turn interpret and integrate the information, thereby permitting exploration, new learning and coherent collective action. At the same time, institutionalizing at the level of the organization feeds back to the group and individual, exploiting what has been learned, affecting how people act and think, and causing tension with feed forward processes. In addition to offering important inroads in the direction of theory development, the authors' framework also provides opportunities for elaboration and extension. For example, of the four arrows in their original framework, only two (interpreting and integrating) are labeled and discussed.

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insert Figure 1 about here

ENVIRONMENTAL, SOCIO-POLITICAL, AND FEEDBACK PROCESSES

Attending processes

The Crossan et al. (1999) framework has a focused view of what motivates organizational learning and when it occurs. At the feed forward end of the learning processes, for instance, the authors conjecture that individual intuiting, the "preconscious recognition of patterns inherent in a personal stream of experience," (Crossan et al., 1999:525) is the source of exploration in

organizations. Such intuiting takes either the form of expert intuition, which supports exploitation, or entrepreneurial intuition, which supports exploration. However, while the authors further state that "individual learning involves *perceiving* similarities and differences—patterns and possibilities" (Crossan et al., 1999: 526; emphasis added), their emphasis on intuition and the subconscious as the source of new ideas gives the impression that organizational learning depends on the "eureka" experiences of individuals.

What, though, of the *conscious* perception of opportunities for learning and innovation and the role of attention and attending (Van de Ven, 1988) to external circumstances as generators of new ideas? While some new ideas may indeed come from intuition alone, they also arise from a combination of attention to customer needs, market opportunities, and end user ideas (von Hippel, 1976). Indeed, in her stage model of individual creativity, Amabile (1983, 1996) outlines both internal and *external* sources of information being gathered before the generation of new ideas. The Crossan et al. (1999) framework overlooks the environment or some link between organizational learning and environmental change. This seems an especially significant oversight considering that the authors are concerned with the domain of strategic renewal of enterprises, and that schools of strategy typically display some concern for the environment (Mintzberg, 1990). Organizations may be less likely to attempt strategic renewal if they operate in a stable environment, occupy a secure niche, or face low intensity of rivalry from industry competitors (Porter, 1985). In any case, a lack of concern for the external environment would lower the perceived need for exploration or significant new learning beyond minor error correction (Argyris and Schön, 1978) and aspiration levels for superior performance (Levitt and March, 1996).

In order to more meaningfully reflect common understandings of strategic renewal, it would be desirable to develop a linkage, whether conscious or not, between the organizational learning framework and the environment. Thus, we suggest that in addition to intuiting, individuals are also engaged in an attending process, which may be a scanning (Daft & Weick, 1984; Farr & Ford, 1990; Kanter, 1988) or search (Mohr, 1987) process that ushers in information from opportunity sources (Drucker, 1985). (See Figure 2 for our revised framework for organizational learning.)

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insert Figure 2 about here

This resultant information then, in turn, becomes the raw material for intuition, new ideas, and the kind of exploration and learning addressed by March (1991). In addition to providing an interface for the environment in strategic renewal, incorporating attending into Crossan et al.'s framework (1999) also serves to cumulate organizational learning theory, which has a long precedent of concern with adaptation (Cyert & March, 1963; Duncan & Weiss, 1979; Levitt & March, 1996; Shrivastava, 1983) and information search processes (Cangelosi & Dill, 1965; Daft & Weick, 1994; Huber 1991).

Our notion of attending draws upon both Van de Ven's (1988) idea of paying attention to problem sources in order to activate thresholds for action, as well as Drucker's (1985) active search and scanning of opportunity sources for new ideas and chances to innovate. The first sense of attending we see as more *passive* and relates to learning triggered by low performance

stress (Cangelosi & Dill, 1965; Tushman & Romanelli, 1985), mismatch of expected outcomes which disconfirm theories-in-use (Argyris & Schön, 1978), and outcomes that fall below aspiration levels (Child, 1972; Cyert & March, 1963; Levitt & March, 1996). When triggered, these search-and-evaluation actions may lead to (a) explorative learning or (b) merely substituting one prototypical script for another or engaging in minor error correction. For instance, a machine operator who, in response to a part being continually manufactured out of specification, adjusts gauges by rote is not engaging in the kind of evaluation and search that promotes explorative learning. However, the same machine operator would be engaged in explorative learning with the chance of discovering new ideas and routines if she discussed the problem with other machinists, inquired about a change in materials, or used a quality improvement tool such as a cause and effect diagram to brainstorm ideas. In this situation, attending processes passively receive information that triggers the evaluation and search of ideas, which may or may not be accompanied by the intuiting of others in addressing the performance problem.

The second sense of attending we see as more *active* and relates to learning that is derived from the deliberate scanning of competitive, technological, social, and legal environments (Tushman & Romanelli, 1985; Kanter 1988) and opportunity sources such as market structures and demographics (Drucker, 1985) for new ideas and chances to innovate. While this second sense of attending is definitely a more conscious, analytical process, it does not preclude and may actually lead into or out of the preconscious process of intuiting as conceived by Crossan et al. (1999). A marketing manager, for example, may purposely analyze demographic trends, but fail to develop the idea of re-focusing some of his advertising efforts to an aging cohort of baby boomers until the idea has time to incubate (Wallas, 1926) in his subconscious and then later presents itself through his intuition. This view of learning, which combines attending and intuiting, directly parallels Amabile's (1983, 1996) stages of creativity, which start with internal or external stimulus in the task identification stage, build up in the preparation stage, and lead to idea production in the response generation stage. In addition, this conceptualization of an attending process provides a critical link to the environment, overlooked in the Crossan et al. framework (1999), of particular relevance to the domain of strategic renewal.

> PROPOSITION 1: Attending and intuiting processes interact to produce opportunity recognition and new ideas that, in turn, trigger feed forward (exploration) organizational learning.

Socio-political processes of championing and coalition-building

The second opportunity to elaborate upon and extend the Crossan et al. (1999) framework is in regard to the socio-political issues involved in organizational learning. Though the authors' first premise addresses the "tension" between exploration and exploitation of knowledge, they do not consider how this tension translates into the political dynamics of social systems. March (1991:71; emphasis added) writes, "both exploration and exploitation are essential for organizations, but they <u>compete</u> for scarce resources." Unfortunately, neither March, nor Crossan et al. (1999), examine the socio-political processes to explain how this competition for

scarce resources unfolds (March chooses to focus on more rational processes, such as choosing between alternative investments and optimal rates of learning and personnel turnover).

Though some theorists and researchers have recognized the role of socio-political processes and competition in organizational learning (March & Olsen, 1988; March 1991), models of organizational learning tend to emphasize the cognitive and cerebral processes of learning. As such, they have missed out in capturing the socio-political dynamics of learning by organizations as social systems. Besides presenting a challenge to cognitive structures, new ideas and learning also challenge social structures and vested interests (Pfeffer, 1992; Kimberly, 1981; Rogers, 1995). New ideas not only have to overcome inertia and institutional rituals for there to be new cognitive maps and shared understanding, but they must also overcome political resistance by those individuals and groups that might not fair as well after the new learning has been institutionalized. We might ask why, of all the thousands of ideas that an organization possesses, do only a few become institutionalized and diffused throughout the organization? Schön (1963) observed early on that new ideas needed to find a champion or die. Thus, in addition to Crossan et al.'s (1999) collective sense-making processes of interpreting and integrating, there is need of further specification of socio-political processes that support new ideas up to the point at which they are institutionalized and exploited. Crossan et al.'s (1999) sense-making and collective processes of dialogue and understanding are necessary, but not sufficient, to explain why explorative organizational learning sporadically reaches the broad-based acceptance it requires to become institutionalized and, in turn, exploited.

By comparison, innovation researchers have long recognized and addressed the importance of socio-political processes involved in protecting and promoting new ideas (Kanter, 1983; Maute & Locander, 1994; Rogers, 1995; Zaltman, Duncan & Holbek, 1973). Generally, new ideas are in need of champions (Howell & Higgins, 1990; Maidique, 1980) and coalitions with sufficient power (Kanter, 1988) to ensure their survival and continued development. As Kanter (1988: 185) observes, "social and political factors, such as the quality of the coalition-building, may account for as much or more than technical factors, such as the quality of the idea, in determining the fate of the innovation."

A champion is an individual who emerges to take creative ideas and bring them to life by promoting the idea, building support, and overcoming resistance (Howell & Higgins, 1990). While the champion may or may not have originated the idea, she is its defender. Championing and interpreting processes interact in a way similar to Bennis and Nanus' (1985) second strategy of transformational leadership: meaning through communication. Because organizational knowledge has the power to shape individuals (Berger & Luckmann, 1967), we view social construction as an inherently political activity. Individuals do not develop new cognitive maps through dialogue and metaphor in an absolutely neutral context. Instead, champions actively promote *particular* metaphors and use language associated with new ideas in an effort to shape and direct conversations with the dual intent of changing cognitive maps and lessening resistance by those opposed.

Championing, however, is not sufficient for new ideas and learning to become institutionalized. Coalition-building is essential to feeding forward new ideas from group to organization levels, because resource allocations are needed to support the continued

development of the idea and its eventual implementation (Kanter, 1988). Thus, we see integrating and coalition-building processes interacting to produce the necessary information, resources, and support (Kanter, 1983) needed to realize the new idea into coherent, collective action. For example, organizations like 3M provide seed funding to help working groups develop new projects and determine their viability. If successful, the project may become incorporated into a new product line and preparations made for its manufacture and distribution. At this point, the new idea becomes institutionalized into organizational rules, procedures, and routines.

> PROPOSITION 2a: Championing and interpreting processes interact to produce persuasive conversations that influence people's cognitive maps towards the advantages of new ideas.
>
> PROPOSITION 2b: Coalition-building and integrating processes interact to produce resource allocations and coherent collective action that support the continued development of new ideas.

Encoding and enacting processes

At least two additional processes are in need of further theoretical development to round out the Crossan et al. (1999) framework. Recall that their framework depicts, but fails to specify, the feedback (exploitation) processes from organization-to-group, and from group-to-individual levels. The feedback processes between organization and group levels we label "encoding," and between group and individual "enacting." These are borrowed from empirical and theoretical work concerned with the institutionalizing processes involved in new technology introduction (Barley, 1986; Barley & Tolbert, 1997). The feedback process between organization and group levels encodes institutional procedures and principles into group scripts which, in turn, are "enacted" by individuals (Barley, 1986). Such scripts are basically specific knowledge structures used to interpret and participate in repetitive events (Schank & Abelson, 1977) such as hiring personnel, participating in staff meetings or offering services to customers. Parallels to the organizational learning literature might include Cyert & March's (1963) standard operating procedures or Cohen and Bacdayan's (1996) work on procedural memory.

We conceptualize the encoding of organization level learning into group learning, and the enacting of group learning by individuals, as two distinguishable steps. The first step, encoding, is the diffusion throughout the organization of informational constraints on action such as managerial visions, technical designs, policies and procedures, budgets, job descriptions and so forth. Encoding essentially lays out the map for group action, and is not unlike canonical or espoused practice in Brown and Duguid's (1996) terms.

The second step, enacting, is not unlike what Brown and Duguid (1996) call noncanonical or actual practice. It refers to the interaction of groups of individuals in an information field that contains both the organizational encoding and the demands of actual work situations. In repetitive work situations, interactive behavioral scripts (Mangham, 1978) crystallize. These interactive, or group-level, scripts can be viewed as consensual cognitive

structures that contain the recognition of cues from others to activate sequences of behaviors for a given situation (Poole, Gray, & Gioia, 1990). It is through the encoding of organizational learning, the demands of actual work situations, and repetitive interactions that knowledge comes to be stored (i.e., in group-level scripts) and exploitation learning takes place.

Note that group-level scripts need not match organizational encoding in all instances (Brown and Duguid, 1996). For example, unanticipatable novelty in groups' actual work may result in group-level scripts that differ from organizational encoding. The organization's ability to exploit such emergent learning depends on whether exploration processes feed forward the new knowledge, making it available for further encoding. The strategic importance of attending to and feed-forwarding such emergent knowledge is evident in the work of Mintzberg and Waters (1985). Moreover, recent research suggests that up to 25% of new organizations are formed by breakaway groups who have enacted scripts that were inconsistent with encoded scripts of the parent organization (Dyck & Starke, 1999)

PROPOSITION 3a: Encoding processes guide and constrain the development of group-level scripts.

PROPOSITION 3b: Enacting processes and group-level scripts guide and constrain individual behavior.

PROPOSITION 3c: Unanticipated novelty in the workplace may result in group-level scripts that differ from their initial encoding.

IMPLICATIONS AND CONCLUSION

In our goal to contribute to a theory of organizational learning, we elaborated the existing organizational learning framework proposed by Crossan et al. (1999), most notably by integrating insights and findings from studies of organizational innovation. We began by introducing attending processes, to provide a linkage to the environment and thereby enhance the framework's suitability for the domain of strategic renewal. Then we incorporated championing and coalition-building, key socio-political processes involved in organizational learning. Finally, we described how encoding and enacting processes provided two missing feedback/exploitation linkages Crossan et al (1999) had identified in their original framework. To be clear, we do not claim that our contributions result in a full-fledged theory of organizational learning, but we contend that they do serve to help advance the original framework closer to the status of a theory of organizational learning by increasing its scope, explanatory potential, and predictive adequacy (Bacharach, 1989). We invite future researchers to continue this work on theory development in the spirit of Bacharach (1989) and Whetton (1989).

We conclude by showing how a theory-building effort such as ours does more than, in our case, simply flesh-out Crossan et al.'s (1999) original framework—our paper also serves to qualitatively change the meaning of the original framework. This is particularly evident in the implications of our discussion for what Crossan et al. (1999:535) conclude are the "two particular areas of research that will help advance theory," namely improving our understanding

of: (1) "the flows of learning (feed forward and feed back) between the levels … [and; (2)] how to reconcile the tension between exploitation and exploration."

First, in terms of understanding the flows of learning across the three levels, our elaboration of the framework draws attention away from a relatively long-cycle and linear view of learning implicit in the original framework, where the discussion emphasizes how learning moves from the individual to the group to the organization and back again. Our addition of the two feedback processes (encoding and enacting) permits the examination of two distinct feedforward/feedback cycles moving from individuals-and-groups to groups-and-organizational levels of analysis (i.e., interpreting and enacting, and integrating and encoding). This two-cycle emphasis draws attention to the iterative learning that occurs within each cycle, and in so doing counteracts an unspoken bias against feedback learning, which may suffer from being confused with backwards learning. Our elaborated framework underscores that organizational learning walks on two feet, feedforward and feedback, and that knowledge creation demands using each iteratively (cf. Mintzberg and Waters, 1985). This lends new meaning to the old adage, where learning is a case of three "steps" of forward learning (e.g., exploratory interpreting) being followed by two "steps" of feedback learning (e.g., exploitive enacting). Further, we posit that the process of moving from the group level to the organizational level is also characterized by similar iterations between integrating and encoding. In short, whereas the original framework draws attention to how knowledge flows feedforward from interpreting to integrating (i.e., from individual-group to group-organizational level), our revised framework provides a more fine-grained analysis of iterative feedforward and feedback knowledge flows within the individual-group level and within the group-organizational level.

This two-cycle emphasis also responds to Crossan et al's (1999) second call, namely to improve our understanding of the tension between feedforward and feedback learning. Here we also point to the importance of socio-political processes. In particular, adding the notions of championing and coalition-building draws attention to the fact that this tension is managed, and thus it is something that can be examined and taught. For example, in order for ideas that have been refined by an iterative interpreting-and-enacting cycling to get to the next level, they need to be championed (whether intentionally or not). Similarly, in order to be integrated and encoded, and institutionalized, coalition-building needs to occur. Whereas in some situations it may suffice to allow championing and coalition-building processes to occur without being intentionally managed, in times of environmental turbulence it is surely beneficial for such learning cycles to be deliberately managed.

The implications of this discussion are also of particular relevance for our current paper. In an environment characterized by an increasing emphasis on organizational learning, scholars and practitioners would be well-served to more deliberately focus their attention to exploit existing knowledge towards more fully developing a theory in this area. Failing to do so may inhibit our ability to understand and thus to manage this learning process.

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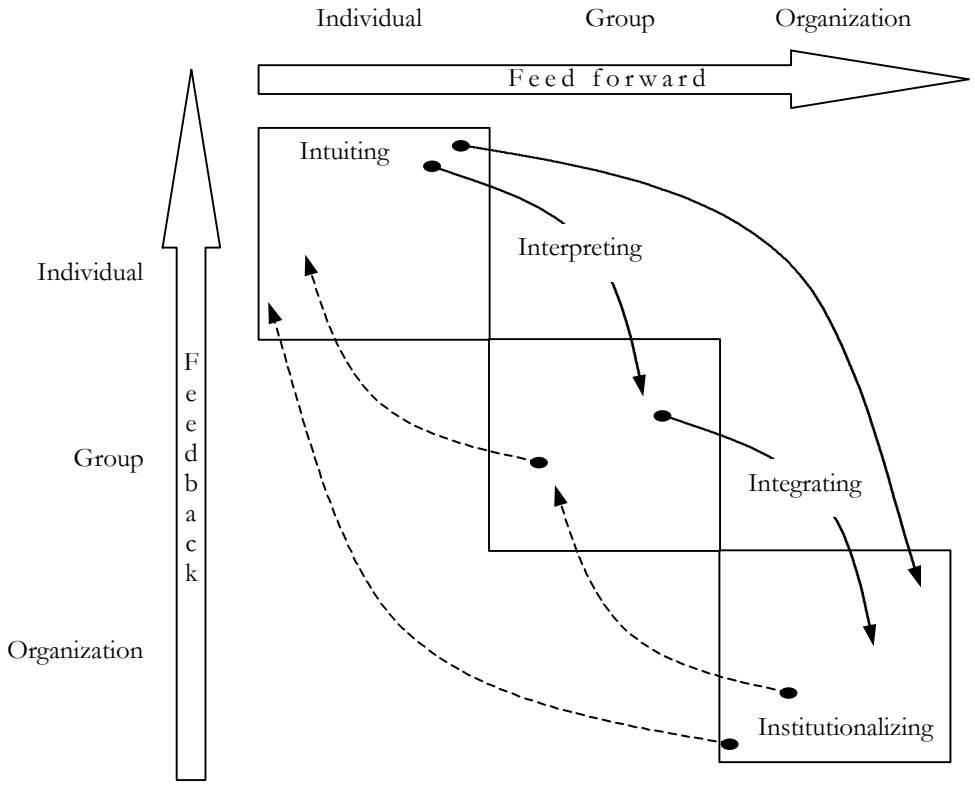
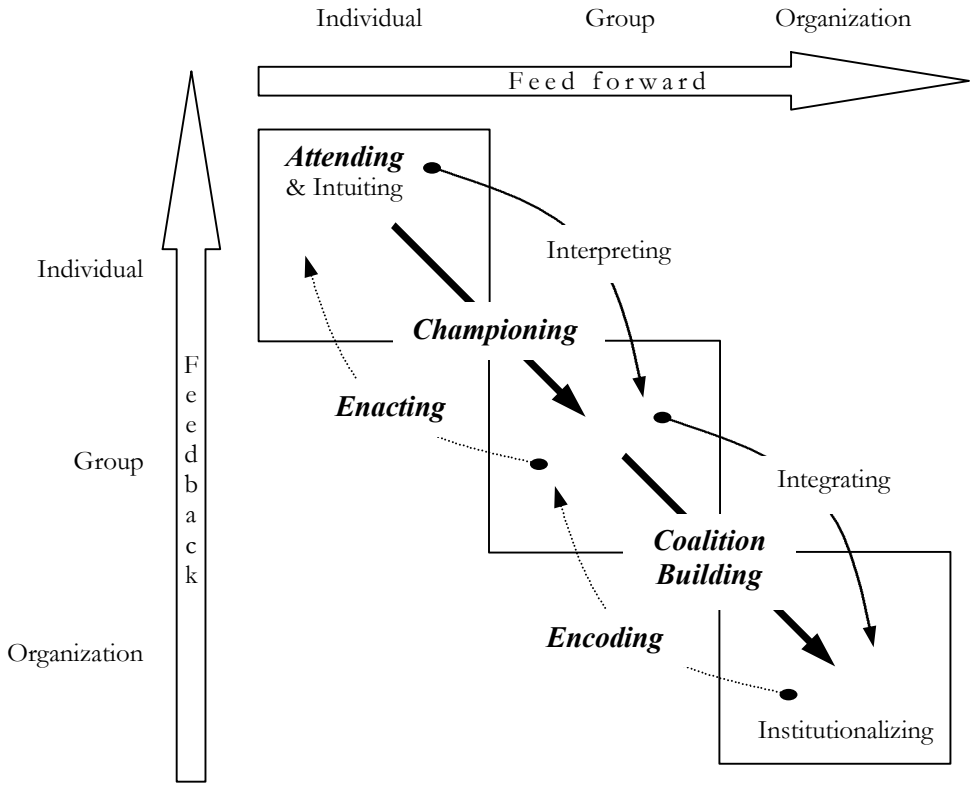
FIGURE 1
Crossan et al.'s Framework for Organizational Learning



Adapted from Crossan, Lane and White's (1999) "An organizational learning framework: From intuition to institution". *Academy of Management Review*, 24, 3: 532.

FIGURE 2
A Revised Framework for Organizational Learning



Based on Crossan, Lane and White's (1999) "An organizational learning framework: From intuition to institution". *Academy of Management Review*, 24, 3: 532. Bold arrows and italicized words indicate additions to the original framework.