Understanding "Strategic Learning": Linking Organizational Learning, Knowledge Management, and Sensemaking

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Abstract

Strategic learning aims to generate learning in support of future strategic initiatives that will, in turn, foster knowledge asymmetries that can lead to differences in organizational performance. From a case study of a unique organization whose purpose is to facilitate strategic knowledge distillation, it was found that this process is characterized by targeted information gathering that relies on diverse experts for interpretation as well as validation. It also embodies the organizational capability to leverage information technologies in the distillation effort, integrating them with processes for generating, storing, and transporting rich, de-embedded knowledge across multiple levels of the organization. As a result of the case study, a model of the strategic learning is developed and a series of propositions regarding its context and processes are presented based on this model. The model highlights key dimensions of strategic learning that suggest design parameters for organizations building strategic learning systems.

(*Strategic Learning*; *Sensemaking*; *Knowledge Management*; *Organizational Learning*)

Introduction

> We don't need more information, we need knowledge targeted on strategically important issues. That is what CALL did for us.
> —Gen. Gordon Sullivan, Chief of Staff, US Army (Retired)

At the heart of much of the recent dialogue in strategic management is the theme that performance differences across organizations can be attributed to asymmetries in knowledge. For example, how these asymmetries are manifested grounds the resource-based view of the firm (e.g., Wernerfelt 1984, Connor and Prahalad 1996), wherein the firm's ability to bundle critical resources in such a way as to distinguish its knowledge base in particular areas (i.e., competencies) is seen as the key to sustainable competitive advantage. Similarly, creating a context that maximizes the organization's ability to learn effectively over time defines the view that such learning organizations will realize performance advantages in competitive markets (cf. Senge 1990, McGill and Slocum 1994). Learning behaviors and processes that enable such long-run adaptive capability have been referred to as "strategic learning"(e.g., Kuwada 1998).

Closely linked to this perspective are the concepts of knowledge management (e.g., Hedlund 1994) and knowledge creation (e.g., Nonaka and Takeuchi 1995), both of which use theories of organizational learning as a platform for providing insight into how organizations can acquire, interpret, distribute, and enculturate knowledge to facilitate and create competitive distinction. From a cognitive perspective, how top managers categorize and interpret the information and knowledge they accumulate has been shown to have a systematic linkage with differential organizational performance (Thomas et al. 1993).

This body of literature is distinguished from much of the extant literature on organizational learning by its emphasis on searching and noticing (Huber 1991) and/or generative (Pelz and Andrews 1966) learning models. These models focus on active learning from outcome, creativity, and exploration (March 1995), as opposed to operative (Nelson and Winter 1982), adaptive (Senge 1990),

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and/or history-dependent (Levitt and March, 1988) types of learning that depend primarily on exploiting emergent routines and processes. This shift represents a move from learning as discovery to learning as foreshadowing (Hirshleifer 1971) and strategizing (Kuwada 1998). It is based on the ability to mine events as they occur for expertise and new knowledge (Henderson et al. 1998), and to become better informed about possible future states of the world (Mosakowski and Zaheer 1996). Given that initial "encounters" with an event may be hypothetical in this mode of learning, the most important learning may actually take place before a body of relevant experience is accumulated (March et al. 1991).

One of the theoretical issues underlying this line of inquiry is that strategic and generative models of learning involve altering the fundamental sensemaking (Weick 1995) and knowledge management structures (Hedlund 1994) of the organization in potentially radical ways. Higher-order search and interpretation routines are needed (Nelson and Winter 1982), and revised or new interpretative schemas are required (Lant and Mezias 1992, Leavitt and March 1988). Strategic learning organizations enact meaning from new, ambiguous experiences and develop shared understandings of both current and future events (Bartunek 1984, Kuwada 1998). Thus, learning becomes inexorably entwined with the understanding processes that help define sensemaking (Weick 1995, Thomas et al. 1997) and becomes "dynamized" as it requires new and highly interactive forms of knowledge transfer and transformation over time (see Hedlund and Nonaka 1993 for a detailed review).

This paper focuses on the strategic learning capability and the need to dynamically learn how ongoing discoveries will affect future events and, ultimately, firm performance. Creating and disseminating knowledge for strategic purposes within and across levels of analysis appears as a recurring theme in the literature (cf. Eisenhardt and Schoonhoven 1996, Virany et al. 1992, Kuwada 1998). While a consensus has emerged that a strategic learning capability is an important one, there is a paucity of empirical research illustrating particular practices that organizations can institutionalize to achieve it (Miner and Mezias 1996, Mosakowski and Zaheer 1996). Thus, the primary motivation for this research is to identify illustrative organizational practices and processes that contribute to performance-enhancing strategic learning. This is done through a rigorous empirical effort that tracks the theoretical relevance and potential of those behaviors.

A second motivation of the paper is derived from the observation that strategic learning has been conceived of, alternately, as a process to foster continuous radical innovation over the long term (e.g., Kuwada 1998), and the focused exploration of anticipated future events and activities (e.g., Henderson et al. 1998). Literature that complements both perspectives, directly or indirectly, suggests that future inquiry into strategic learning must also include investigation of the roles of sensemaking (Thomas et al. 1993), knowledge management (Dyer and Nobeoka 2000), and information transfer processes (or "strategic knowledge distillation"—Kuwanda 1998). In this sense, we need to understand how interpretive processes, subsequent learning, and transfer of lessons learned combine to enable strategic learning. Such understanding is critical to optimize allocation of organizational resources in a strategic and innovative learning environment (Teece et al. 1997, Kuwanda 1998).

Learning models or modes that take on this strategic flavor of learning are easily invoked (and have been by much of the popular press), but are very difficult to study in any systematic manner (Huber 1991). Key constructs that might define such models (e.g., "sensemaking" and "organizational memory") are difficult to measure, and even the simplest models involve dynamic, nonlinear processes with complex interactions across multiple units, people, and even organizations (Miner and Mezias 1996). Accordingly, our understanding of such learning phenomena is underdeveloped, even speculative. Under these conditions, we chose an investigative a technique referred to as theoretical sampling (Yin 1994), wherein a case is selected as an unique exemplar of a particular phenomenon to bring key dimensions to light. We selected an appropriate case as our context for inquiry into strategic learning.

Based on this inductive inquiry and the existing literature, four characteristics of "strategic learning" became apparent: Data collection efforts are targeted; it is timed to coincide with the strategic action horizon of the firm; it leverages the organization's ability to generate, store, and transport rich de-embedded knowledge across multiple levels for the purpose of enhancing firm performance; and it has institutionally based sensemaking mechanisms in place with associated well defined validation processes. These characteristics are used to craft a set of propositions to guide future inquiry, and to build a theoretical model based on those propositions, which frames how strategic learning can be manifested.

Context of Inquiry

One of the critical challenges that confronted us was identifying an organization, the observation of which provided insight into the practice of strategic learning and

concepts and processes that comprise it. The Center for Army Lessons Learned (CALL), located at Fort Leavenworth, Kansas, is an organization whose expressed purpose is to create versatile, expert-enhanced learning tools for use in coping with and managing strategic events. This case study explores CALL's attempt to institutionalize strategic learning processes into the U.S. Army at multiple levels, including, ultimately, the strategic management level.

The Training and Doctrine Command (TRADOC) of the U.S. Army was created in 1973 as the agency for overall Army development in charge of procedures and training. This command established the Center for Army Lessons Learned in 1985 as a means of collecting new lessons as they emerged from the Army's various training centers and laboratories. Historically, other learning programs had been established prior to, and then disbanded after, each major U.S. Army intervention (e.g., Vietnam), but no ongoing learning mechanism existed before 1985. Since then, the scope of CALL's mission has expanded to include lessons generated from actual operations in addition to those originating from training exercises.

As a very small subunit of the United States Army, CALL sends teams of experts into the field to observe missions first hand—collecting, analyzing, integrating, and interpreting insights from dispersed sources—and then works with both line and staff organizations to disseminate the resultant content in various forms. During the U.S. Army's intervention in Haiti in the fall of 1994, CALL was able to produce new and validated lessons and then deliver them back to the ground troops in Haiti within five days of the observed events. For example, the vignettes, videos, and lessons they created were also used to develop realistic simulations of anticipated conditions in Haiti, complete with belligerent crowds, barking dogs, and rotting garbage, for the purpose of training replacement troops. These lessons learned enabled a series of strategic decisions that facilitated the Army's ability to meet critical mission objectives. One such objective involved the ability to achieve a "seamless troop transition" from the 10th Mountain Division troops, who had stabilized the island, to the 25th Infantry Division troops, who replaced them. For the purposes of this study, CALL provides an example of how an organization transforms and effectively leverages new and historical knowledge to facilitate strategic learning.

Several aspects of CALL are particular to its context within the U.S. Army. First, the Army is a place where much work is performed during crisis, so heedfulness is required (Weick and Roberts 1993); function supersedes form, and individual needs are subsumed to those of the whole. In such an environment, withholding information can cost lives. A culture is emerging in which soldiers are taught to develop "information consciousness"—to view information not as a source of power but as communal property that belongs to the organization and not to individuals (Cook and Yanow 1993 provide a detailed look at culture and learning). Within this culture, lessons get implemented without mandate because good ideas have high currency when lives are at stake. Second, the Army has worked to institutionalize a process called After Action Reviews (AARs). AARs have been a part of standard Army procedure since 1972 (Sullivan and Harper 1996). After every mission and training session, those involved meet together (often with a trained facilitator) to discuss a set of four questions—what was intended, what happened, what was learned, and the action implications for future events. Many CALL staff members start out as AAR facilitators. A wealth of useful knowledge gets generated in these sessions. But most importantly, the institutionalization of AARs has created a climate of double-loop learning in which actions are reflected upon, defensive routines are brought to light, and espoused theories are distinguished from theories-in-use (Argyris and Schon 1978). Third, communities of experts within and across the Army's training centers provide a source of competence that CALL is able to draw upon for the purpose of debating and validating new information. This pool of expertise enables ongoing interpretation of new knowledge (Weick 1995, Kuwada 1998) and simultaneously provides a mechanism for incorporating new lessons into practice (Mosakowski and Zaheer 1996) throughout the Army.

Methods

Informants

To adhere to the logic of theoretical sampling (Glaser and Strauss 1967a), informants at CALL were selected with the aim of providing a wide range of perspectives. During three extended visits over a six-month period, comprehensive interviews with CALL staff and leaders from five areas of the organization were performed: operations and administration, collections, analysis and publication, information systems, and simulation development. Of the 30 full-time staff members working for CALL, 23 were interviewed, for a participation rate of 77%.

In addition to these 23 interviews with CALL staff, three telephone interviews were performed with stakeholders (i.e., current users of CALL products). These three stakeholders were included to determine their level of satisfaction with the CALL products and services they had used. Further, six leaders of the replacement troops

in Haiti were interviewed as a group via a videoconference that was recorded and analyzed as outlined below. These leaders had relied heavily on CALL's training materials and field manuals during the U.S. occupation of Haiti, and were included in the study to provide insights through their perceptions of the CALL system.

Data Collection

Study procedures were designed to allow us to gather information for the purpose of developing theoretical propositions, not to test hypotheses. Towards that end, the three phases of qualitative-based research outlined by Lincoln and Guba (1985) were followed.

Phase 1—Orientation and Overview. The first step in the data collection process involved gaining entry into CALL by contacting its top officers to solicit participation. Once obtained, an initial interview was conducted with the military officer who had administrative oversight of this unit, as well as an interview with the officer who ran the operations of the unit. These were intended to clarify the project and discuss the research logistics. After these interviews were completed, two of the researchers participated in a series of briefings on how the five administrative areas of CALL were organized and operated. Following these briefings the researchers discussed the information that was presented and inferences drawn with the military officer in charge of unit operations. The purpose of this meeting was to validate CALL's purpose and procedures. Finally, prior to further interviews, the researchers also participated in a demonstration of the information technology that CALL makes available to its "clients."

Phase 2—Focused Exploration. Interviews with the participating unit members were conducted on-site at CALL headquarters. The interviews were semistructured (Berg 1989), and informants were encouraged to use their own terminology and experiences. Informants were asked a core set of structured questions and probed for elaborations and explanations of issues as they emerged. In this way interviewees provided "thick" descriptions of events and procedures that pertained to the research questions. A sample of the structured interview questions include:

- What methods and procedures are used for knowledge gathering/creation and why? (i.e., knowledge acquisition);
- What methods are used for knowledge dissemination and why? (i.e., information distribution);
- What processes are used to determine how lessons can be applied to new problems? (i.e., information interpretation);
- What are the impacts/effects of CALL on the Army? (i.e., organizational memory).

During the interviews, various rules of interviewing and data handling were employed (Spradley 1979, Yin 1994). First, interviews were tape recorded when the informants permitted us to do so. Once recorded, the interviews were transcribed verbatim for analysis (see below). In those cases in which the informants (for reasons of anonymity or national security) prohibited tape recording, detailed interview notes were taken and reviewed (generally within 24 hours) for any gaps or inconsistencies. Follow-up phone calls to the interviewees were used to resolve any such issues. Second, as many informants as possible were interviewed to reach theoretical saturation (Glaser and Strauss 1967b).

Phase 3—Member Checks. In addition to interviews, supplemental data collection and member checks were used. Specifically, archival data was collected in the form of newsletters, handbooks, vignettes, and instructional videos produced by CALL, or copied from CALL's web site. This information was collected to enable additional insight to the knowledge-based technologies utilized by CALL. These additional data were also used to triangulate the information gathered from the informants and to validate our interpretations of the interview data. CALL staff members were given copies of our first- and second-order analyses (discussed in detail below) and were asked to provide corrections of facts and to note questions of interpretation. These comments were incorporated into revisions of the final analysis.

Confidentiality

The informants were given the opportunity to ask questions regarding the study's purposes and were assured that their individual responses were entirely confidential. They were also informed that they could refuse to answer any question during the interview. Interviews were tape recorded only with the permission of the subject; the informants were given the opportunity for the tape recorder to be turned off at any time during the interview.

In addition to these measures, several other steps were taken to ensure confidentiality. First, data could not be presented without the written consent of the participants. Second, after the study was completed, all existing notes and cassette recordings of all the interviews were destroyed.

Analysis

Figure 1 below depicts the steps taken during data analysis and the supporting references.

A two-stage process was undertaken to analyze the data collected in the interviews. First, content analysis of the data was performed following the procedures outlined by

Figure 1 General Summary of Qualitative Methodology

Stage 1. First Order Domain Analyses (Spradley 1979)

Purpose: To identify major domains and themes in the data

Steps taken:

- Identify key terms
- Identify connections between terms based on universal semantic relationships
- Group semantic relationships into domains
- Compare across domains

Stage 2. Second Order Analyses (Van Manaan 1979)

Purpose: To develop conceptual relationships among the domains

Steps taken:

- Generalize labels of first order domains
- Abstract domains into second order concepts
- Aggregate second order concepts into analytical dimensions

Spradley (1979). Specifically, this content analysis followed several steps. The first step was to conduct a domain analysis to identify major themes. This was accomplished by taking notes on the data and searching for categories within the data as it was being collected. The information gleaned from initial notes and coding was used to inform further inquiries. The coded data were then placed into domains (first-order), which featured identical semantic relationships between the included terms under a single-cover term (Spradley 1979). Once the domains were specified, a taxonomic analysis was conducted by mapping informants' perceptions of the relationships among the domains they had identified. This hierarchically categorizes informants' conceptual schema into subcategories that are related in similar semantic ways (for example, *X* is a characteristic of *Y*).

With the first-order analysis complete, a second-order analysis (Van Maanen 1979) was performed to move beyond the data-induced domains and toward interpretations of the relationships among the domains and themes in the first-order data. These relationships were then studied, revised, and reflected upon in an attempt to begin the building of grounded theory (Strauss and Corbin 1990). The first-order analysis represents the data within domains as they are conceived of by the informants, while the second-order analysis moves beyond this inductive representation of the data to embody the researchers interpretations of these domains, and to develop conceptual relationships among them. The steps followed in both the first- and second-order analysis are described in detail below.

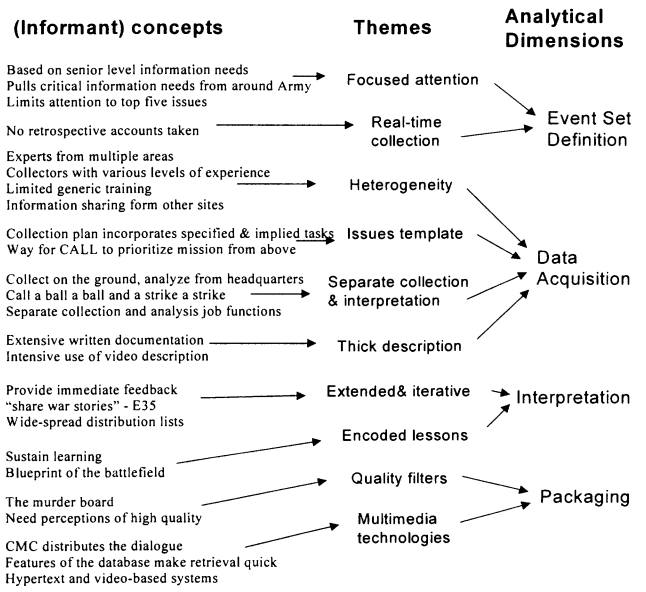
First- and Second-Order Analysis. In making a domain (first-order) analysis, we used four primary steps (Spradley 1979). First, verbatim notes were reviewed and sections were selected as the basis for analysis. Once selected, key terms were identified as provided by the informant and possible related terms were identified. "In-vivo" codes (Strauss and Corbin 1990) were used within the domain analysis whenever possible. This process was repeated until all the notes were examined and all relevant terms were identified. The next step involved identification of connections between the terms based on the universal semantic relationships provided by Spradley (1979, p. 111). The importance of these semantic relationships is two-fold: First, they provide meaning to the relationships between informant-generated terms; and second, they are a critical part of performing a taxonomic analysis.

Performing a taxonomic analysis is a process used to find relationships among subsets of domains, and involves a variety of steps. As noted by Spradley (1979), the first step is to identify domains in which substantial information is available. Because domains and taxonomies involve a single type of semantic relationship, the next step is to group semantic relationships. Once this step is completed, the researcher can move beyond the single domain and compare across domains to see how these domains may be related.

With the first-order domain analysis complete, a second-order analysis of the interview data was conducted. While the first-order analysis sought to remain with the data and let the data speak for itself, the purpose of the second-order analysis was to develop a higher level of abstraction and conceptualize how the various domains may be related and labeled. Labels of these second-order themes were derived by developing the more general labels (e.g., "focused issue group") that described first-order groupings. Finally, second-order themes were aggregated into analytical dimensions to provide a "superordinate" framework for organizing the emergent findings. We refer to these as "gestalts." Figure 2 (below) illustrates the relationship between first-order and second-order findings, and the gestalts that formed the foundation of our model of strategic learning.

In addition to these qualitatively rigorous analyses, the authors and a research assistant conducted an impressionistic analysis (Van Maanen 1988) to try to gain a general

Figure 2 Analytical Framework



sense of patterns in the data. Overall, then, we assessed convergence across the multiple analytical techniques to establish confidence in our findings. Discussions among the authors, often involving CALL staff, were used to resolve inconsistencies and ambiguities.

Findings

The second-order findings below are grouped into four gestalts for presentation. The first describes the principles that CALL uses to target learning events deemed to be strategic. The second looks at the structures and processes they use to perform data collection. The third presents the activities CALL undertakes to transform raw data into organizationally interpreted lessons. Section 4 describes ways that CALL packages and makes these interpretations available to the rest of the Army organization for widespread assimilation. Propositions are included in each section that reflect the relevant processes and implications of strategic learning. Appropriate extant theory is interspersed with the interpretive results to ground and support them in the literature.

Defining the Event Set

Senior officers of the Army outside of CALL's jurisdiction are charged with identifying general areas of learning opportunity. This involves senior management in creating the fundamental foundation of strategic learning and removes CALL from the politics of strategy making, which makes them less susceptible to bias in foci development. This arrangement serves to extend the information processing capacity of senior management, embodying the notion of critical incident-based learning discussed by March et al. (1991). Learning events are selected because they offer insight, affect the world, and reflect novel or problematic settings that test key strategic beliefs, theories, and practices. The focused collection of knowledge thus works to efficiently allocate resources between contextual and generalizable new knowledge (Levitt and March 1988) and between current and future information needs (Teece et al. 2000).

A Telescope, Not a Vacuum Cleaner. CALL staff, and particularly the ranking officer-in-charge, continually network with senior leaders throughout the Army to identify critical learning events. Such events are candidates for hosting an observation team of experts who gather the raw data that will eventually become new knowledge after undergoing the interpretation processes described below. In this way, potential sources of strategic learning are continuously identified (Nonaka and Takeuchi 1995, Kuwada 1998). Haiti was selected for observation because it was an "operation other than war," and so offered new challenges for the Army, a potentially generalizable learning opportunity. For example, arrival troops were launched from an aircraft carrier—a completely new entry tactic. Similarly, anticipated transfer of command to non-U.S. military represented a major new challenge to Army leadership. For these reasons, the senior leadership of the Army decided that a team of experts would be sent to Haiti to observe first-hand how these new situations were to be handled, and to develop learning strategies on the spot.

In the past, data collection for organizational learning in the Army "had taken a 'vacuum cleaner approach;' observation teams were widely deployed, and little attempt was made to define specific learning objectives a priori" (Director). This strategy resulted in the collection of massive quantities of raw data that overloaded the Army's capacity to turn it into useful learning that could inform future engagements. Now, CALL incorporates an informal attention-directing framework (see Hall 1984) to carefully select an event for observation that it believes has a high potential for generating data and knowledge with future strategic value.

PROPOSITION 1A. *Strategic learning involves focused attention to those events that have direct links to the organization's strategy, theories, and practices, as perceived by the top management team.*

Real-Time Observation. Learning events are observed by CALL collection teams as they occur, and thick descriptions are gathered in real time. Rich, first-hand

accounts sustain the "ground truth" of observations as they are processed into lessons and interactional procedures (Wenger 1998). Collectors talk with members of the community being observed to collect multiple perspectives on the event, and they discuss their observations with the ground commander before reflecting on them with other team members. Direct observation of events and discussion of findings across multiple members enables the construction of rich experiences and chains of causal belief from small samples, increasing the validity of the strategic learning (March et. al. 1991).

PROPOSITION 1B. *Strategic learning units collect knowledge in real time to promote the richness and validity of the learning event.*

Knowledge Acquisition

Data and knowledge are acquired in real time by an observation team that has been deployed in parallel to the targeted learning event. Preliminary steps include forming the team and creating a learning template.

Designing the Team. Data collection teams are composed of eight to 12 "guest experts" borrowed from units across the Army. It is CALL's job to identify and recruit these dispersed experts. Team design consists of identifying those specialist roles most relevant to the particular knowledge sought. For example, in addition to specialists in such areas as logistics and communications, the Haiti team included a pastor and a linguist responsible for addressing the cultural issues that are important for "operations other than war." A team leader is identified and recruited from outside the CALL organization. He or she is selected primarily on the basis of rank and network, which serves to provide an entrée to the unit to be observed. An Operations Officer (Opsco) is selected from the CALL organization to share team leadership responsibilities with the "guest" leader.

In this way, a list of the ideal team configuration is developed and distributed to the eight service schools around the Army that CALL draws upon to build its observation teams. In recruiting, CALL seeks experts that have the interpersonal skills to make good collectors on the ground because expertise alone is not sufficient. These cross-functional teams provide the requisite variety (Ashby 1956) necessary for understanding highly complex systems. CALL's cross-disciplinary field of experts serves to diffuse best practices (Kotha 1995), enables deep knowledge mining, and allows events to be experienced richly for enhanced reliability and validity of learning (March et. al. 1991). Highly specialized "guest" experts are brought in to fill knowledge gaps for particular learning events. They are able to interpret events deeply for absorption at extremely high levels of complexity and specialization, and interpretation processes are enriched by the different disciplinary perspectives brought to bear on new events. Core team members are selected for their multiple weak ties (Granovetter 1992), which they use to access diverse and remote sources of information and support. Leaders work to guide the collection process and direct information crossover between disciplines, enabling interdependence through redundancy.

PROPOSITION 2A. *Strategic learning utilizes decentralized and heterogeneous communities of experts from within and outside the organization to guide knowledge acquisition and reduce interpretive bias.*

Modeling the Collection Process. Prior to deployment in the field, team members travel to CALL for training (although some missions, such as the one to Haiti, deploy so fast that most team training occurs in the field). But, before leaving their schools of origin, each expert works with other specialists in his or her field to generate a list of issues and questions to be addressed by the observation team. Out of this process, each expert brings to CALL a list specific to his or her discipline that identifies areas where knowledge of current practice is thin or obsolete. During training, CALL works with each team member to develop customized "directed telescope" (Opsco) collection plans from these lists, consisting of hierarchical levels of questions focused on each area of expertise (Hedlund and Nonaka 1993, Hedlund 1994). Each item on the list is expanded into increasingly detailed sets of questions concerning events that members expect to observe in the field. These collection plans serve to keep each team member focused on critical information requirements and provide a structure within which to locate the myriad details collected during actual observation. Plans may be modified during collection to include new, but related, questions discovered by experts as they delve more deeply into their areas of concern. A computerized collection system has been developed, but word processors and pen and paper were used to collect observations in Haiti. At this stage an initial report is also prepared from archival knowledge that provides preliminary contextual information on the arena to be entered (e.g., local weather, disease threats, topography, and politics).

PROPOSITION 2B. *Data collection for strategic learning involves developing an issues template to guide collection and utilize archival knowledge that represents a contextual model of the learning event.*

Minimizing Bias. Interpretation processes require mechanisms to control for bias (Daft and Weick 1984). Awareness of the potential for interpretation bias is promoted throughout CALL, emphasizing and engendering

the norm of objectivity. Both collection and analysis processes apply broad-based experience and multiple perspectives to control for within-process bias.

Separation of the roles of data collection and analysis works as a mechanism to minimize the risk of bias in lessons by increasing the reliability of new learnings. Analysts at headquarters extend and appropriate new knowledge as it is generated (after Hedlund 1994), and release preliminary knowledge to solicit feedback. This feedback, in turn, gets iterated through multiple causal feedback loops (Von Hippel 1994, Monge 1990) that serve to prevent premature closure on the interpretation. This role separation makes visible the potential for subjective bias in the interpretation process (Cook and Campbell 1979) and institutionalizes the theory of causal proof embedded in the scientific method. Geographic distance physically manifests the role separation between collectors and analysts, and affords the analysts the opportunity to acknowledge biased information.

PROPOSITION 2C. *Data collection and analysis are kept separate during strategic learning to take advantage of and to coordinate multimethods and perspectives during interpretation.*

Exploring and Exploiting. Collection team members join in on field missions to look for factual observable events to document as observations. Members seek to identify systemic problems rather than those due to error or temporary anomalies (e.g., "we ask, is this observation really important, or is it just a weak link due to incompetence?"—Team Leader). Observations consist not only of problems, but also of "work-around" solutions and exemplary ways of doing things, which also serve to give credit where it is due. Observation information must be operational in nature—a learning event that results in a "lesson to purchase a new aircraft carrier won't fly" (Opsco).

Once on site, CALL team members observe events in real time. Their task is to "thread the needle" (Opsco)—trace the path of a problem back to its source to gain a rich understanding of what happened and why, collecting evidence along the way. They call this understanding "ground truth" because it is the result of weaving the interpretations of many people into a consensus of what occurred and why. In this way it generates problem structures (i.e., identification of critical variables and relationships that define the problem—see Simon 1973) not just descriptions of problem situations. Such an understanding promotes the realization that a gap exists between what is occurring and what should/could occur (Mintzberg et al. 1976). In this sense, CALL observers develop ad hoc theories of what the problem is and how it can be dealt with (Rein and Schon 1977).

In Haiti, CALL observers took part in important missions, talked with people at all levels, attended all AAR meetings, and recorded the details of issues related to their domain of expertise as per their customized collection plans. On a typical mission, a CALL observation team member might obtain live video of action, write down a rich description of what happened, and note with diagrams possible causes and consequences of the event, mentally comparing these results with other similar operations he/she had observed in the past. Immediately following the mission, observers discuss and verify their observations with the commander of the mission, eliciting the leadership perspective. Later that same evening, they discuss this raw data further among themselves to bring multiple perspectives to bear on the narratives they have generated (Boland and Tenkasi 1995), and to serve as a validity check (March et al. 1991). Most observations require follow-up investigation that includes early feedback from an assigned analyst back at headquarters. This analyst becomes involved by procuring the insights of other Army experts and by providing team members in Haiti with additional information that they find they need over time (for example, the codes under which new observations are to be indexed). In this way, diverse, detailed organizational interpretations are brought to bear on observed events and related issues.[1]

PROPOSITION 2D. *Observations for strategic learning consist of thick, contextually rich description and a focus on developing and structuring critical issues associated with the event.*

Interpretation

During analysis, the raw data of observations get processed into lessons through an expanded interpretation process that includes feedback from around the Army. For example, while the team was on the ground in Haiti, the assigned analyst back at headquarters was communicating with them to "devise better questions" (Military Analyst) by soliciting the views of additional Army experts. In this way, multiple interpretations were brought to bear (Daft and Weick 1984) on the new knowledge as it was generated, and technology-enabled rounds of discussion, reflection, feedback solicitation, and editing produced lessons codified for storage in electronic organizational memory—the lessons-learned database. In this way communication technologies enable the production of shared perspectives from the rich narratives built from observed experience (Boland and Tenkasi 1995).

A Distributed Dialogue. Within days after the collection team arrived in Haiti it began sending observations of events to CALL headquarters at the rate of five to 10

per day (primarily by telephone, later by satellite) in the form of thick descriptions. The diagrams and videos that supported these observations were sent later by mail ship or personal carrier. At headquarters, analysts indexed these observations variously, scanned them for formatting and grammatical errors, and confirmed the anonymity of those providing the information. They also posted these observations on electronic bulletin boards and distributed them to electronic distribution lists to solicit feedback from networks of appropriate specialists. Bulletin boards are open forums aimed at wide audiences, while distribution lists target those members interested in particular topics. Together, these technologies enable CALL to keep communities of experts abreast of new developments in their fields, and enable broad-based review and input around particular genres of lessons. For example, experts in logistics subscribe to a logistics distribution list, so that they receive pointers to new perspectives that CALL helps generate in the domain of logistics. At the same time, an open logistics discussion group encourages input from those with an interest but no deep expertise in the logistics area. By keeping as much of the original description (including video clips) as possible linked to more succinct descriptions, CALL uses the hypertext and multimedia capabilities of the technology to enact highly thick and rich descriptions. In this way, technologies are employed to support the exploration of differentiated meaning and facilitate the conduct of dialogue among diverse experts (Tenkasi and Boland 1996). Analysts use this feedback to identify relationships between new knowledge and existing organizational knowledge, to expand the circle of interest brought to bear on new observations, and to identify new issues and questions to be communicated back down to the ground team for additional data collection.

For example, analysts helped to clarify how the Army should work with non-Army organizations in Haiti, such as the local government, Haitian police, and multinational forces. This required extensive negotiation with Haitian factions, and the establishment of many new procedures (Mosakowski and Zaheer 1996). Analysts at CALL functioned as information conduits, checking with experts across the Army as to the best ways to approach these challenges (Kotha 1995) and responding to the information needs of those in Haiti to prevent international incidents. By facilitating electronic dialogue among the multiple constituents and coalitions, analysts kept the interpretive debate open, redirecting issues to other participants where necessary to avoid premature convergence and closure. Allowing the issue to "percolate" provided an opportunity for CALL to sort out the ambiguities (cf. Jemison and Sitkin 1986, Thomas and Trevino 1993)

PROPOSITION 3A. *Strategic learning involves accessing the insights of experts throughout the organization to promote a rich, extended dialogue and provide multiple interpretations of learning events.*

Classification. Observations, once interpreted and codified, are called lessons. CALL uses two types of indexing schemes to enable entry and retrieval of lessons in their "lessons learned" database. First, structural indexing based on a priori and widely shared coding schemes enables structured keyword access to learning. The CALL database can be browsed using the Library of Congress subject coding system or by using other attributes of the learning event, such as time, place, and date. Another structural coding scheme is based on the Army-wide distinction between conditions, tasks, and standards. Tasks and standards do not change from one location to another, while conditions do. Standards apply to tasks variously, depending on the conditions or context in which they occur. CALL indexes its lessons according to the conditions, tasks, and standards that apply.

Second, process-based indexing schemes offer an organizationally specific approach to knowledge access and afford CALL more flexibility than static archival schemes. In the U.S. Army, the "Blueprint of the Battlefield" maps all organizational processes and functions as a dynamic enterprise model. Because this type of model can reflect many levels of abstraction, learning "classes" can be established that enable intelligent searching. This process blueprint is used by analysts to relate new learning to current processes, and to integrate new lessons into appropriate contexts for understanding future consequences. These attributes assist individuals in making interpretations about the particular situation and engaging others in dialogue about them. Such multiple and flexible coding schemes enable the multiplicity and indeterminancy necessary for information systems to support distributed cognition (Boland et al. 1994). While many organizations do not have a completed enterprise model, other documentation can be utilized for this purpose, such as Intranet directories and database inventories.

PROPOSITION 3B. *Ongoing strategic learning requires that interpretations of observation events are coded and indexed for ready access across multiple current and future contexts and issues.*

Packaging the Product—Knowledge Assimilation

The goal of CALL is to effect Army-wide rapid behavioral transformation in response to changing circumstances. "CALL does not consider its lessons learned until they engender behavioral change" (General). Its purpose is not to build a knowledge base per se, but to actively

engage in the process of challenging assumptions and altering the set of available behavioral options for a given event. To this end, they strive to achieve a customer focus as they deliver lessons through three channels: self-service, customized, and generic or mass market. Self-service learning occurs when Army staff members use the lesson database online from remote locations to do their own research. This channel is currently the least used of the three, but CALL is working to expand Army use of this access mechanism. CALL also develops customized products in response to specific requests; they produced, for example, more than one hundred vignettes and prepared a video briefing for commanders to use to create training simulations for the replacement troops entering Haiti. The third channel of their product delivery is aimed at wide audiences and published in the form of handbooks, newsletters, and training materials.

Through these channels, lessons are incorporated into long-term organizational memory through modification of formal training programs and manuals (Walsh and Ungson 1991), and the ongoing movement of noncanonical practices into organizational canons becomes institutionalized (Brown and Duguid 1991). Midrange products have near-term behavioral impacts when CALL distributes its field handbooks and newsletters—long before their lessons are incorporated into formal development materials. These midrange products have no formal release approval process. The onus is on the community of relevant experts to monitor observations as they are published, electronically and otherwise.

Quality for Assimilation. CALL has no authority to mandate implementation of its lessons; lessons are integrated into organizational routines (Grant 1996) on the basis of their quality alone. Thus, the organization's effectiveness depends on the quality of its published content and the credibility of the organization (Gioia and Thomas 1996). By focusing on how to add value to Army operations, they create demand and generate a "pull" rather than a "push" effect for their products. Lessons with apparent wisdom and "ground truth" will stand on their own merit. Every attempt is made to maintain high standards, because release of lessons judged ineffective could adversely affect the reputation of the organization.

It is to this end that CALL undertakes the "murder board" process, so-called because its purpose is to axe lessons—those deemed not important enough to be widely distributed. The Haiti team returned to Ft. Leavenworth after generating a critical mass of lessons during two months of observation work. In a three-day meeting, team members put aside their functional loyalties to decide which lessons should be published in an "initial impressions" report and in the field manual sent to thousands of ground and replacement troops. This process acts as a filter to prevent all but the highest quality lessons from being released (March et. al. 1991, Kotha 1995). CALL also continuously assesses its products for accuracy through informal customer evaluation, for example, by telephoning users to identify changes in lesson application and relevance and to solicit suggestions for improvement.

PROPOSITION 4A. *Impact filters that engender lessons with the potential for high-quality learning are incorporated in strategic learning to increase the probability that lessons will result in assimilation and behavioral transformation.*

While clearly face-to-face interaction is the optimal arrangement for externalizing tacit knowledge, it may be a luxury for global organizations where critical learning events continuously occur at a distance. Of particular interest here is the process by which experiential and business-level knowledge is converted into corporate-level knowledge and basic assumptions. Kuwada (1998) calls this process *strategic knowledge distillation*, and identifies it as a key driver of strategic learning that begs further investigation. Strategic knowledge distillation entails a conversion of procedural knowledge into declarative knowledge, and therefore underlies all forms of knowledge sharing that rely on externalization. Once externalized, knowledge which is explicit can presumably be stored digitally.

CALL relies heavily on advanced technologies to speed this process. To move new knowledge rapidly around the organization and support the simultaneous contribution and collaboration of multiple members, CALL relies on three types of technologies: (1) telecommunications capabilities, (2) a multi-indexed knowledge base, and (3) multimedia capability.

Computer-Mediated Communication (CMC) for Soliciting Input. Collaborative online groups provide a forum for efficiently integrating the views of diverse members (Finholt et al. 1990). In this vein, CALL analysts "hang" new knowledge on accessible bulletin boards for simultaneous review by multiple members. This creates competency networks in which professionals have the opportunity to challenge evolving interpretations—a process that promotes rich debate and leads to high-quality lessons learned. CMC also serves to distribute new learnings because feedback regarding new ideas can only be solicited from those who have absorbed them. Thus, CMC bridges the boundaries between knowledge generation, interpretation, and distribution (Haeckel and Nolan 1993). By enabling input from many members, it expands the scope of the consensual basis for acceptance of new

knowledge and the capacity for perspective making (Boland and Tenkasi 1995). By providing a means through which new knowledge can be widely shared, CMC enhances the reliability of learning by creating a forum for constructing and sharing beliefs (March et al. 1991), for confirming consensual interpretations, and for preventing rejection of novel ideas.

Knowledge-Base Attributes for Storage and Retrieval. Organizational memory is a critical component of all organizational learning systems (Walsh and Ungson 1991, Huber 1991). In addition to storage in individual memories and interindividual relations, organizational knowledge can be stored electronically as text or video (Huber 1990). Sophisticated retrieval systems for computer-resident organizational memory can be superior to some aspects of human organizational memory (Stein and Zwass 1995). However, the "strategic" value of electronic organizational memory depends on the extent to which it is used to bring knowledge to bear on future events. For this reason, storage considerations must be driven by assimilation processes if they are to change behavior—coding and indexing schemes must anticipate future access needs, and organizational databases should have flexible structures, storage and retrieval mechanisms, and multiple coding schemes (Boland et. al. 1994, Huber 1990). Medical information systems that utilized multiple coding schemes to meet the various cognitive needs of multiple clients are good examples of such schemes (Cimino et al. 1993).

Multimedia for Tacit Knowledge Transfer. A picture is worth a thousand words, especially for strategic learning. Tacit or procedural knowledge can be transferred via rich media, such as videotape (Daft and Lengel 1986). CALL uses video extensively for Army-wide development of training simulations for tacit knowledge transfer. Simulations of copresence are especially useful in training for events that require rapid response, and can be built around those events that are most likely to recur. Multimedia products provide rich contextualization of new knowledge—viewers can witness events in great visual detail and approach the experience of the actual participants (Daft and Lengel 1986). By using hypertext technology to link situated contextualized, episodic memory to the more general semantic (Stein and Zwass 1995) lessons that grew from it, CALL offers the capability for understanding the origins of new knowledge. As a delivery vehicle for new lessons, CALL provides its clients with customized videos designed and edited to meet the needs of the particular clients. The literature identifies shared experience and its implication of copresence as necessary for tacit knowledge transfer (Anderson 1983, Nonaka 1994), and clearly copresence is optimal for transfer of tacit knowledge. However, where copresence is not possible, as with distance learning, CALL works hard to provide as many different types of accounts as possible, using different media, to approach the challenge of tacit knowledge transfer. By reading rich textual accounts (i.e., vignettes) and watching videos of complex events and then imagining best possible actions, soldiers mentally rehearse future tacit experiences. By watching videotapes of distal conferences, commanders learn tacit nuances of the experience such as emotional reactions and leadership tactics. No single medium can support tacit knowledge transfer alone (Tenkasi and Boland 1996). However, by exposing members to multiple accounts, told in multiple ways, of the perspectives derived from real experience, CALL works to embed the tacit within explicit content. Recipients get a tacit feel for the context in the spaces between the multiple accounts they are exposed to. In this way CALL approximates the nonembedded transfer of both tacit and explicit knowledge (Nonaka 1994) that helps make strategic learning effective.

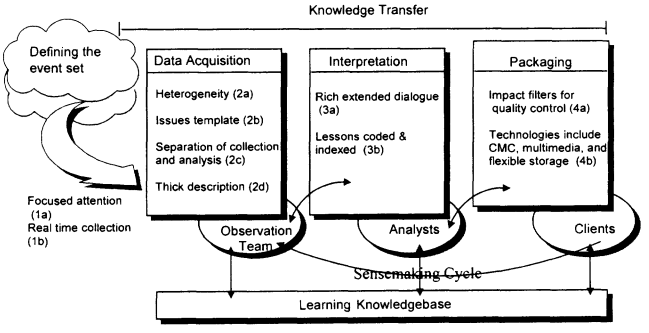
PROPOSITION 4B. *Strategic learning utilizes broad-based technologies to facilitate the nonembedded transfer of tacit and explicit knowledge.*

Figure 3 (below) presents a model of strategic learning that emerges from these findings and uses the propositions as the fundamental building blocks. The model summarizes the critical constructs and process flows that define such a system of strategic learning.

Discussion

This investigation of "strategic learning" began with a basic premise that knowledge generation and assimilation processes can be a sustainable source of competitive advantage (Barabba and Zaltman 1991, Nonaka 1994). Indeed, organizations that can convert information into knowledge and learning will be the most successful

Figure 3 Emergent Model of Strategic Learning



(Davis and Botkin 1994), especially those in highly turbulent environments (Volberda 1996). Theories of managerial cognition stress the importance of organizational knowledge bases for supporting managers' strategic choices (Walsh 1995), suggesting (and supported by the findings of this study) that sensemaking processes play a valued role in such learning. The resultant strategic learning becomes a key asset to the firm (Kuwada 1998, Glynn 1996) and, when integrated into the organization's memory, can contribute to organizational effectiveness (Walsh and Ungson 1991, Stein and Zwass 1995).

This study supports previous conceptions of strategic learning in several ways. First, it shares with other researchers the emphasis on rich experience for supporting creation of diverse meanings and assimilation of tacit knowledge (Kuwada 1998). Rich descriptions elaborate the contextual bases of learning so that even deembedded content can foster discovery and interpretation processes. Second, this study supports previous conceptions of strategic learning that stress the need to utilize diverse, heterogeneous experts to collect, interpret, or validate raw data. Therefore, team selection is a critical point of exposure for the validity of lessons learned through strategic learning. CALL goes to great lengths to ensure multiple diverse perspectives on a given team by choosing members across different units in the Army and including outside experts where appropriate.

This study departs from previous conceptions in several interesting and ultimately insightful ways. For example, CALL has evolved *intentional* learning mechanisms, the use of which enable them to design how to bound the amount and collection of data. Previous conceptions of strategic learning prescribe the use of slack resources and autonomy to seed multiple low-level experiments in the hopes that some will bear serendipitous fruit and alter basic assumptions regarding possible new approaches and fields (e.g., Van de Ven and Polley 1992). CALL takes the opposing tact, using the current frames of senior managers to allocate resources to areas of high potential, placing high stakes on the few best options. This system works because it is used incisively—as a scalpel—to carve out learnings from only those processes that represent strategic opportunity. The value realized depends on the centrality of the events chosen and the extent of knowledge reuse as applied to future events. Because it is difficult to know in advance whether a particular event warrants investment, event targeting entails risk and is a critical process. Organizations can mitigate this risk by probing hard to learn where strategic events are most likely to occur and reoccur.

In this way the processes depicted here are distinct from the assumption-challenging learning and innovation that defines much of the current thinking on strategic learning (e.g., Kuwada 1998). Strategic learning as developed by CALL means prescribing learning domains a priori based on strategic assumptions in place. We can understand these two forms as diverse manifestations of strategic learning that lie at opposite ends of a continuum. Firms that want to enhance their strategic learning capability should understand where they lie on this dimension, and take this into account when they consider how tightly to design their learning processes (Haeckel and Nolan 1993) because the dimension reflects assumptions about the potential for control and design. Clearly it's important to maximize an organization's reflective capability to capitalize on serendipity, but it's also important to optimize what the organization learns from its ongoing strategic practices. Elements of both perspectives of strategic learning can be effective at different times, depending on the organization, its environment, and assumed fit. Indeed, one of the important implications of the study may be the observation that strategic learning has different faces and true learning of this type may involve developing a portfolio of processes and perspectives.

Finally, this technology platform enabled feedback at a speed that was not achievable on a sustainable basis through face-to-face contact. For example, CALL discovered, validated, and distributed lessons learned during the Haitian operation on a five-day cycle. This capability created the attribute of timeliness, that in turn increased the value of the knowledge asset for those making decisions in the field. While all situations may not require such speed, the credibility of the CALL organization was significantly enhanced by their timely responses. This credibility became a powerful motivator for others to participate in the knowledge-sharing process.

Another issue of theoretical importance to strategic learning is whether raw data should be collected by internal organizational members or by external "data gatherers." Kuwada (1998) identifies internal managers as important for translating business-level knowledge into corporate level understanding. CALL believes that teams external to the contextualized processes under study are better suited for data collection than internal managers because of the objective expertise they can bring to bear. However, this use of external teams creates an additional boundary that naturally obscures history (Weick 1995). Yet, internal groups may be too close to the process, introducing bias through the application of organizational heuristics. Theoretically, we need to understand this sense-making paradox. The use of external gatherers enables collection of very deep, complex content, whereas the use of internal organizational members maximizes the understanding of local content and ambiguity. The

strengths and weaknesses of each approach need to be further examined; indeed, the best solution may be the creation of midrange roles that are matrixed.

A fundamental issue raised by this research is the role and use of technology in this domain. This study suggests that explicit learning processes such as CALL's, that combine the use of video, images, and rich text, can be erected to discipline the knowledge-acquisition process and used to leverage the firm by preparing it for future strategic action. This theme acknowledges that the tacit/explicit distinction is not a dichotomy but a continuum (Cook and Brown 1999). As digitized video and hypertext multimedia technologies become more commonplace, a system that combines them may be the best option for gathering contextual and tacit knowledge when colocation is not an option. Clearly, tacit knowledge is less appropriate for de-embedded storage than is explicit knowledge. As one moves from tacit knowledge to stored explicit knowledge, information is lost, and while CALL uses advanced technologies to mitigate this information loss, it is important to understand when technology can be applied to stop "information bleeding."

Technology offers opportunities for enhancing strategic learning when it necessarily transpires over distance. It also serves a critical role in the knowledge-validation process because it is electronic bulletin boards and listservs that serve to expand the interpretive field from a few members to numerous topical experts. Fundamentally, these collaborative technologies enhance the perpective-making (Boland 1995) capability of the organization by increasing the number of perspectives that are brought to bear on an event stream. Theoretically, without these technologies the interpretive process operates at the group level, but with them they operate at an organizational level and provide a high incidence of integration. As experts throughout the organization participate in the process of interpreting and validating new lessons, they facilitate enculturation of the knowledge and help to create a sense of ownership. So, while the primary function of these experts is to bring deep yet diverse knowledge sets to bear for improved validity (March et al. 1991), a natural by-product of this process is enhanced learning assimilation.

Technology also offers CALL the capability for developing their lessons-learned databases and organizational canons (or doctrines) digitally, structured so that increasing complexity is available through hierarchically linked levels of content. Such canons enable the contextual richness to reflect modus operandi, but also provide frames to minimize overload and structure search. The extent to which organizations are able to build canons that reflect modus operandi without introducing intractable complexity is an important stream for future research. But, it is clear from this case that technology can be used to leverage strategic learning capability across distance and multiple levels of analysis. The extent to which it is put into place to do so is becoming a design consideration for strategic learning systems.

A key theoretical lever for understanding strategic learning and its implications for future-oriented, even radical, change is the role of *sensemaking*, both as an individual and organizational conduit for learning (see Figure 3). While researchers have shown that a relationship between sensemaking and firm performance exists (e.g., Thomas et. al. 1993), it is not clear why such a linkage often persists. Our analysis of CALL sheds some theoretical light here, suggesting that the scanning, interpretation, and action components of sensemaking (Weick 1995) rise to strategic relevance when guided by the procedural and philosophical underpinnings of strategic learning as presented here. In terms of future research, another fruitful direction may be to show the systematic relationship between this intersection of strategic learning and organizational sensemaking from both a theoretical as well as a procedural perspective.

Additional research paths are suggested by the case findings. First, the role and implications of politics in strategic learning appears as a fruitful research tack. What is the systematic relationship between politics and learning? Do the structures illustrated in the case minimize politically driven learning bias, and if so, how? Second, we need to know more about the nuances of learning "communities" that cross organizational boundaries for the purpose of interpreting new learning opportunities. What special qualities of such a group should managers be sensitive to for managing learning effectiveness? Third, the Army has in place a coding system that facilitates the timely acquisition of lessons learned by the general organizational membership. What can we learn from such a scheme, and what should be the theoretical assumptions the drive such a system? And finally, the findings suggest that tacit information can be de-embedded and successfully transferred. What are the limits of the process of transferring de-embedded tacit knowledge? Can this process even be replicated in other organizations? What other forms of de-embedded knowledge can be transferred most quickly and accurately? Where does it make more sense to rely on embedded transfer mechanisms? What does codified knowledge mean when applied to stored video cuts?

The findings of this research provide a rich theoretical description of how one organization is developing the systemic capability to rapidly learn from ongoing practice and to create foreshadowed knowledge of future events.

In so doing, it stands at one end of several dimensions that researchers can use to understand strategic learning in other organizations, and that practitioners can use as design parameters to build variants of this system. While no single organization has a system resembling CALL's in its entirety, many organizations have set up mechanisms and processes that lie somewhere along the dimensions identified here. By identifying how such mechanisms and processes are most advantageous for particular organizational forms, we pave the way for future empirical work in this area to be comparable and cumulative and encourage inquiry into the streams of research that these dimensions and design parameters manifest.

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Endnote

[1]Many of these procedures are similar to those proposed by Yin (1994), suggesting that strategic learning may involve some use of the systematic, formal rules of qualitative research.

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