

Information Sharing And Its Link To Organizational Sub-Cultures In A Manufacturing Company

Toni Powell, (Email: tpowell@mail.barry.edu), Barry University

Abstract

This study examined the cultures of two organizational departments and the relationship between their cultural norms and the effectiveness of their departmental information sharing systems. The findings indicated that (1) the two departments, described for the purpose of this study as “sub-cultures,” had developed conflicting norms which appeared linked to their departmental information sharing effectiveness; (2) during an organizational change process that involved rotation of department managers, workers underwent a three-stage change process identified as unlearning-boundary spanning-re-framing, similar to Lewin’s unfreezing model. These findings suggest that (1) department managers can play a major role in the learning and development of employees and should be supported in doing so; and (2) the organization consider a more holistic structure, where common language and mental models could alleviate and possibly eliminate the confusion and misinformation resulting from organizational sub-cultures.

1.0 Introduction

Although an extensive body of research on organizational information sharing and sub-cultures exists, little research has been reported on the relationship between sub-cultural norms and the information sharing efforts of department members. This qualitative study examined organizational issues that embed the information sharing processes of two departments in a global organization. There are some interesting questions that arise out of such an investigation. How do sub-cultures existing in one organization develop norms that appear so different from each other? How are these norms linked to the way in which information is received and shared among department workers? To what extent do the departments’ histories, myths, and traditions play a role in impacting on the information sharing processes?

2.0 Organizational Sub-Cultures And Information Sharing

With the increasing pressure to compete globally, American manufacturing companies confront a plethora of new information to be shared and distributed throughout the system. Organizations today are more vast, fragmented and multi-dimensional than ever before and often encounter serious problems in the sharing and dissemination of information (Daft & Weick, 1984). It is not unusual in multiunit organizations for members of one operating unit who need specific knowledge from other operating units to find themselves unable to determine whether such knowledge exists in the organization at all, or if it does, where it can be found (Hanson, 1999).

Departments often are unaware of the existence of certain information due, in part, to the development of their own unique semantics. Operating units such as these are often composed of specialists "who, in most fields cannot talk across specialties" (Isaacs, 1993, p.29) and can become so isolated from the corporate culture as to become sub-cultures (Schein, 1990). A sub-culture often emerges with its own language by which it defines reality and creates a set of unique

Readers with comments or questions are encouraged to contact the author via email.

shared beliefs. These collective beliefs lead to ambiguity and, as a result, a breakdown in communication across

boundaries (Tushman and Scanlan, 1981).

An organizational culture "includes a pattern of basic assumptions developed by its members over time, thought to be valid and taught to new members as a correct way to perceive, think and feel" (Schein, 1990, p.111). From systems theory comes the premise that the organization, as a system, tends toward a kind of equilibrium and tries to reduce dissonance, bringing assumptions and beliefs into alignment with each other (Lewin, 1952; Schein, 1990) However, an organizational culture often develops sub-cultures which, in turn, can create dissonance and disharmony. Each sub-culture, operating as a mini-system, develops its own communication network and, over time, evolves into a unique subset of norms, assumptions and behaviors (Schein, 1990).

When information is widely distributed in an organization, retrieval efforts are more likely to succeed, and individuals and their department members are more likely to be able to learn (Huber, 1996). One researcher (Simon, 1991) noted that "What one person in an organization learns depends on what is already known by other organization members and what other kinds of information is available in the workplace" (p.176). However, when information is not widely shared, the organizational learning may be lessened. When organizations are comprised of multiple sub-groups with different degrees of overlap, (e.g., product development teams, functional departments, and regional offices) relevant knowledge is often available only in a distal part of the organization. As a result, retrieval of that knowledge often becomes extremely difficult (Anand, *et.al.*,1998). Unsurprisingly, isolated units, where sub-cultures often evolve, are the most seriously impacted by their inability to access knowledge.

3.0 Methodology

The study took place at a mid-sized global company that manufactures blood analysis instruments. Franklin Corporation (a fictitious name) is a leading provider of instrument systems that range from centrifuges and blood analyzers to diagnostic rapid-test kits. With offices in 130 countries, annual sales for the company totaled two billion in 2001. Its Research and Development units are located in California and London; the Manufacturing and Corporate Offices, however, are housed in a Southeastern city in the U.S.

During the past few years, Franklin has undergone dramatic strategic change efforts to compete more successfully in the global market. As a result, corporate headquarters increased the pressure on all departments to streamline their processes and function more efficiently. Managers were told that all departments had to follow the same standards as the Manufacturing Department, which was considered a model of high performance. To understand how information sharing was addressed, I selected the two departments that represented the "extremes" {Corporate Office's descriptions} in terms of effectiveness: (1) Manufacturing, since it was identified by the Corporate Office as one of the five most highly productive departments, which meant, according to managers and department directors, that it not only met, but exceeded its annual goals, and (2) Re-Manufacturing, which was classified as "unproductive" since it did not meet its annual goals.

This study followed an emergent design and relied on qualitative case-study data. Data was acquired from three major sources. First, in-depth semi-structured, open-ended interviews were used to collect thick descriptions of participant meanings of information sharing. These interviews ranged in length from sixty minutes to approximately ninety minutes. The second method of data collection involved observation of the general work environment of the two departments as well as team meetings. Finally, the participants' non-verbal behaviors, actions, and reactions were noted and recorded by the researcher. Non-verbal behaviors were used to confirm verbal statements and to act as a cue for further probing when disagreement between verbal and nonverbal behavior was noted.

The study addressed the following questions:

- How is each of the information sharing systems of the two departments presented in this study linked to the department's norms?
- How effectively do the departments share information among their members?
- What impact does the role of manager-as-boundary-spanner have on inter-departmental and intra-departmental information sharing?

I selected fourteen workers and six managers, all of whom were male, from Manufacturing and Re-Manufacturing to participate. Studies have suggested that the view of managers is crucial to understanding the effects of organizational change on the information network (Daft & Weick, 1984; Isabella, 1990), and that managers can play a crucial role in information sharing by interpreting events and creating meaning for other department members.

Three managers from each department were asked to describe their work environments and to discuss how information was distributed and shared in their departments. To discover the collective perspectives of as many department members as possible, I interviewed three members from each department's self-directed team as well as five floor-workers. Team members in addition to floor workers who were not team members were selected as informants in this study for two reasons: (1) individuals from Corporate Headquarters told me that department members who had been chosen to serve on the self-directed team were generally the most experienced and competent individuals in the department, and (2) information transfer and dialogue are especially important skills among self-directed team members (Ancona and Caldwell, 1990; Austin and Baldwin, 1991; Cicourel, 1990); consequently, I assumed that members of department teams would have more knowledge and understanding about the information sharing process than would other department workers. Three team members from Re-Manufacturing and three floor-workers were then interviewed.

To obtain consistency, I asked all participants to review their transcripts for accuracy. In conjunction with member checking (Merriam and Simpson, 1995), and to enhance the validity of the emerging themes, I asked three independent reviewers to read the transcripts and field notes and use the open coding process to form their own conclusions regarding themes and findings. Two of the reviewers were colleagues who instruct doctoral students in qualitative and advanced qualitative inquiry courses, chair qualitative dissertation committees, and publish qualitative studies. To obtain further trustworthiness (Lincoln and Guba, 1985), I invited a third person to serve as an external reviewer. As an active member of the Academy of Management with fifteen years of managerial experience in a Fortune 500 company, this reviewer shared perspectives that were crucial to verifying the trustworthiness of the study's findings. The results of the open coding process were recorded and compared. Although there was general consistency about the themes that emerged, we underwent the coding process several times to reconcile minor discrepancies until complete consensus was achieved between the reviewers and myself. The coded categories were then examined for relationships that would indicate patterns or themes explaining the frequency of these categories. Organization members from Franklin Corporation also assisted in this process (See Appendix for Steps to Coding)

4.0 Findings – The Story Of Two Departments

Workers from both departments were asked to share their perceptions of their work world, and how they received and shared information. In the Manufacturing Department, workers, managers and team members all spoke of the team's success in award-winning competitions in professional organizations. When I asked two of the team members to explain the source of the team's success, they pointed to its autonomy in making and implementing decisions. As evidence of this success, Sam showed me a scrapbook filled with articles from the Franklin in-house newspaper indicating the number of awards the team had received in recognition of its development of new processes and procedures.

Manufacturing appeared to be very successful in distributing all of the new information needed to effectively produce, service, or market new equipment. Juan, one of Manufacturing's floor workers, explained how he thought his department handled complex information. "We talk to people in Research, Engineering, and Corporate all the time, and if we can't understand what they're saying from the phone or from an e-mail, we just go over and talk to them. Roberto {the manager} expects us to do whatever we need to do to get the information we need to do our job."

The climate of Re-Manufacturing, however, contrasted greatly from that of Manufacturing. During interviews, I discovered that many of its members felt as if they had been "ignored and forgotten", as Jose expressed it, by their managers. Re-Manufacturing repaired and serviced faulty equipment and parts that had been returned by clients. The Corporate Office often referred to this Department as the "re-cycling" department. Many workers in the department, however, called it the "garbage can" of the organization. Pat, one of the floor workers, told me that "a transfer to Re-Manufacturing is the last step before they fire you." In further discussion with Pat and Jose, I learned that up until ten

years ago, Re-Manufacturing had been a subsidiary of Franklin's Marketing Department. The purpose of this unit had been, primarily, to create a buyers' niche for used equipment and parts. Although the marketing staff had achieved some success in selling used parts to local medical supply and distribution companies, the unit had never acquired much respect or support from Corporate Office or other departments. Basically, Jose explained, workers and managers both felt that "there was something 'sleezy' about selling medical equipment that had been used." Then, when the AIDS scare became endemic and it became general knowledge that a few people had acquired the HIV virus through blood transfusions, Franklin shut down this subsidiary and soon afterwards, created a new unit which would be used to repair defective equipment which was still under warranty and had been returned by hospitals or medical centers to be fixed. During my first visit to Franklin, I spent several hours with individuals from the Corporate Office. Although several executives shared their views openly about both departments, including their concern with Re-Manufacturing's poor performance records and their disappointment with its team's poor showing in the recent awards ceremony for the industry's top self-directed teams, no-one mentioned Re-Manufacturing's previous history, nor did anyone indicate that Corporate felt that this unit's purpose was subservient to that of other departments. However, some of the Re-Manufacturing members with whom I spoke indicated that they felt that this history was at least partially responsible for the negative image their managers had of the department; others, however, thought that it was the work itself that created the "less than" image. Pete said that he had never heard the story about the department's history as a Marketing subsidiary. "I don't care what it used to be," he told me. "I think other people don't like us because we don't make stuff; we just fix it when it's broken. People don't care about broken things. All the glory goes to the engineers and the builders, not the 'fixers.'" Regardless of whether Re-Manufacturing's history was responsible, it was clear that at least two of the three managers I spoke to did not like being assigned to this unit and, although none of them actually told me they felt punished by the assignment, some of their comments suggested they felt unappreciated. Both Clive and Richard, Re-Manufacturing managers, when asked if they enjoyed their work, became noncommittal and changed the subject. All three of the managers complained to me about the workers in the department. According to them, they were "lazy, "untrustworthy," "uncooperative," and "disrespectful."

Members of the team in Re-Manufacturing had never undergone formal training in teambuilding; none of them indicated that they had been told about how information was shared among team members. They also reported that they had received no encouragement by their managers to develop as autonomous decision makers. In reality, in fact, this department had no self-directed team in operation. A group described as a "team" was actually composed of five floor workers involved in many of the same operations and directed by the floor manager. Jose, a floor worker who served as an informal leader to many of the less assertive workers, had tried to form a self-directed team but was discouraged by his boss. "The managers don't want us working together because we might get smart enough to do things without them. Even if we screw up that's better than the managers not knowing more than we do."

Workers and managers from Re-Manufacturing found it very difficult to make the changes necessary to emulate the practices of Manufacturing. Two floor workers indicated that this was due in large part to their inability to receive and then effectively distribute the information necessary to perform effectively. My observations of their department meetings supported their statements. The managers and four of the workers sat at a small table in the middle of the room. The rest of the workers either sat or stood by the door. When I asked Pete about the meetings, he said "You know, we can't even hear what goes on. The managers just talk loud enough so that the 'specials' {his name for favored workers} can hear. We have to show up and sign in, but we don't have anything to say about what goes on." Gene, a floor worker, commented on the sense of isolation workers felt from the other departments in the organization and how little they knew about new processes and new techniques developed by Manufacturing "until they have to let us know. They have to share information with us sometimes, but they don't like us so they don't tell us anything until they have to." When I asked Pete if he ever communicated with members from other departments, he shook his head vehemently. "We aren't supposed to talk to anybody from other units. The managers tell us that if we do we could get in big trouble." Workers believed that the managers were withholding information. Clive, one of Re-Manufacturing's managers, denied this charge however. "These guys know what they're supposed to know. They're just lazy".

From the information I obtained from the interviews, team reports, and monthly and annual department reports, it appeared to me that within the two departments, different information gathering and dissemination processes, developed over time and supported by each unit's unique history and cultural norms, had evolved. For Re-Manufacturing these

processes had resulted in a "broken information loop," as one of the workers described it. Manufacturing members appeared to receive all the information they needed to do their jobs effectively, whereas workers from Re-Manufacturing received information in small bits, often too late and too little. Neither department communicated with the other, although Manufacturing appeared to gather information from other departments successfully.

4.1 Departments In Transition: Emergence Of Boundary Spanners.

Soon after my first set of interviews with both departments, the company began its organization-wide effort to streamline its processes and Franklin executives soon realized the extent of the disparity in production and performance levels between some departments. One of the first strategies employed by division heads to remedy this disparity was to transfer some of the managers and floor workers who had been identified as having superior technical and interpersonal skills, from Manufacturing to Re-Manufacturing. Two of the three managers I had interviewed at Re-Manufacturing were fired. The third manager, Richard, was demoted to technician.

5.0 Analysis Of The Data

The research questions asked in this study were: (1) To what extent does the department's (sub-culture) information sharing system reflect its norms? (2) How effectively do the two departments share information among its members? (3) What impact does the role of manager-as-boundary spanner have on inter-departmental and intra-departmental information sharing?

The data analysis showed that the two departments had very different information sharing processes. The following statements illustrate this disparity.

EVERETT: {Worker in Manufacturing} Since they {the managers} know that we have to know how to solve all the problems they give us, they always make sure we have whatever it is we need to find a solution.

MARCO: {Manager recently transferred to Re-Manufacturing} The workers here have learned to milk the system because they're frustrated at being treated like morons and not being allowed to do their job right.

The democratic management style at Manufacturing clearly resulted in a perception among workers that they received all need-to-know information. Since workers were expected to solve problems and make decisions with little input from managers, they were given all the resources necessary to meet these expectations. The authoritarian managerial style at Re-Manufacturing, however, encouraged workers to become dependent, passive and manipulative. Workers felt that management expected very little from them; consequently they provided inadequate resources with which to complete a job effectively. The expectations, norms, and managerial style of the Re-Manufacturing department differed so greatly from those at Manufacturing, as well as those espoused by the organization, that it prevented Re-Manufacturing workers and managers from acquiring much of the information shared among other departments. Although this isolation was not intentional, the results were as devastating as if it had been, resulting in a de-moralized and ineffectual group of workers.

Four dominant themes emerged which were grounded in organizational culture and information sharing theory.

5.1 Conflicting Values

Conflicting values occur when sub-cultures develop "local languages and local conceptual schema" (Tushman and Scanlan, 1981, p.191) which makes communication across these sub-cultures difficult and full of biases and distortion. Distortions create misunderstanding and, as the gap between sub-cultures widens, the differences between sub-units' norms and behaviors grow as well. This gap was clearly reflected in the norms and values emerging from Re-Manufacturing that demonstrated the values of dependence ("managers don't want us working together because we might get smart enough to do things without them"), secrecy ("we're not allowed to talk to anybody"), and isolation ("most of us feel ignored and forgotten").

The primary values shared by workers and managers at Manufacturing, however, appeared to be trust and autonomy. These qualities are reflected in statements such as “trusted and free to do our jobs,” which were repeated throughout the interviews. These are qualities clearly shared by the organization as well. Included in its Mission Statement is the sentence “Through productive and creative life science research, our employees work together as a team to save lives and improve the quality of daily life.”

5.2 Unlearning -- Unfreezing

For the first few weeks after the rotation of managers, department meetings were chaotic. At the first meeting, the newly transferred managers announced to the workers seated in a big circle around them that the agenda for future meetings would come from them. When Marco asked the workers to indicate which issues they wanted to deal with, no one responded. At the second meeting, there was slightly more participation; however, the vast majority of the workers remained silent. The silence, uneasiness, and confusion was consistent with the unlearning process (Hedberg, 1981), during which learners discard knowledge. Unlearning often occurs when the cognitive system of an individual, a department, or the organization shifts as a result of shared meanings (Daft and Weick, 1984). Unlearning is analogous to Lewin’s (1951) concept of unfreezing, the first of three sequential stages identified in Lewin’s model of organizational change. Unlearning occurs when individuals or groups first feel the need for change, Unfreezing, as with unlearning, opens the way for new learning to take place which is essential for transformational change. Ricardo’s question about the new managers’ apparent trust of workers (“if we screw up, then what?”) illustrates the unlearning process. However, because Re-Manufacturing was giving up its previous script, or set of acceptable behaviors, workers became paralyzed, temporarily, while they and the new managers wrote a new script (Huber, 1996). For workers and the newly transferred managers alike, this was a very frustrating process. None of the managers were happy about the move. Roberto contrasted the climate at Re-Manufacturing to that of Manufacturing: “I feel as if I just entered the Stone Age. This place is prehistoric. It’s like working with a bunch of dinosaurs.”

Productivity slowed down as managers encouraged risk taking to develop new behaviors. “We have to tell them it’s okay to make mistakes. But when they make them, everything slows down to a halt,” Roberto commented. Clearly, unlearning was uncomfortable for workers and managers alike. However, the process of unlearning, as with unfreezing, may be the first indication that organization members recognized a need for a dramatic change in their work lives.

5.3 Boundary Spanning -- Moving

The managers who transferred from Manufacturing to Re-Manufacturing brought not only their knowledge and experience with them, but their expectations of employees, as well. Reactions of workers from Re-Manufacturing to the manager rotations varied from uncertainty and distrust to interest and enthusiasm. Ricardo reflected some workers’ ambivalence. “These guys {the new managers} tell us that they want us to meet without them more and decide things on our own. Well, that kind of makes me feel like they trust us. Yeah, but if we screw up, then what?” Pat’s conversations with the new managers had made him more aware of how isolated Re-Manufacturing had become from the corporate communications network. “Man, this place is like Siberia. It’s like we just don’t count. Nobody has been telling us anything. Well, we don’t have to put up with that any longer.” Jose appeared pleased and excited about the behavioral changes brought about by their new managers. “Now we have a chance to be more like Manufacturing...to meet more, to talk more, to understand stuff better. Since the old managers left, I already know a lot more about how the job should be done than I ever did before.”

When the former managers of Manufacturing were transferred to Re-Manufacturing, they took on the role of boundary spanners (Tushman & Scanlan, 1981), communicating across departments, and obtaining relevant information on one side which they could disseminate to the other. As boundary spanners, the managers led the employees in Re-Manufacturing from the unfreezing stage to Moving, defined by Lewin (1951) as the implementation stage of change, where activities and events are evidence that change is occurring. In fact, managers need to be effective boundary spanners if they wish to increase their individual influence and enhance their careers (Manev and Stevenson (2001). Recent studies have indicated the importance of boundary spanning in increasing internal system efficiency as well as responsiveness to the external environment (Cross, Yan & Louis, 2000). Boundary spanning can reduce the number of levels in a hierarchy,

curb the authority of chains of command and implement cross-functional, team-based structures (Denison, et al.,1996), thus creating substantially more permeable boundaries within the organization.

5.4 Re-Framing -- Refreezing

As with refreezing, Lewin's (1951) last stage of change, re-framing occurs when new norms and behaviors are learned and a culture is shifted (Isabella, 1990). Once an established routine has been disrupted, "managers search their surroundings for clues from which to derive new meaning or reconfirm old understanding, and symbols provide that valuable information. Symbols bring double exposures into focus" (Isabella, 1991, p.25). An example of a symbolic message often repeated by managers and supervisors in both departments was the phrase "Let me play golf." Managers in Manufacturing used this phrase to illustrate their management style. One of the managers told me "my team knows what to do. They don't have to come to me. They make their own decisions and I get to play golf." At Re-Manufacturing the expression became symbolic of the goal the recently transferred managers set for their workers. Marco told me that he repeated to his work group each day: "Your job is to make my job look easy. You solve all the problems and I get to play golf". Pete showed delight and anxiety over this expression. "Our new manager says he wants us to know enough so that he can just leave and go play golf. What do you think of that? You think he's gonna trust us that much? I don't know if I believe him or not, but if he's telling the truth, that means we're gonna have to know a lot more than we do now." Another symbolic phrase members used to describe necessary change in the information sharing system was "opening the loop." Marco, speaking for the Re-Manufacturing employees, said "We aren't in the loop yet. We have to get Corporate to widen the loop to include us."

6.0 Discussion And Implication

This study examined the relationship between organizational sub-cultures and the system's information sharing process. The findings from this study have two implications for managers in their role as organizational change agents. First, managers can, and often do, take on the role of boundary spanners, serving as translators and interpreters to facilitate information in organizations. At Franklin, for example, where departments were highly specialized, the information sharing network could be very efficient (as in the case of the Manufacturing Department); however, this same systemic specialization often blocked information processing across unit boundaries. Consequently, there emerged an urgent need for boundary spanning individuals who could facilitate the unblocking and unlocking of clogged lines of information retrieval and dissemination. In order to be more productive, Franklin's information loop would have to be opened or, perhaps, completely re-created, so that all departments could work together as a total system, rather than in isolation. Secondly, the study's analysis suggests that managers are learning facilitators, regardless of whether they perceive learning as one of their goals or not. With the growing trend towards encouraging managers to train, mentor, and coach their workers, this study's data support the role of managers as learning facilitators. This finding implies that managers may need more training themselves, particularly in facilitation and presentation skills.

Finally, this study suggests that Franklin seek out a more holistic organizational structure, where a common language and mental models would emerge, cutting across the subcultures of the organization. Future managers should be prepared to lead such an effort.

7.0 Limitations

There are several limitations associated with the qualitative research paradigm. One of the limitations can be found in its use of perceptions as data. Clearly, perceptions are subjective and reflect the reality of each individual rather than that of an entire group. It is possible that other employees not interviewed or observed would disagree with the managers, team members and floor workers who participated in this study. Additionally, although I spoke at length with the corporate operations officer (COO), I did not talk with all of the top corporate executives including the corporate executive officer (CEO) and the corporate financial officer (CFO). Therefore, it is certainly possible that the beliefs and expectations of major corporate heads contrasted with those described in the findings and data analysis of this study.

A second limitation of qualitative research is that the findings cannot be generalized. However, the intent of this

study, as with all qualitative approaches, was not to use a random sample of all organization members; its purpose was, instead, to explore the information sharing processes of two departments in an organization and reach a deeper understanding of some of the culture and performance issues that appear to be related to information sharing.

The findings of the study suggested to this researcher that sub-cultures emerged, each with its own set of norms, work attitudes, and management and employee behaviors. However, there are many other variations on this theme. For example, one might ask what impact management styles had on the norms and the information sharing processes in each of the departments. This question could better be addressed in a longitudinal study, where data could be obtained regarding the impact of managers assigned to the departments prior to those in charge during this study. Both qualitative and quantitative measures could be used to ascertain links between various types of management style, information sharing effectiveness, and the norms and attitudes of each department and the extent to which they differed from one another.

Another issue that could be explored in a larger study is the extent to which information was effectively disseminated throughout the entire organization. Any study that initiated a more holistic or global examination of the study would probably obtain data that would clarify many of the issues raised by this study and enable those who authored such a study to interpret the findings more comprehensively and thoroughly. A telescope provides us with a much clearer view of the big picture than does a microscope. However, if I am more interested in the workings of one part of the picture, I will select the microscope-- with the knowledge, however, that I can never fully understand that one part fully until the complete picture is placed before me.

A final limitation to the study lies in all the possible alternatives to interpreting the findings of the data. However, through the use of independent reviewers, qualitative studies, including this one, can achieve a degree of trustworthiness and verification. Although other researchers could conclude that factors other than information sharing are linked more obviously to sub-cultures the fact that this study's independent reviewers reached similar conclusions to those of this researcher lends credibility to the study's findings. 📖

References

1. Anand, V., Manz, C.C., Glick, W.H. (1988). "An organizational memory approach to information management." *The Academy of Management Review* 23(4) 796-809.
2. Ancona, D.G. & Caldwell, D. F. (1990). "Information technology and work groups: The case of new product teams." In J. Galegher, R.E. Kraut, and C. Egidio (eds), *Intellectual Teamwork* (173-190). Hillsdale: Erlbaum.
3. Austin, A.E. & Baldwin, R.G. (1991). *Faculty collaboration: Enhancing the quality of scholarship and teaching* (Ashe-Eric Report No. 7). Washington, D.C.: George Washington University.
4. Brown, S.L. & Eisenhardt, K.M. (1995). "Product development: Past research, present findings, and future directions." *Academy of Management Review*, 20, 343-378.
5. Cicourel, A.V. (1990). "The integration of distributed knowledge in collaborative medical diagnosis." In J. Galegher, R.E. Kraut, and C. Egidio (eds). *Intellectual Teamwork* (pp. 221-242). Hillsdale: Erlbaum.
6. Creswell, J. (2000). *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks: Sage.
7. Cross, R.V., Yan, A, & Louis, M.R. (2000). "Boundary activities in 'boundaryless' organizations: A case study of a transformation to a team-based structure." *Human Relations*, 53(6) 841-59.
8. Daft, R. & Weick, K.E. (1984). "Toward a model of organizations as interpretation systems." *Academy of Management Review*, 9, 284-295.
9. Denison, D.R., Hart, S.L. & Kahn, J.A. (1996). "From chimneys to cross-functional teams: Developing and validating a diagnostic model." *Academy of Management Journal* 39(4), 1005-23.
10. Denzin, N. & Lincoln, Y. (1998). *Strategies of qualitative inquiry*. Thousand Oaks: Sage.
11. Guba, E.G. and Lincoln, Y.S. (1981). *Effective evaluation*. San Francisco: Josey-Bass.
12. Hansen, M.R. (1999). "The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits." *Administrative Science Quarterly*, 44(3).
13. Hedberg, B.L.T. (1981). "How organizations learn and unlearn." In P.C. Nystrom & W.H. Starbuck (Eds.)

- Handbook of organizational design*. (Vol. 1, 3-27), New York: Oxford University Press.
14. Huber, G.P. (1991). "Organizational learning: The contributing processes and the literature." In M.D. Cohen & L.S. Sproull (Eds.). *Organizational learning*, 124-152.
 15. Isaacs, W.N. (1993). "Taking flight: Dialogue, collective thinking, and organizational learning." *Organizational Dynamics*, 24-30.
 16. Isabella, L.A. (1990). "Evolving interpretations as a change unfolds: How managers construe key organizational events." *Academy of Management Journal*, 11, 6-41.
 17. Lewin, K. (1951). *Field theory in social science*. New York: Harper and Row.
 18. Lincoln, Y. & Guba, E. (1985). *Naturalistic inquiry*. Beverly Hills: Sage.
 19. Manev, I.M. & Stevenson, W.B. (2001). "Balancing ties: Boundary spanning and influence in the organization's extended network of communication." *The Journal of Business Communication*, 38(2), 183-201.
 20. Merriam, S.B. & Simpson, E.L. (1995). *A guide to research for educators and trainers of adults* (2nd ed.). Malabar: Krieger Publishing.
 21. Schein, E.H. (1990). "Organizational culture." *American Psychologist*, 34(2), 109-119.
 22. Simon, H.A. (1991). "Bounded rationality and organizational learning." In M.D. Cohen & L.S. Sproull (Eds.) *Organizational Learning*, 175-187.
 23. Tushman, M.L. & Scanlan, T.J. (1981). "Boundary spanning individuals: Their role in information transfer and their antecedents." *Academy of Management Journal*, 24(2), 289-305.

Appendix Steps to Open Coding

1. Data analysis and management of data were conducted using the constant comparative method (Denzin & Lincoln, 1998). This process is used to recognize the similarities, differences, and consistencies of meaning across phrases and data. Through this dynamic ongoing process, codes (which I identified as "sets" at this phase of analysis) were constantly compared, added, merged, renamed, or discarded.
2. Coding data requires categorical aggregation, where the researcher searches for a collection of instances, or similar events, thoughts or phrases (Creswell, 2000). I selected phrases as the unit of analysis. All phrases within each data set were rigorously reviewed. A total of 132 phrases, or data strips were labeled.
3. I used a file card approach recommended by Guba and Lincoln (1981). After I exhausted the data, by forming and re-forming different categories and sub-categories, I then classified the data strips into themes, or patterns which served as guidelines for understanding the case, defined by Creswell (2000) as a system, bounded by time and place.
4. Once recurrent themes were identified, I listened to the interview tapes again to determine if the language used, voice, inflection, and pauses held significance for meaning extracted from the text of the transcript.
5. A copy of the actual transcripts were given to the interviewees for review and then were submitted to the three independent reviewers for the purpose of reducing bias, confirming findings, and validating the themes.

Notes

