LEARNING TO CHANGE: ORGANIZATIONAL LEARNING AND KNOWLEDGE TRANSFER

By

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Abstract

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This qualitative study of organizational learning and transfer of learning in the context of planned organizational change reveals concrete ways that learning occurs and both affects and is affected by the knowledge transfer process. Rigorous application of grounded theory methodology produced a model of learning wherein a) willingness to adapt is antecedent to learning at the organizational level, b) mental maps are influenced by both intrapersonal and interpersonal processes, and c) emotion is as central as cognition relative to the construction of both willingness and mental maps. This interactive, iterative process of assessing, believing in, choosing, and owning the change is called locker room learning to situate its development and enactment in the everydayness of job performance rather than the classroom. Locker room learning emphasizes the social nature of learning while recognizing the technical needs of the change. This case study looked at the process innovation and strategic change of replacing mass production with lean production at a single plant that is part of a global manufacturing firm, primarily through multilevel, multifunction interviews. The knowledge or learning that was developed in this change had the potential to be used in other functions and sites, both within the firm and with supply chain partners. What is most interesting is the relationship discovered between LRL and knowledge management, specifically the knowledge transfer. This relationship is based on the social bonding that developed during the knowledge creation process. The
emotional component of the experience of learning creates a *boundary* that both aides and hinders knowledge transfer. This organizational analysis of knowledge transfer of new, novel organizational learning has theoretical, practical and epistemological implications.
Chapter 1  Introduction

People learn, leaders create a context in which to learn and organizations or whole systems learn. It is the last that this work takes up. How do organizations learn - not individuals, but organizations? And not just about the content of a specific change, like improving quality by 10%, but about the process of change itself - how an organization learns from its own experience. In today's complex fast moving business environment, organizational learning has been said to be a key factor to success (Nonaka, 1991). This study, which is set in a global manufacturing company, builds on the extant theories of types, methods and outcomes of learning and creates a better defined explanation of learning in the process of change and transfer of new learning.

How does an organization learn? Not a new question. Certainly this is not an unimportant question. If there were no learning at an organizational level, there would be no organizational "learning curve," no increasing returns to experience. If there were no learning by the organization itself, what would be the value added of the organization in changing and adapting, particularly in a turbulent, high velocity environment where learning is most central to success? Given the benefits and primacy derived from understanding how an organization learns, have we not, as a scholarly community already adequately addressed it? Do we need more examination of this phenomenon? Surprisingly, current literature suggests that "no" we haven't adequately addressed it and "yes," we need more.

In a most current and comprehensive review of the literature, Lahteenmaki et al (2001, p. 113) identifies two gaps that must be filled “before we can really talk about a theory of organizational learning.” While not criticizing any one theory, they target a “theory building” process that “drifts away with new definitions and approaches that break up rather than construct a theory” and lack of empirical research. Both of the gaps that they identify deal with the learning level, individual and organizational, specifically a) that there is too much emphasis on individual learning and not enough on organizational, and b) that we don’t understand how individual learning becomes organizational learning, a key question in existing theory.
Other scholars support this overall view regarding theory building (see Huber, 1991) and Lahteenmaki’s gaps (see Kim, 1993). Moreover, nothing in the extant literature could be found which contradicts these views, though there are many popular practitioner books, workbooks and theories, which describe, explain, and offer prescriptions. The field seems to have drilled down into subsets of the phenomenon, for example learning defenses (Argyris, 1990), which are useful, but not holistic and integrated and which do not address both levels of learning, dealing only with the individual. Likewise, most learning scholars have tended to be distant from practice, creating two branches in the field (Argyris & Schon, 1996).

There are three domains that are foundational to this research: 1) organizational learning, 2) knowledge management specifically knowledge creation and transfer or conversion and 3) strategic change implementation, change management, specifically, process innovation. Organizational level learning refers to a collective, group or whole organization, “thinking” and behaving differently as a result of a change process. The knowledge creating and transfer process refers to those activities, both human and technology based, that change cognition. The change management referred to herein is an organizational initiative designed to achieve significant improvements in performance by changing relationships between people, technology, organizational structure, and information, and which typically begins with a strategic change to which the top management team is committed.

Research Questions

I address two questions. First, how does organization level learning occur? There is broad agreement that individual learning leads to organizational learning, but how does this happen? How does individual learning get diffused, built on, elaborated, joined, or in some way constructed to become “organizational” in nature. Becoming “organizational” in nature is to say that learnings are held at the organizational level rather than at an individual level. Here organizational norms, behaviors and viewpoints or worldviews are changed as a result of the learning process. I will examine this by looking at the learning process.
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associated with moving from a traditional mass production operation to a "lean" or waste
less production process (Womack et al, 1990).

Three methods of organizational level learning (OLL) have been theorized. First is
an aggregated or shared meaning view where individual learning rolls up into organization
level learning. In other words, it can be said that the organization has learned because each
of the members has learned (such as Wenger, 1998). Second is the distributed view,
whereby what is learned at the organizational level is not learned by all, but only by some,
who are distributed throughout the system (such as Tsoukas, 1997). In this case the
learnings of the organization or “what the organization knows” are the composite of the
individuals and the connections or linkages among them. And third, is the chaotic view,
whereby an understanding is dynamically or autopoietically developed (self-generating)
(Cheng & Van de Ven, 1996). In this view the organization comes to a new understanding
based on discovery, trial and error, or a self-produced process.

The second research question is how do organizational learnings get transferred?
Here I will investigate what the organization learned about change management. I will look
specifically at a change project that is currently getting underway, that of “digitizing” or
“making electronic,” the procurement or purchasing process, what might be called e-
procurement. Change scholars look at four factors relative to change projects: goals,
structure, resources, control (Boddy & Macbeth, 2000). These will be investigated in light of
what has been learned from the “lean” project, and if and how any organizational learnings
have been transferred to the e-procurement project, or possibly other projects that are
suggested through the interviews.

Contribution

This research responds to continuous calls by several scholars for a more coherent
This work is of particular significance not only because it is about learning, but because it is set in
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a context of process changes that many firms will be undertaking in the future. As such, the contributions to both the research community and the practitioner domain are timely for both.

Outline of this dissertation

While this study is exploratory in nature, there were expected areas of findings. In Chapter 2 the extant literature is reviewed and a theoretical framework is developed. In general, it uncovered key elements of a path or process of “learning from experience” at an organizational level. This was investigated looking in two directions. First there is learning that occurs because the experience of individuals is somehow evidenced at the organizational level. And second, it describes how knowledge that has been created in the firm, learned from experience, is transferred to other domains and change tasks. These findings will be related to existing theories of learning, knowledge management and process innovation. Chapter 3 develops the questions for which I seek answers and the rationale for their selection. Chapter 4 describes the research method and fit to the study objectives. In Chapter 5 the results of the data collection are describes and the major themes or categories are identified. Grounded theory method was used in analyzing the results and inducing models of the findings which is described in Chapter 6. Chapter 7 discusses the implications and qualifications of the research are explored.

It is believed that this is the first study that focuses on these characteristics and their relationship, at an organizational level. It takes a novel approach in looking at learning and transfer on a contingency basis. As such it illuminates how to bridge the gap between strategy development and implementation, an area that continues to disappoint in practice and be a major focus area in academia. This study is timely given the complex, turbulent, exogenous forces such as global competition, deregulation and re-regulation, advances in price performance of digital technology and the inherent shrinking of the world, and the demand on organizations for regular and continuous change, as well as systemic planned change.
Chapter 2 Theoretical Framework of Organizational Level Learning and Literature Review

Organizational level learning

While there is broad agreement of the need for organizations, not just individuals, to learn (Harvey & Denton, 1999; Dunphy, Turner, & Crawford, 1997) there is much less agreement on what organizational learning is, and how and why it happens. The term “organizational learning” is a tent under which is housed various, non coherent models and concepts. Some of the more popular and familiar are a) single and double loop learning (Argyris, and Schon, 1978), b) experiential learning of individuals or collectives (Kolb, 1984; Dixon, 1994; Stata, 1989), and c) a systems view of learning which is constructed in Senge’s treatise, The Fifth Discipline (1990).

Looking at twenty-five years of literature that has grown up around organizational learning, two of the original thinkers in the field, Aryris and Schon, conclude that two different branches have emerged. One branch is “prescriptive, practice-oriented, value-committed, sometimes messianic, and largely uncritical” and the other is more scholarly and “tends to be distant from practice, skeptical of first-branch claims, nonprescriptive, and … open to the view that learning may be good or bad, linked or not linked, to effective action or desirable outcomes” (1996, p.xix). That organizational learning literature is not more consistent and congruent makes it difficult for practitioners to use, and for scholars, either in OL or in aligned fields such as organizational change, to consider and build upon.

In an effort to bring some order to the field, Lahteenmaki et al have recently created taxonomy of the existing literature, (2001). This is useful in conceptualizing OL and bounding it for the purposes of research. Here learning is divided in two ways: 1) learning is either individual or organizational, and 2) it is either a process that is enacted, or a set of attributes or characteristics that are held, which is often referred to as a “learning organization” or “LO.” The LO theories depict behaviors (what leaders can do to “instill” or encourage learning, see Senge,
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1990) and conditions (organizational environments, see Pedler, Bourgoyne, and Boydell, 1991) that, if present would indicate a capacity to learn or expectation of an ability to learn, at either the organizational or individual level.

Table 1 summarizes the four segments that are created in this model. The subject of this research is the "process of learning at the organizational level (OLL)" and to some extent its relationship to individual learning. This is the cell that is least understood (Lahteenmaki, et al, 2001) and in which there is great benefit to understanding (Dunphy, Turner, & Crawford, 1997). Even in this single segment or cell, however, there is not a single definition or congruence of paradigms.

However, if I think of organizational level learning as having the following three components, 1) a type of learning to be done, 2) a method and 3) an outcome or action, there are concepts that are commonly accepted throughout the OLL literature. Putting this into a research context I can say that the central question of organizational level learning is not “what is the way that organizations learn” but “what are the combinations of these three components that are used?” This work seeks to find the threads or patterns that create a typology of various learning modes, connecting 1) what is learned, 2) how it is learned, and 3) how this learning manifests. It essentially constructs “learning method” as a choice in the context of the type of learning required and the type of

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outcome that is desired in a given situation. Therefore looking at this integrated view of OLL I define it, for the purposes of this study, as:

Organizational level learning (OLL) is the means by which the organization comes to hold new ideas (beliefs or knowledge) and/or operates in a new way (behaviors), and is the vehicle that the organization uses to create a change in paradigms, either in degree or type.

It is these learning concepts, established in both the practitioner and scholar branches of the extant literature, as well as the knowledge management and process innovation (see methods section) literatures, that form the framework of this study.

Knowledge Management

A study of organizational level learning today is not complete without considering the developments in knowledge management (KM). In my model of learning I explicitly recognize declarative and processual knowledge as types of learning. However, knowledge creation is roughly equivalent to organizational learning as it has developed in the allied field of information systems or knowledge management. As such, a conceptual understanding of its role and development is essential for this research. And while it stands beside classical organizational learning theories, it has gained more recent popular exposure and interest than the organizational behavior perspective, as practitioners hunt for useful learning perspectives and tools.

The study of knowledge is not new, it was the grist of philosophers in ancient times, and gained scientific consideration in the early 1950s with exploration in the cognitive sciences, including artificial intelligence. Recently, knowledge, as a strategy and as a resource to be managed, has gained popularity in business management practice and theory (eg. Earl, 2001; Zack, 1999; Nonaka & Takeuchi, 1995; Leonard-Barton, 1995). It is increasingly seen as a bottom-line, results oriented solution with increasing returns in a variety of industries and
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functional areas, from research and development to sales management (Armbrecht et al, 2001; Davenport, 2001; Salisbury, 2001).

**Underlying Drivers for Knowledge Management Processes**

The recent emphasis on knowledge management is the result of the convergence of two forces. First, new technology, namely the personal computer and telecommunications, lowered the wall or made permeable the boundary between the users of information and the “corporate caretakers” of it, the information technologists (Grover & Davenport, 2001). As a result of the wide spread deployment of the personal computer in the 1990’s, organizations became capable of producing and delivering, at low cost, more information or data than is useable or useful. Through the companion technology of telecommunications and networks, this data can be deployed globally, ubiquitously and instantaneously, around the world, around the clock. Users, executives and factory workers alike, began to understand the capabilities of information systems and integrate this into their thinking about their needs.

During the early 1990s, with this new insight, these users of information, who had traditionally demanded more data than the technologists could typically deliver, reframed their needs. They began asking for less not more data. They sought instead information that is more useful and that adds high value to their tasks and processes. The attention of the actors, rather than the information itself, had become the scarce resource in the organization (Davenport et al, 2001). For example, a sales manager no longer wanted to see just a list (data collection) of sales metrics, she wanted to know where to focus her efforts, help in making decisions, and direction in taking action. Collecting, codifying, storing and retrieving data, typical mechanistic information management functions, were no longer sufficient (Grover & Davenport, 2001).

User demands had morphed from “timely, accurate information,” the mantra of the 1980’s, to usability and value. There was a demand for information that is developed and presented in a way that contemplates the use of it, meeting practical needs, applying information to a specific purpose in a specific situation. As the old IBM advertising tagline said “not just
data... reality." What users were now seeking is information that is embedded in a context, characterized by Grover and Davenport thusly, "Knowledge has the highest value, the most human contribution, the greatest relevance to decisions and actions, and the greatest dependence on a specific situation or contest" (2001, p.6).

The second force that drove the need for managing organizational knowledge was the increasing rate of dislocation or turnover of the employee base. The length of time that an employee would stay with a firm was decreasing rapidly during the 1990s. Rather than lifetime employment within one firm, entering workers could expect to work for 6 to 7 companies, and have at least two non-intersecting careers. The turnover was motivated by various conditions - a) they were no longer needed in a restrategized, restructured, downsized organization, b) their skills and/or interests were not longer a match for the task, and c) they found better alternatives elsewhere. Rather than the historical dislocation of a gradual loss through attrition, in some cases whole functions were being terminated en masse, as in the case of “outsourcing” a function that is currently being done in-house. As these people left, it became apparent and problematic that the firm was also losing their experience, their knowledge, their “situated” learnings (Nidumolu, Subramani, & Aldrich, 2001).

This acceleration in the loss of intellectual capital drove organizations to seek ways in which they could capture and retain vital learnings, particularly tacit knowledge, in a systematic and proactive way (Von Krogh, Ichijo & Nonaka, 2000). Tacit knowledge is defined as knowledge which is not spoken, but is implied by action or statements. This differs from explicit knowledge which is articulated and therefore able to be communicated. Tacit knowledge may be so embedded in the individual that it is not even conscious. For example, the factory worker who roles rubber onto a cylinder over and over again until it is a consistency that makes it ready for the next step, performs this task everyday, but may not be able to describe it, or make this knowledge explicit. The same is true for the engineer who reads functional specifications for an integrated circuit and then, seemingly automatically, uses computer tools to produce the design. With the increased probability of losing these people and this knowledge, knowledge that is being
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used in everyday performance of the work, organizations were motivated to capture and preserve it, unlike ever before. Information systems and data bases needed to be reconsidered in light of the need to uncover, discern and preserve critical knowledge, both tacit and explicit (Nonaka, 1991).

Knowledge Management Defined

The convergence of these two forces, 1) user demand for knowledge rather than “information” and 2) the increasing rate of loss of intellectual capital, inspired the current emphasis on the management of knowledge. Like organizational learning, KM has become home to a variety of concepts and definitions. In fact, it includes views that suggest knowledge cannot be managed, and can only be “stimulated and channeled” (Armbrecht et al, 2001). The KM literature addresses knowledge as 1) a noun or an object, 2) a verb or a process and 3) a combination of these when it is considered as a resource of the organization.

It is a noun, or state of being as in “what an individual or what the organization knows.” It is a verb, process or action as in “creating, sharing, or generating knowledge.” And lastly, as both an object and a process, it has been viewed as a capability, competency or resource that offers future benefit to the firm, as intellectual capital that adds value to the formation and implementation of strategies (e.g. Sawy, et al, 2001; Zack, 1999; von Krogh, 1998). This “capabilities” view applies to a) knowledge the noun, since many firms have proprietary knowledge that drives strategy decisions, and b) “knowledge the process,” since strategy implementation relies on developing and transferring new knowledge (Abraham, 2001; Zack, 1999b). Of these three perspectives, “knowledge as a process” is the one taken up here because it is most aligned to the organizational learning process.

Gold, Malhotra and Segars have distilled a myriad of definitions suggested by many researchers into a comprehensive and concise set of four sub-processes of knowledge process (2001):
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1) acquisition - accumulating existing and creating new knowledge (innovating), both of which require sharing and disseminating personal experience (Inkpen & Dinur, 1998; Leonard-Barton, 1995);

2) conversion - making existing knowledge useful, having standards and representations that enable and support communication and dialogue across various boundaries (e.g. personal, functional, organizational);

3) application - using knowledge, having processes for storing, retrieving and sharing, which can be found for example in software development that employs open architecture; and

4) protection, discouraging “illegal or inappropriate use or theft” of knowledge.

And to further delineate the KM domain upon which this work relies, two of the sub processes are most relevant to learning: acquisition and conversion. First, acquiring knowledge can be thought of specifically as individual or organizational learning that is based on personal experience (experiential learning). And second, converting knowledge recognizes the need to make tacit knowledge explicit and make explicit knowledge available for other’s learning and acquisition, and transfer to others; to make it common, useable by many at both the individual and organizational level (Wenger, 1998).

Knowledge versus Information Management (KP not DP)

As discussed earlier, knowledge management is not just a mechanistic process of collecting, storing, and retrieving data (data processing or DP), though that is a necessary step along the way. Rather, knowledge comes about by connecting the content or the subject matter, to the context or the setting in which the event takes place (Grover & Davenport, 2001). Connecting content to context, involves relationships; both the relationship between and among people (Cross, et al, 2001), and the relationship of the data to the person, which includes both relevance and interpretation of the data (Daft & Weick, 1984).
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With regard to the relationship of people, when knowledge creation depends on information being shared between and among people, its very availability depends on communication, interpretation and meaning. In order for this information to transform into knowledge, there must be openness and disclosure both within the cognitive system of the source and in the relationship of the workers (Davenport et al, 2001). This sharing is a matter of trust and of personal boundaries (Prusak & Cohen, 2001) as well as a willingness to disclose (Goffman, 1959). The extent to which this “context” of sharing can be made available depends on the relationships of people. Being able to access certain constructs of a person’s life (context) requires a different kind of relationship than is used in the mechanistic managing of information, namely personal and subjective rather than distant and objective. Personal and subjective business or economic relationships are complex in that they at once offer the possibility of opportunism and trust, which are antithetical in nature (Sako & Helper, 1998).

This distinction also extends to the “connection” or the relationship between the viewer of the data and the data itself. The perception and perspective of the viewer actually determines the construction of the context and therefore the construction of the knowledge (Handy, 1995).

Organizational Level Learning (OLL) and Knowledge Processing (KP)

Looking at learning through a knowledge processing perspective suggests that in order for learnings to be transferred they must be made explicit, so that they can be communicated, a concept which is also present in the learning theory perspective. But perhaps even more importantly, the knowledge that gets created must be capable of being unpacked so that it can be looked at and assessed for other uses and applications, separately from its environment. Only in this deconstructed form can one assess its usefulness and appropriateness for another situation or context (Fiol & Lyles, 1985). With both of these learning factors, communication and deconstruction, I see a convergence between the traditional learning theorist’s and the KP views.
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**Literature Summary**

Organizational learning and knowledge management have much in common as they address the phenomenon of increasing the organization’s capacity to innovate and change (Grover & Davenport, 2001; Rowley, 2001; Stewart et al, 2000). Like OL, the KM literature has:

1) developed “rich theoretical perspectives” and must now address “the ‘how’ questions of [knowledge] management” through field research (Grover & Davenport, 2001, p.12; also Schultz, 2001).

2) taxonomized various schools of KM practice (Earl, 2001) and now needs to systematically, rather than fragmentally, study knowledge as a field, recognizing the differences from its “field of origin,” information systems and management, particularly the situated nature of knowledge and the socially constructed attributes of “knowledge,” the role of the human in converting data into knowledge and making it available for transfer (Hauschild, Licht & Stein, 2001; Nidumolu, Subramani, & Aldrich, 2001).

3) identified that both organizational (example, Zack, 1999a) and personal (individual) knowledge exist and that there is a link between them (Jarvenpaa & Staples).

**Research Needs Based on Current Literature**

Both literatures lead to a need for primary research, that builds on existing theory and frameworks, and that explores, in depth, the relationships between type of learning or knowledge creation, method of learning and knowledge creation, and manifestation of learning, what is getting unpacked and used in other areas and processes in the organization (see Figure I). Taken together this offers integrated perspectives from which to view OLL, rather than simply more drilling down on either the behavioral or cognitive frameworks. Following is an expanded explanation of each of the components of the framework (see Figure II).
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Type of Learning

It is generally agreed that there are different types of learning. From an organizational behavior perspective these are depicted in various models such as single and double loop learning (Argyris & Schon, 1978) or lower and higher level learning (Fiol and Lyles, 1985). From a knowledge management perspective, the type of learning is about either facts or apparent data, or the processes that underlie or operate on the facts.

Organizational behavior view.

In a literature review of types of learning Fiol and Lyles identify 15 different models that through various terminology and concepts are essentially about behavioral (lower-level) and/or cognitive (higher-level) type learning (1985). In summarizing the characteristics they conclude that lower level learning addresses learning relative to routine tasks, learned through repetition, in a well understood context, typically by all or many levels in the organization; higher level learning is considered in conjunction with nonroutine tasks, learned through heuristics and insights, in an ambiguous context, by upper levels of management (also Nystrom & Starbuck, 1984).

Argyris and Schon described the type of learning relative to how much change occurred (1978). Their view holds that learning may be constrained by existing paradigms. For example in learning how to put the customer first, the organization may be constrained by a need to implement this within the existing organizational values. This would be considered single loop. And this is contrasted with learning that is unconstrained. Here through an understanding of what
it means to be customer focused, the organization learns that existing values have to change, breaking the frame of an existing paradigm. This is termed, double loop.

*Knowledge management view.*

Another perspective of the learning type comes from the field of knowledge management. In my model, we can think of learning applying to, or the subject of learning being, either a) factual or declarative knowledge or b) processual knowledge, which relates to the underlying process that affects the facts. For example, an organization may learn that they can improve their customer service 5% by reducing the number of customers they serve by 2%. This would be declarative or learning about declarative information. On the other hand, they may learn that their process for understanding the key performance parameters must include a cross functional team and this is creation of processual knowledge.
Second, there are three basic methods or processes that have been theorized by which organizations learn. These are 1) shared or saturated, 2) distributed, linked or networked, and 3) chaotic; divergence and convergence. These methods are applied to a type of learning to produce an outcome. In reified form, they would be considered the input to a process, that process being a certain form or method of learning. These three forms that have been theorized in the literature are described below.

**Shared/saturated.**

The first method is termed “shared” or saturated. Here all individuals, in the organization (group) have come to some common understanding of a phenomenon, such that it can be said that the organization operates or thinks in a certain way because, each of the members, individually, operate or think this way. Learning therefore occurs when the shared meaning of the organization members changes (such as Dixon, 1994; Stata, 1989).

An underlying assumption of this method is that it is possible for all people to have the same mental map. And that through conversation and collaboration among its members, through sufficient discussion, construction and reconstruction, all or just most of an organization’s members and therefore the organization will come to a new perspective or cognition (such as Hedberg, 1981; Nystrom & Starbuck, 1984). Often though not always, this method is characterized by use of large group events, quality circles, and other programs designed to reach a broad population, which together then shapes the vision, goals, expectations, and new behavioral norms.

The shared model seeks to extend theories of individual learning to the organizational level, “organizations do not have brains, but they have cognitive systems and memories” (Hedberg, 1981, p6.). And it is these cognitive systems that must develop a shared worldview and this memory bank that must be recalled uniformly across the entire group or organization, as it would for a single individual. In this method, the sharedness of insights and behaviors is the
gate to organizational learning. As described in an often referenced article on organizational change and learning “….organizations can learn only as fast as the slowest link learns” (Stata, 1989, p.64).

So, for example, take the case of implementing lean manufacturing in a work group or cell. Here we have individuals who have traditionally been responsible for and measured on performing one function, at one station in a mass production process. In a lean mode, groups of workers change their focus from being good at their individual function, to one of collectively being good at high quality, low cost and throughput. In order to succeed in this environment much more is expected of the individuals. Not only must new skills be acquired by individuals, but the organizational goals, expectations and view of priorities must change. The shared method of learning would say that in order for it to be said that learning occurred; all of the members would share the new beliefs and behaviors, and have the memory of the old. Specifically, the change that would be reported would be something like - we all used to do just our own work and not care about the total throughput and now we all care about the cell first and do whatever ever it takes.

Distributed, linked, and networked as learning process.

The second method is termed “distributed” and is characterized by a network structure. Here the organization is said to have learned when changes in thought and behavior come from the linkage of nodes of knowledge. Unlike the shared or saturated method, “distributed” holds that few people with different expertise, roles, or functions are linked together in such a way that if they collectively change their beliefs and behaviors, it can be said that the organization has learned. It places much more emphasis on the situated nature of learning, a learning perspective that “views knowledge as embedded in the individuals, in connections between individuals, and in artifacts” (Nidumolu, Subramani, & Aldrich, 2001).

Recent research creates a distributed, rather than shared view of organizational cognition using social network theory (Tinaikar, 1997). The map of participants in this learning method is
much less dense and redundant than that in the shared method. Here an organization is said to know something or have learned something based on a few people who jointly hold discrete knowledge, that through connection to one another, collectively have learned. It is in fact unlikely that those with whom one typically communicates will be a part of the learning process, the new knowledge formation. This type of learning is catalyzed through non-redundant linkages and it is the links that hold the key to learning and the transfer of learnings (Yoo & Ifvarsson, 2001).

For example, the implementation of work cells typically results in a different flow of material through the plant, perhaps requiring a different set of tools and equipment, as well as worker skills and beliefs. As the workers focus on throughput and meeting delivery commitments, the mechanism to appraise the investment in appropriate resources to support these workers, such as these tools and equipment, may need to change. In order for the investment decision making process to change, multiple experts or functions must be involved in understanding the connections among throughput, customer satisfaction, accounting, manufacturing technology, etc. If organizational members from each of the functions collectively changed their perspective and behavior around this issue, it could be said that the organization had learned. What we would hear is that - a few of us shared information that collectively created new knowledge of what the organization needed to do and believe; we changed not based on a shared view of what was (memory) or is (shared view or common understanding of the business) but on what must be. Specifically, there would be great numbers of people who know nothing of the change in utilization accounting and a few others who describe communication and the need for understanding and linking the critical pockets of expertise and experience in the firm. This will often happen not only across functions, but across line (on the ground) and staff personnel.

This view relies in part on a knowledge management perspective, specifically knowledge creation. A separate section on knowledge management is included below in this literature review.
Chaotic, divergence and convergence in learning process.

The third and last model is probably the least understood and articulated and comes from the process innovation literature (Jayanthi & Sinha, 1998; Tinaikar, 1997; Cheng & Van de Ven, 1996; Leonard-Barton, 1995; MacIntosh & Maclean, 1999; Brown & Duguid, 1991). Based on innovation theory, organizational level learning can be said to be a product of dynamic systems behavior. This stream of innovation research suggests that OLL is not linear, as would be found in a cyclical model such as Dixon’s work, nor is it random.

In empirical research using dynamical systems theory or DST (Morrison, 1991), Cheng & Van de Ven found that the innovation process exhibited chaotic patterns, meaning it is a “nonlinear system, which is neither stable and predictable nor stochastic and random” (1997, p. 606). They further suggest that “[DST] provides hope by suggesting what a dynamic model of learning during the innovation journey might look like.... a nonlinear dynamic model of learning calls for an expanded definition of learning that examines not only how action-outcome relationships develop, but also how prerequisite knowledge of alternative actions, outcomes, and contexts emerges....learning in chaotic condition is an expanding and diverging process of discovery.” (1997, p. 607). This is supported by research results in a high technology manufacturing innovation implementation process (Jayanthi & Sinha, 1998). And Kim hints at the connection to DST, “The complexity [in organizational learning] lies in the nature of the interrelationships among the parts whose cause-effect relationships are highly nonlinear and distant in space and time” in his highly regarded theoretical work (1993, p47).

For example, in lean implementation, the way the work group changed may be described something like – for weeks we experimented and read and talked about how to do work cells. There was much disagreement, we didn’t see it the same way at all, we seemed to be coming from different places, and then one day that changed. Though we didn’t necessarily see it the same way, we each knew what had to be done. There was nothing that could have brought to that point sooner, other than more experimenting sooner.
Learning Outcomes, Organizational Changes

The third and last component of the exploratory model are the "outcomes" to learning that in fact give credence to and make manifest the output of the learning process. It is how we know that learning has occurred. It is not axiomatic that if there is change, there must have been learning, or vise versa (Fiol & Lyles, 1985); nor if there was training there must be learning; nor if the manager or machine operator learned something, the organization did (Hedberg, 1981). Learning at the organizational level has it own sets of outcomes and changes. These are connected to the learning methods through the action-outcome relationship. The methods act on the learning type and produce an outcome.

These types fall into two broad categories: one is tactical and the other more strategic. Many have called this behavioral versus cognitive. However, in keeping with my desire to integrate the practitioner and scholarly literature, particularly as it relates to pragmatic outcomes of learning, I choose to use the tactical/strategic framework which is common to the two branches. Moreover, the tactical and strategic boundaries will better serve my purpose of investigating the typology of learning that connects types, methods and outcomes, because these concepts are linked, as opposed to juxtaposed, as with the cognitive/behavior framework.

Learning outcomes can manifest in either or both forms.

Tactical outcomes.

These are changes in operating norms, behaviors, procedures (SOPs and the like). Here the output of the learning can be seen in the action of the organization, the change in the routines of every day operational behaviors. This includes such elements as the normative behavior of people or systems; of experts and technology specialists and machine operators; of database design or plant floor design. This is change that is visible, though it has come about as a result of a change in the knowledge or intelligence in the organization (Leavitt & March, 1988; Feldman, 2000). It is often though not always explicit.
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Strategic outcomes.

These are changes in expectations, goals, mental maps, viewpoints, myths, and theories of action. Here the output of the learning can be found in the application of insights, new heuristics and a new organizational (collective) consciousness. We can look for evidence of learning in how the organization, again through its members, plan, consider, anticipate. This is change that may not be seen at the time that it occurs, but decisions based on these new insights are in evidence, supporting the notion that the learning itself is often, though not always, tacit in nature. Nystrom and Starbuck provide a representative description of how these changes would be reflected in the organization is “Cognitive structures manifest themselves in perceptual frameworks, expectations, world view, plans, goals, sagas, stories, myths, rituals, symbols, jokes, and jargon” (1984, p 55; also Hedberg, 1981, p 6).

Guiding Framework of Organizational Level Learning

Together these concepts constitute an area of investigation as depicted in Figure II. This model bounds my research in the sense that it focuses on this learning process of the organization which includes reliance on the learning process of individuals. To be clear the model represents areas of inquiry rather than a hypothesis that is being tested. The specific research questions and the reasons for pursuing them, follow in Chapter 3.
Chapter 3 Research Questions

The essence of this study is to better understand how organizations can more easily implement successive change programs that are driven by new strategy initiatives. As discussed earlier, nearly 70% of such programs do not meet expectations. Since learning is always associated with new strategic direction, if we understand the nature of organizational learning, what learning method supports what type of learning to produce what outcome, we can expect to improve the organizations ability to implement strategic change. This in turn improves the organizations capacity to sustain itself. This Section further elaborates the research questions regarding learning as they apply to the context in which they will be researched, namely strategic change and process innovation.

The fact that we have been looking at organizational learning for thirty years and still do not have an agreed upon perspective, may argue for accepting a multiple perspective approach. Perhaps the reason that there are several different theories of OLL is that there is a contingency mechanism at play among type, method and outcome. This study will investigate the relationship of these three factors of learning, building on the robust foundation offered in the extant literature. This approach offers the hope of a somewhat more coherent understanding of the learning phenomenon, as well as increasing the value of existing theoretical contributions, by defining when and how a learning process is effective.

There are two questions that are considered here in response to a myriad of calls for further investigation into organizational level learning (Lahteenmaki, 2001; Harvey and Denton, 1999; Tripsas and Gavetti, 2000; Newman, 2000; Cheng & Van de Ven, 1997, Kim, 1993 and others) and knowledge transfer (Grover & Davenport, 2001). First, how does organizational level learning occur, and second, how is this learning manifested or transferred?
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There is broad agreement that individual learning is foundational to organizational learning, but how does this happen? How does individual learning get diffused, built on, elaborated, joined, or in some way constructed to become "organizational" in nature. Becoming "organizational" in nature is to say that learnings are held at the organizational level rather than at an individual level. Here organizational norms, behaviors and viewpoints or worldviews are changed as a result of the learning process.

As outlined in the literature review, three learning methods have been theorized to explain how OLL happens: 1) shared or saturated, 2) distributed or networked and 3) chaotic. These three frameworks will be explored by looking at how learning was done in the context of implementing strategic change.

The second question "how is learning manifested or transferred?" essentially verifies that learning actually occurred and investigates the transferability of tactical versus strategic learnings.

These questions are investigated in the context of two process changes which are considered here to be subsets of strategic change, they are 1) conversion from mass production to lean production and 2) implementation of electronic procurement which is a web based, digitized, highly visible and interactive information base between supplier and manufacturer. These processes have been selected because they are pervasive in the manufacturing sector, and in concept they can be and are being applied to many industry sectors.

Strategic Change

Out of the desire to innovate, renew, transform, and improve viability, comes the need for organizations to restrategize or reconceptualize the nature of the business. While this requires sophisticated higher order thinking and tools, it is, in many ways, the easy part of change. It is often forward looking and by design does not necessarily connect to or take into consideration the concrete experience and conditions of the present operation. While strategic analysis tools such
as SWOT and Porter’s five forces are used to account for firm capabilities and capacities, these “visions” and goals are viewed as a jumping off point, and don’t address the operational transition to some new schema.

It is this operational transition that is often the hard part and around which the field of change management or strategic change implementation, has grown. Both process innovations involved in this research, lean and e-procurement, are examples of operationalizing a strategic change. This implementation of new strategies in an existing organization is hard in that it involves changing a work force with embedded work routines, attitudes, skills, relationships and expectations (Weick, 1996). In order for people to change, and for leaders to catalyze and lead change, they need more than cognitive skills, such as systems thinking and pattern recognition which are required for strategic planning (Boyatzis, 1982). They also need emotional intelligence, the competencies that lead to flexibility and adaptability, that allow for learning and unlearning. As Daniel Goleman, a leader of the emotional intelligence field, puts it “Today organizations are reshuffling, divesting, merging, acquiring, flattening hierarchies, going global. The acceleration of change through the 1990’s has made the ability to lead it a newly ascendant competence. In earlier studies in the 1970’s and 1980’s, being a change catalyst was not highly valued. But as we approach the millennium, more and more companies are putting a premium on people who can lead through change... In addition to high levels of self-confidence, effective change leaders have high levels of influence, commitment, motivation, initiative, and optimism...” (1998, p.195)

However, change today is not just about leaders and “agents,” though these functions and roles are important (Cummings & Huse, 1989; Kanter, et al., 1992; Markus & Benjamin, 1996; Schwarz, 1994). Today’s competitive environment requires broad involvement of personnel and continual improvement of business performance. At the 1999 Academy of Management Annual Meeting, David Nadler, a long time scholar and consultant in the field, spoke of the obsolescence of organizational development. He discussed an inflection point identifying that the focus of OD on intervention and behavior change was being replaced by the need for
continuous, integrated change that was proactive rather than reactive, that had characteristics of sustainability.

Nadler joins others who see the work of change to be ongoing and broadly embedded within the organization, as well as with partners and service providers (Handy, 1995; Kotnour & Matkovich, 1999; Mezias, Grinyer & Guth, 2001). In a recent review of the state of organizational change Weick and Quinn (1999) note that the research focus of the last decade has been on this question of the “tempo of change,” episodic or continuous. They conclude that these views present an ongoing tension and that: “Classic machine bureaucracies, with their reporting structures too rigid to adapt to faster-paced change, have to be unfrozen to be improved. Yet with differentiation of bureaucratic tasks comes more internal variation more diverse views of distinctive competence, and more diverse initiatives. Thus while some things may appear not to change, other things do. Most organizations have pockets of people somewhere who are already adjusting to the new environment. The challenge is to gain acceptance of continuous change through the organization so that these isolated innovations will travel and be seen as relevant to a wider range of purposes at hand.” (1999, p 381).

It is said that for an organization to be sustainable, it must employ a unique strategy, differentiated in some way from all others (Schumpeter, 1939). This could include some combination of culture, markets, products, processes, costs, customers, networks, technology, workforce, and so on. The factorial of these combinations is a large number. That is to say, there are many ways that a firm can be distinctive in the marketplace, value chain and economy, the challenge is to find one that works best, is most appropriate for each firm. If this is true for strategy development, why would it not be true for strategy implementation or the strategic change process? Complex change in dynamic systems involves multiple levels, competencies, processes, and functions that in combination are unique to a firm. In addition to these structures, political systems and culture make change processes somewhat unpredictable (Handy, 1996; Dawson, 1994). Therefore it may be that these systems don’t lend themselves to reliance on “best practice” or “exploitation” of change that works across the board in organizations, one size
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fits all. That there is not a single coherent or cumulated view of change (Porras & Silver, 1991; Weick & Quinn, 1999) after fifty years of investigation may be more a testament to this factorial or the nature of the researched (Kilduff & Mehra, 1997), rather than to the researching or researchers.

In recognition of this, of late, there has been a shift to more exploration of the situated nature of change (Weick & Quinn, 1999) through a variety of mechanisms like case studies, ethnographies and cross-organizational research (Starbuck, 1993; Katz, 1997; Boddy & Macbeth, 2000; Macy & Izumi, 1993; Huber & Glick, 1993) in an effort to improve the quality of the evidence. And though not the focus of this case study, this research will, through its methodology and the inherent interaction of organizational change and learning (Lahteenmaki, 2001), build on and add to the empirical, theory based research of the change process. It will make accessible another situated or contextualized data point for future comparison and meta analysis which has been advocated (Beer & Walton, 1987). This will also support concern about the state of research in the change field: “there is a continuing debate about whether change research is developing as a cumulative and falsifiable body of knowledge” (Weick & Quinn, 1999, p.363).

While there continues to be concern about the theoretical and research base of the change field, it does not want for “prescriptions.” Well regarded scholars like Kanter and Kotter have accumulated personal knowledge and developed theories, though unresearched in a formal sense, on the nature of change. Recent research by Boddy and Macbeth (2000) provides a rigorous analysis of the “suggestions” that these and others have provided, surveying firms that have undertaken collaborative, and working relationships with another organization. The areas of goals, resources, structures and controls, provided the most statistical differentiation in determining success. This framework provides grounding for the inquiry and research protocol relative to the change process.

Lean Manufacturing and Supply Chain Management
Two situated change processes are considered in this research: a) "lean" manufacturing or “lean” production and b) supply chain management, are major process innovations that are strategic in nature. Consistent with overall views in the field of change management outlined above, business process change scholars are recognizing the contextual reality of successful change efforts (Earl, 1994; Caron et al., 1994). Through the lens of “lean” implementation, as a change process, theories of organizational learning were explored, and through the lens of supply chain management or as it turned out, procurement, transfer of learning were examined.

**Evolution of Lean Manufacturing and Role of Kaizen**

In the early 1980’s, Japanese automobile producers were gaining market share in the U.S. creating a debate about closing borders, erecting trade barriers and otherwise thwarting foreign producer inroads. By this time the U.S. apparel and consumer electronics industries (television, video and audio recorders and players, etc.) had already gone “off-shore” for manufacturing, and the erosion of the auto industry which accounts for 4-5% of GDP was real and growing. A few MIT researchers mounted a research and revitalization effort in the automobile industry, which became known as the International Motor Vehicle Program (IMVP).

This group studied Japanese automotive production techniques and found that they were considerably different from the mass and craft production processes originally established by Henry Ford and still employed in the U.S. The Japanese strategy emphasized reduction of organizational waste (“muda”), integrated process flow, and zero defects. Together these manufacturing goals were coined “lean” by John Kraficik one of the IMVP researchers and they were documented in a now famous book, “The Machine that Changed the World” co-authored by Jim Womack (1990). In this landmark treatise the authors stressed the cross-functional, broad based nature of this organizational shift. In fact, the manufacturing part of lean, “Running the factory,” was just one of ten chapters. The balance spoke about the involvement and interdependence with the supply chain, customers, designers; the implications of “lean
production” for the finance and human resources function; and the overall strategic challenges of managing in a global economy.

Going lean can deliver tremendous bottom-line improvements over mass production. Quality experts estimate a 90% reduction in inventories, lead time and cost of quality, and a 50% increase in labor productivity (Lathin & Mitchell, 2001). However, while lean has been widely accepted in many industries, philosophically, it has been difficult to implement (Schwartz, 1999; Velocci, 2001). U.S. manufacturing firms have been implementing lean concepts for two decades (Krizner, 2001) yet by some estimates, only 2% of U.S. companies can actually be considered to be operating “lean” (Hutchins, 2001).

In an effort to understand these implementation issues the Society of Automotive Engineers (SAE) conducted a study. In 1998, SAE developed a best practice survey which looked across manufacturing sectors including aerospace and farm equipment as well as automotive (Quality, 1999). Consistent with findings regarding other major change processes (change research), this study found that “management” leadership and “organizational learning” need to be key areas of implementation emphasis. There are also structural conditions that make implementation difficult and complex. Experts in the field have found that a) lean implementation is most often undertaken as a result of “feeling some pain” which means that the solution set may be constrained by capital, human, financial or intellectual (Labow, 1999) and b) these changes are complex involving multiple organizational functions and levels and the inherent communication and decision making challenges across these boundaries (Convis, 2001).

At the heart of lean implementation is kaizen.

The term kaizen means make better, but in English the word has become a verb meaning to take a process or a product[service] or a design, and using the power of internal experts, the people on the shop floor and in the design room, to make something measurably better. To kaizen a process requires much planning, concentration, and focus until the job is over, which it never truly is.”(Laraia, 1997, p.216).
Kaizen is based on the belief that many incremental developments will accumulate into a substantial gain which stands juxtaposed to “business process reengineering” (BPR) which is concerned with elaborate, structured “fundamental organizational redesign” (Bond, 1999, p.164). The kaizen process starts with the “process owner,” which could be the division or plant manager, but depends on broad multifunctional team participation. It is not a one size fits all “best practice” but a way of developing the lean tools and techniques that are uniquely appropriate for a specific firm, given its particular core strengths and competitive advantage (Allen, 2001).

Today lean manufacturing translates into three underlying principles:

1) pacing operations to customer demand,
2) one piece flow - producing goods one at a time, and
3) flow of materials is based on customer demand (Laraia, 1997).

The kaizen effort then is the tool for aligning the organization to these production principles.

Kaizen is action, not just proposals; it “differs from traditional continuous improvement processes because it is almost entirely action based” (Laraia, 1997). It typically uses change agents or facilitators who are knowledgeable in kaizen techniques and understand the lean goals that the firm seeks. Next specific projects and team members are selected; kaizen events are held; processes and skills are analyzed; actions are determined and implemented. Ultimately, learning occurs, changes are made and a new way of doing things becomes the norm.

And this is the first question of this research “how does the organization learn this new way of being?” Specifically it is not how individuals learn, but what process is used to address which type of learning, which produces a change or learning outcome.

Supply Chain Management

Having “installed” lean, an organization can now truly “build to order” and “manufacture on demand” and are doing this in industries as diverse as PC’s (Dell) and heavy equipment (Trane) (Labow, 1999). Often the next logical step, a step enabled by lean, is connecting electronically to both supply chain and customers. Giving both customers and suppliers visibility
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into the factory is productive when the manufacturer can actually build to demand and when it has available in digital form, information that supports these other members of the value stream. Reaching out through the distribution channel to the customer and reaching back through the supply chain, electronically or digitally, is what has come to be known as e-business. And while the mania of the Internet startup era of the 1990's has dissipated, the underlying economics of "E" are still sound; "...there are still compelling elements of wealth creation, productivity gain, and efficiency that the Worldwide Web brings to every business" (Oliver, 2000, p. 8).

There are many versions of "e," e-business, e-commerce, e-strategy and the like. For the purposes of this study I use a common view - "the integration, through the Internet [and other electronic transmission vehicles such as EDI], of an organization's processes from its suppliers through to its customers - commonly referred to as 'Business to Business' (B2B)" (Boddy & Boonstra, 2000, p19). Similarly it can be constructed as more about the processes and the relationships first and the technology second - "the comprehensive automation of a company's collection of relationships – business partners, competitors, customers, employees and suppliers – into a unified value chain, all based on IP and Web applications" (Berry, 2000).

As with lean, implementing e-business is a major change project and process innovation, often requiring transformation of the business model and value chain (Dutta et al., 1998; Mahadevan, 2000). It is complex in nature, with many uncertainties at the outset; broad in scope, involving changes not just in technology, but in the social systems across functional and organizational boundaries. Research indicates that "successful implementation appears to have required constant adjustments to the organizational infrastructure" (Boddy & Boonstra, 2000, p33). As such, as a firm moves from using a continuous improvement process such as kaizen in implementing lean, to implementing e-business, there is a natural reservoir of "learning about how to change" that is available.

It can be argued that the subsequent change process, procurement in this case, can be expected to benefit by learnings that were gained in the previous change process, lean here. How does the reservoir get tapped; how does the firm learn or transfer knowledge about learning;
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how does the learning curve phenomena happen in process innovation, how does the use of the kaizen process of incremental improvements benefit the transition of the firm to procurement? Addressing these questions allows us to better understand the ways in which continuous organizational learning can become a reality.

Contribution of this Research

As a result of this work we will have a clearer view of the phenomenon of OLL, particularly in the process of learning and the transfer of learning. This will be done in the complex, popular and prominent context of change management, as an organization implements two different strategically driven process innovations. This work is of particular significance since both processes, “lean thinking” and supply chain management, are high value-added changes that have their important growth periods in front of them.

There is particular value to looking at these process changes, lean which opens the door to e-business. Much has been written about the advantages of putting one’s business on the web or establishing direct electronic linkages across multiple members of the supply chain. E-business is expected to be revolutionary in scope and globally pervasive in scale. No major function will be left untouched. It will not only increase revenues and reach beyond its e-commerce incarnation, but will affect the bottom line in many ways. For example, the Boston Consulting Group estimates productivity gains of 1-2% of sales by 2004 and 6% by 2010. Substantial cost savings per transaction, as much as 80-90% per order as an example, are already being realized. This is considered to be a sea change in the how a business operates, and while there is much talk, there has been little research as to how this innovation will actually happen. It is widely agreed that learning is essential to innovation (Stata, 1989). Because these firms (CMs) are located in the middle of the supply chain this change has far reaching implications. In this middle position, they are part of their customer’s inventory management and quality systems; as well as part of their suppliers' “just-in-time” inventory and purchasing
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systems. So tightly linked are these players that a change initiated by a CM often affects both
types of partners, and of course visa versa. For example, when a CM is connected electronically
to its customers, distributors may become unnecessary, they may be disintermediated.

Many scholars and practitioners talk of e-business as though it were a technological
issue. But this research highlights that it is most importantly an organizational and economic
proposition. In addition to these benefits of looking at these two processes in the component
manufacturing sector, there is anticipation that the results could easily extrapolate to other
industries including service providers, based on the generic nature of learning, management, and
knowledge, and based on the central position in the value chain that is held by the CM
organization.

Finally, the existing work of many theorists and consultants will be viewed in light of this
empirical research. Many have called for a study such as this in order to multiply the usefulness
of existing organizational learning inquires and models that have been developed over the last
several years. In this vein it is expected that findings will not only add clarity, and new
understanding and insights to the organizational learning and knowledge process literature, but
may also develop more coherence in existing frameworks. Offering efficient, effective pathways
of transition will be useful to practitioners. Providing a rich case description of these hard to study
processes will help to integrate and bring convergence to existing learning and knowledge
transfer theories, and provide a more congruent foundation on which other scholars can build.
And finally, if process change results can be improved organizations will benefit not only
operationally and financially, but may also be encouraged to change more regularly, continually
enhancing their strategic position, capacity and capability.
Chapter 4  Methods

The questions asked in this research were “why” and “how” a phenomenon behaves as it does, namely how an organization learns and how and why learnings are transferred to new projects. This work involves understanding relationships, between individuals and between individuals and groups, organizations or business divisions, and collecting data as an emergent process, such that as relationships are discovered and deemed important, they can be pursued.

Together, these research needs pointed to using a qualitative case-study methodology. The study of a case typically is an examination of an event or related events that is expected to display certain theoretical principles. It is appropriate here for four reasons: 1) because it exists only in situ, it cannot be replicated in a laboratory; 2) because it looks at the “how and why” of relationships, a quantitative method may produce statistical correlates but would likely not produce meaningful, logical results (Mitchell, 1983); 3) because the focal events develop over a long period, years, it is impractical to use ethnography or participant observation; and 4) because this research is designed for descriptive as well as theory building purposes it is not necessary to observe the phenomena over multiple cycles (Eisenhardt, 1989; Yin, 1989).

Research Site and Sample

Following accepted research methods in the field (e.g., Yin, 1989; Strauss & Corbin, 1990; Locke, 2001), this work is an exploratory, empirical, applied, qualitative research study (Yin, 1989). This case study explored organizational learning and knowledge transfer at the Ohio Component Manufacturing Company (OCM), specifically at a plant called GC, in the Hose Division. The sample was comprised of employees of the Hose Division who are a) responsible for implementing “lean” manufacturing, viz. manufacturing managers and production workers, and b) other staff specialists and executives involved in supporting the
OCM provided an excellent environment in which to understand the organizational learning and transfer issues associated with strategic change as outlined in Chapter 3. It is a large, diversified, integrated component manufacturer which operates on a global basis. This sector has been under pressure for the last decade primarily due to new low cost alternatives from abroad. As a result it has constantly sought methods for cutting costs while improving quality. At the same time it has gone through a consolidation phase as new manufacturing methods, in particular, lean manufacturing, have in fact yielded higher productivity which in part has led to overcapacity. During this period, OCM has become the largest manufacturer of motion and fluid control components in the US. This 85 year old company qualified for the Fortune 500 for the first time in 1996 primarily as a result of becoming the acquirer in this industry consolidation. Its 500,000 products range from sophisticated hydraulic and pneumatic motion and control systems to individual parts, like connectors and seals. They have been highly entrepreneurially in that the 80 general managers of some 220 business units have had profit and loss responsibility and broad authority in decision making. OCM employs about 42,000 people in 46 countries, market 1400 product lines produced in 190 manufacturing plants that serve more than 1000 industrial and aerospace markets.

OCM has employed major improvement programs over the years including “just in time manufacturing” (JIT), continuous improvement programs designed to improve quality (TQM and “BP” which stands for best people, product, performance), and it has assimilated several other firms through acquisition. For the last three years it has undertaken large scale change efforts focused on lean manufacturing processes. As a result relationships throughout the value chain, he way suppliers do business with them and they with their customers have been altered.

I entered the organization through a contact with one of the two Executive Operating Vice Presidents who helped me select an appropriate site. The GC plant was selected as
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the study site because of its recent undertaking of a conversion from mass production to lean production. This is precisely the kind of change effort that has the opportunity to be leveraged to other areas of the business and other functions within the local context. As such it provided the context in which I could retrospectively gather data regarding how and why learning occurred.

The GC plant employed approximately 150 people (sown from about 250 in its prime), of whom 75% were floor workers. Thirty-seven people were interviewed, two of these twice for a total of 39 interviews. The plant was headed by a plant manager, who reported to a remote business unit manager, and who was supported by a small staff of production, engineering and scheduling people. Several functions were located in the plant where they reported dotted line to the plant manager, and straight line to the Division Staff Manager at Division headquarters (see organization chart and map, Appendices A and B, respectively). This particular plant was in rural Ohio where it seemed to grow right out of the corn field. It had been owned by two other firms, dating back to 1982 when it was sold for the first time, then in 1988 it was acquired by OCM. Since the workforce had been on a decline and the union contract called for last in first out, many of the current workforce had worked for at least one of the former owners.

The sample reflected a diversity of functions at the plant, both line and staff, male and female, senior and junior in tenure, front of the production process and end of the process. The sample was limited to 37 individuals, two of whom required a second interview when data showed up downstream in the interviewing process that needed clarification. The number interviewed was determined in accordance with grounded theory tenets that suggest sampling should stop when a theoretical category has reached saturation (Glaser & Strauss, 1967). By virtue of the data collection and analysis, the researcher determines theoretical saturation when new interviews are not providing new insights. The types of functional areas or departments that were involved in sample are generically indicated below (Figure III).
Data Collection and Analysis

Data collection.

Of the 190 plants in the OCM production stream, GC was considered to be one of the worst; one manager had referred to it as the albatross of the division. That this was the internal perspective was not a well kept secret. People who worked there were aware that they were not as productive as was needed, particularly with the advent of the global competitors. This reality made it a particularly sensitive research environment, one that called for a qualitative approach in order to deal with any preconceived ideas held by the personnel as to the purpose and motive of the study that was needed to enable a free flow of candid, honest information. By using a combination of the semi-structured interview and
critical incident interview (Flanagan, 1954) methods, and meeting with each one in private, and face to face, I was able to create gain the trust that is necessary for disclosure. This was exceptionally important for this research given the personal nature of the data, namely how they experienced and observed the change at GC, both operationally and culturally. For the purposes of confidentiality, all interviewees signed a consent form and no names are being used on any records. Each interview last between 70 and 90 minutes and was tape recorded and professionally transcribed. The focus of each interview was on developing an understanding of how the organization learned to change and then subsequently employ these changes in another context.

While this study was exploratory rather than “hypothesis testing” in nature, much of the situation had been analyzed provisionally prior to actually collecting the data. This enabled the interview to be focused and bounded, to be somewhat structured through a preplanned interview guide, which offers some assurance of comparability or at least connectability from one interview to the next (Merton, Fiske, Kendall, 1956). The art of exploratory interviewing is the ability to use an interview guide and relevant prompts and at the same time be open to the direction of the conversation (Kvale, 1996). For this purpose I used a combination of life story, critical incident, and focus group interview techniques (for protocols, see Appendix B).

This interview approach allowed data collection to be an emergent process. It started with interviewing the nucleus of division members who are responsible for implementing “lean” manufacturing. I had been sent to the General Manager of the Hose Division, to which the GC plant reported, as my study entry point. He had been involved in the decision to give the GC plant one more and last opportunity to come into a profitable position and was ultimately responsible for bringing in a consultant and setting the course for the conversion to lean.

I moved through the organization interviewing people being lead by the data from one interview to the next, not only in terms of with whom to talk, but, what the structure of
the interview should be. This is one of the key values of grounded theory technique that allow the researcher to improvise based on the early findings such that data, analysis and themes were developed reflexively (Glaser & Strauss, 1967). Early interviews indicated that a major change had to do with teamwork attributes not just the technical aspects of moving product through the plant in a different way. As a result of this, I probed more deeply in this area in order to better understand it’s complexity in order to better characterize it. So it was the developing concepts based on the emerging codes and categories that became the focus of the future interviews. Likewise, who was interviewed was responsive to the developing data. For example, as it became apparent that the transfer of knowledge relative to procurement was predominantly backward in the value chain, rather than forward internally, I decided not to interview as many procurement people as had been originally planned.

As mentioned earlier, this data analysis was done reflexively rather rigorously following the notion only the researcher really knows whether or not she is in touch with the case under investigation “… the usefulness of explicit coding during data collection appears limited. If the researcher is close to the data, analysis and theorizing is inevitably taking place. The value of such procedures may have more to do with making qualitative research appear acceptable and rigorous, than [with] improving the method” (Smith, 1991, p.156).

I also ran a focus group made up of 8 individuals whom I had already interviewed. They were invited based on the heterogeneity objective of having a range of functions and position levels represented (Fern, 2001). Within these parameters, they were selected at random. At this session I clarified the understanding of commitment to the change and had an opportunity to see the range of perspective that I had gathered during the original individual interviews that dealt primarily with shared mental maps and proximity. It provided a window into the type of social interaction that had been described by individuals which turned out to be an important component of the findings.
Other relevant artifacts were solicited during the interviews. These included documents/recordings (meeting agendas, run rates of production, training materials business cases, procedures, reports, etc.) and other artifacts that have been used as communication tools regarding the change process.

And lastly, observations of the plants, offices and meetings were made. Both lean and team are said to be cultural changes, as indicated in a Parker Hannifin document “Lean is a cultural evolution.” (Parker Hannifin, PS999). While considered inappropriate for most quantitative research, observation has long been a tool for the case study research of anthropologists and sociologists who focused on culture (Radcliffe-Brown, 1948; Malinowski, 1922; Thomas & Znaniecki, 1927). Moreover, this data collection method lent itself to the subject of this research in that “visible management” is a principle of lean production. Based on the trust and rapport developed during the on-site phase of the research only highly confidential information was not available.

These four different gathering methods and sources of data all contributed to category and code development that enabled rigorous analytic induction of highly specified and valid constructs about the learning and transfer process. Grounded theory methods guide not just the collection of data but also the analysis of it. Glaser and Strauss (1967) developed this method as a way of letting the researcher get closer to the data than can be done in quantitative methods which keep the “subject” at arms length, yet it gives the research rigor by providing a systematic way in which to analyze the data, which some had considered lacking in previous qualitative methods. Others have since further refined the method (Strauss & Corbin, 1990; Locke, 2001) and it has come to be seen as particularly useful in organizational research (Prasad, 1993; Martin & Turner, 1986).

Data analysis.

Given the abundance of noncontiguous theory regarding how organizations learn and transfer these learnings to new situations, grounded theory is a particularly useful methodology
based on its “follow the data” philosophy. It allows the researcher to get in-between existing theory or totally away from it as the data dictates throughout the collection process. The rich description of individual stories and examples that results from qualitative data collection, has, in grounded theory method, the worthy companion of systematic analysis, enabling generation of theory.

The rigor of theory generation comes from systematically identifying what the data is saying, analyzing the data by sentence, paragraph and sometimes the whole interview or just a word, asking who, what, when, where, how, how often, how fast and so on. Following standard grounded theory process (Glaser & Strauss, 1967; Locke, 2001) I broke the data down and examined it for major concepts or phenomenon, constantly comparing the data, going back and forth between the data and the coding to understand the nuance of the language or the context in which it appeared. This constant comparison of data within an interview, between interviews, between developing codes, between codes and the interview data is at the heart of grounded theory analysis (Glaser & Strauss, 1967; Miles & Huberman, 1994).

The ability to take in the data and let it influence you in terms of how you conduct the rest of the data collection (for example, who else you interview and what questions you ask) and at the same time stay open to what is going on with each new interviewee is critical. One needs to continue to listen for new directions to take, new people to interview, new concepts, yet one also needs to recognize non-fruitful areas of inquiry and data saturation. For this reason I didn’t start interacting with the data in the sense of analyzing it, until I had conducted six interviews, which by intention, included actors in different functions and at different levels in the organization. My first step then was to go through each interview and identify concepts that had to do with the change process, learning and transfer of learning. I had used open ended questions in the interview which provided data that was more authentic, but this process also made the data less comparable. For example, rather than offering a list of possible answers to the question of “what was learned during this process”, I let the interviewee describe it in his or her own language. This was particularly true in the early stages of data collection. As the categories started taking shape,
I began testing the findings with interviews conducted in the latter part of the study, but only after asking the open ended question. This allowed for comparison of the reduced data and the concept development with its appearance in raw form and thus increased the reliability of the emerging categories and codes.

In the first pass I gained a broad but specific understanding of what the interviews were saying, by excerpting the exact phrase from the interview that seemed to be a concept of relevance and interest (showing them as “comments” using the MS Word tool). What I was then working with were interview documents with comments off to the side (see sample in Appendix C). These I then reduced to just the comments and started putting possible labels on them, words that communicated conceptually what was happening.

In the beginning I was building both the macro story of change, when did it begin, how, who was involved what were the goals and objectives and the micro story of learning and transfer. There was a tendency to try to separate the phenomenon from the context, which I later found to be impossible, though for purposes of categorization, concepts had to bounded and deconstructed. This study also had many variables which had to be managed simultaneously. There were multiple levels of analysis, multiple research questions, all of which were viewed through the lens of organizational systems and knowledge management. I regularly had to remind myself that I was opening up a stream of research out of which I am looking now for those ideas that relate to my research question.

Within each interview document I asked myself “What is this?” and ‘What does it represent?’ (Strauss & Corbin, 1990, p.63). As I was doing this I questioned what went with what? What phenomenon sounded similar and why. After doing this with several interviews, I had a list of dozens of concepts that might apply to my research questions. But trying to work with all of these is not possible. Following Strauss & Corbin, I then put these into categories; grouping concepts that seem to pertain to the same phenomenon is called categorizing (1990). Once I had a fairly good sense of a category, I listed the examples from the data that came from the excerpts, the “comments”, on the original transcripts. The label for the conceptual category
comes out of the data. For example, I ultimately described the category whereby actors were questioning what was going on in this change and doing it in a collective setting or interpersonal form, as assessment, but it started out as many different concepts. While the term assessing was mine, it came about from the actual quotations from interviewees about “observing”, “watching”, “noticing” and so on, which came from different interviews, said in different ways.

I then created an analysis grid, arraying the excerpts by interview, by category to determine the properties and dimension of each category (for a sample see Appendix D). This allowed me to further compare and contrast, to further reduce the data and, at the same time, detail its meaning. Within each category I looked for the critical defining characteristics. What are the key attributes or dimensions of let’s say, “assessment”? What makes it assessment in this context as opposed to it being a generic concept? For example, the characteristic of individuals looking for information from the group, about which they then reflected and evaluated, was a densely populated space in the analysis grid indicating this to be a dimension of the category, assessment. The combination of denseness and my view of the importance that any property had in relation to the whole story (theoretical sensitivity) determined whether or not it was a key defining property for each category.

This approach was used until all excerpts were accounted for in some way in the grid, discarded as not germane in the meaning that the category was now taking, or was moved to another possible category where it may apply or be congruent with the meaning under development there. This was done for all categories. This grid was an electronic equivalent to the “concept card” which is an established grounded theory technique (Turner, 1981). While unwieldy, it allowed me the opportunity to see what an interviewee reported on a given category. I was able to compare on the basis of within interview - within category or property, or vertically. At the same time, it allowed me to compare across interviewees within category properties.

From these, dimensions were established with ranges or defining properties. For example, in the case of seeking information from the group, I can say that seeking information is a property of the category “assessment” and “from the group is a dimension of “seeking
information," namely the dimension “from where”. Again the grid with the original excerpts from
the transcript (staying close to the data) was used to define the dimensions and their continuums.
The “from where” dimension has a range associated with it, in this case it ran from close in to far
away, from one's peers to the consultant and management, to books on lean and change. This
was done for each dimension within each property within each category.

Applying the method of constant and continual comparison, I then went back to the
interviews and applied the categories and codes to the transcripts, primarily to ensure that the
codes were non-duplicative, orthogonal and clear. At this point, I am also testing the theoretical
sensitivity of the categories and codes, or my “ability to recognize what is important in data and to
give it meaning” (Strauss & Corbin, 1990, p.46). To assist in this, I used some techniques
suggested by Corbin and Strauss (1990) that helped me be skeptical and at the same time close
to the data. The objective is to push my examination of the data so as not to get into a rut or get
too far out. For example, at one point while I was developing some preliminary categories and
codes, I began to wonder if what I was seeing in terms of the “buying in” process by the actors
was strictly a function of the GC plant being a union shop. If so this would have had implications
not only on the generalizability but also on the findings themselves.

In particular, I was interested in the way that people were free or not free to “choose.”
How would they operate, I wondered, if there was really a range of options or if it were strictly a
top down, union directed decision which is often the case which I knew from previous personal
experience? And it was possible that this was the way it may have come down in GC, given that
the union officers were consulted on this project before the decision to do it was made, and they
had given there agreement to do it. If, in fact, this was how it was implemented here, though my
interviews were telling me otherwise, it would mean that I should take a route in the data
collection and analysis that I had not contemplated, learning more about union rules, structure
and the like.

So I employed the “flip-flop” technique (Strauss and Corbin, 1990, p. 84) asking myself
how would “buying-in” present itself if there were no union shop, if there were a union shop that
acted in a laizze faire manor relative to this project, and if there was a union shop that prescribed attitude for all. I developed a simple idea of this from my experience with change where both union and non-union populations were affected and literature in the field and compared this to what I was finding. Based on this analysis I scheduled two interviews that I had not anticipated. I re-interviewed the human resources manager at the plant and the union president with intent to better understand this issue. (This is how the sample became 37 interviewees and 39 interviews). For a period I also kept more attuned to this in my regularly scheduled interviews and conversations.

I concluded based on understanding the continuum on which individual choice ranged, that in fact, the dynamics of the buy-in were as I had been gathering, truly an individual preference, albeit in a social or community setting of the plant and in consideration of co-worker relationships. But that it was not a top-down decision, being covered with a more politically correct answer for the interviewer (Bion, 1959). In reality, the fact that this was a union shop was not the differentiator; it was the decentralized nature of the decision making which can be found in either context (union or non-union) that was relevant, and pertains to generalizability. In this case “flip-flop” enabled me to better understand the property of “choice” and buy-in and thereby guide not only the analysis, but the data collection as well.

I also used other validating techniques to assure myself that I was accurately reflecting the data in the coding. In a few instances I counted occurrences in the data. When I coded assessing I went back to the data and counted the number and level of people who talked about this. By doing this I could see the community of interest in the plant, those intimately involved in the day in day out change effort and see them clearly distinguished from those who were not a “part of” the community. These examples illustrate the back and forth of grounded theory method, where data is seen, provisionally analyzed and questioned, through a grounding process, while still in the thick of the gathering process. To get this level of refinement and “in situ” clarification and detail is simply too cumbersome using quantitative approaches.
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Having arrived at a set of major categories with their defining properties and dimensions, I then did axial coding, creating paradigms that describe the relationship of these categories and again tested this against the interview data. Here I took my learning categories and drew relationships among them based on the Strauss paradigm (Strauss and Corbin, 1990). In this framework each category could be related to another in one of several ways. The coding paradigm considers conditions, context, action/interaction strategies and consequences (see Appendix E for an example.).

I then went back to the interviews and connected the categories as described in the interview. This also helped me again check the fit of the categories to the data, but also indicated what the story of this study was. Take the case of the plant manager, for example. In applying this paradigm one could see that the rewards of the organization did not align to the new production method. As a result the manager had to choose between adhering to the principles of the new production methodology or to violate them and gain greater personal compensation. He chose to do the latter, which produced the only case of willful sabotage uncovered in the study. This individual later left the company, being forced out, for non-compliance. By using the paradigm, I could depict how the intervening condition of believing or not believing which influenced his action that contradicted new policy, was related to his staying or leaving the company. In his case, his assessment led him to erroneously conclude that the company was not serious about using the new operations method. His “belief” was that it would be OK to do this. Applying the paradigm to other interviews as well allowed me not only to see the relationships of the categories, but helped, again through comparison, refine the nuances of the codes. By comparing these frameworks, which were developed by going back to the interviews and connecting the categories, I was able to see and build the story.

Qualitative research carries with it both the benefits, about which I’ve mentioned several, and the liabilities of being close to the data, of collecting and analyzing the data reflexively. The major concern with a grounded theory method and all qualitative methods for that matter is its reliability that comes out of the objectivity of the research process. One
answer for this is in the researcher’s personal skill in maintaining objectivity, upon which the analysis relies (Smith, 1991). To the extent that the setting is somewhat new and about which the researcher has little a priori knowledge, researcher bias can be minimized. In this case, my personal involvement in an organization going through a strategic change effort made the environment at OCM not unfamiliar. On the other hand, I had no prior personal knowledge of this firm or any of the actors at the time that I selected them as the case study site. Likewise with the function that was changing.

I had had experience with quality improvement programs, but not with lean. Another method of improving reliability of qualitative analysis is to use multiple data sources and collection methods. In this research triangulation of the data is designed to reduce the latitude of interpretation or constrain the researcher’s need to imagine what cannot be observed directly (Denzin, 1970). Multiple perspectives on the phenomenon came through interviewing actors at multiple levels in the organization from the floor machine operators to the operating vice president, across functions from production scheduling to machine maintenance, to production and others. This data in turn was viewed from multiple angles when the interview findings were compared to other data and artifacts, such as meeting observation, training programs, informal conversations, presentations and so on.

In order to add the greatest possible rigor to the results, inter-rater coding was employed. This is the gold standard of reliability tools and ensuring, as Boyatzis calls it, “consistency of judgment” (1998, p.159). Comparison is made between the researcher and the second party’s indication of presence of a code (Atkinson, 1958; Smith, 1992). A portion of the interviews from this study were independently coded using the codes established in this research. This independent coder indicates the presence of the code and this is compared to my original coding. The result is a percentage of agreement in coding the presence of a category. This currently being finalized and at the time of this writing there is no indication that adjustments will be needed.
This research process is built on an epistemology and ontology of social construction. In keeping with this perspective, the approach to theory development that most fits the research goals and the subject is a variation on classical grounded theory, one that emphasizes “the agency of researchers who actively compose their analytic categories and research findings” (Locke, 2001, p. xi). Getting useful, valid research results here must depend on the involvement, intent and perspective of the researcher much more so than on a process of dotting i’s and crossing t’s. This view has been supported by many others (see Eisenhardt, 1989; Yin, 1989), including this researcher. During my seven months of on-site research I became a part of the organization being able to come and go at will at both the plant and factory locations. I at once, blended in and was yet distinctive in terms of my professional role and relationship, not socializing or becoming too familiar. Denzin (1978) puts the attempts at research precision this way, another way using the words of George Homans “so much guff has gotten mixed with the truth [about theory and method] that, if you cannot tell which is which, you had better reject it all. It will only get in your way. No one will go far wrong theoretically who remains in close touch with and seeks to understand a body of concrete phenomena.”

And now, on to the story...
Chapter 5 The Story: The Results of Open Coding

This is the story of transformation. First I look at the organizational learning that occurred during the implementation of lean manufacturing, and then I describe the way in which the learning that went on in this implementation is transferred to other places and times. While it is told as a story it is not a fiction novel. Each of these three “descriptive narrative[s] about the central phenomenon of the study” (Strauss & Corbin, 1990, p.116) are followed by analysis and conclusions that relate the findings to the original model and indicate new contributions to the extant literature.

Organizational Learning Open Coding

Lean Production at the GC Plant

Typically organizations undertake a serious change program only if it’s absolutely necessary and OCM is no different in this regard. Change like this is can be disruptive to customers and the workforce alike, expensive both financially and from a resource use or time perspective, and risky in that outcomes are not assured. But it was deemed necessary for the GC plant of OCM to change from mass production to lean production, and at the same time improve the culture, breaking down the barrier between the floor workers and the office.

In many ways it did not come as a surprise. There was broad recognition that operating indicators such as inventory movement and order fulfillment were below par and made the organization uncompetitive. Likewise on the cultural side there was poor communication, lack of interpersonal respect, lack of personal responsibility, ownership of results and problem resolution, and the big one, an “us and them” attitude. As a machine operator put it, “you’ve been here so long you know that you’re not keeping up with your orders we had a late list on orders we had an inventory that was unbelievable… something had to be done.”
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In the fall of 1999, an outside consultant, who had had some success with a sister plant was contacted to begin discussions about the feasibility of doing something at GC. This firm offers a methodology that combines lean and Six Sigma and in this case focused on inventory reduction, eliminating buffers. After discussions with the union leaders about the dire need for change and the program that was under consideration, the consultant was hired and the change process began between Thanksgiving and Christmas of that year.

Introducing the Change

The GC plant, built during the post war boom of the 1950’s had been through many different management teams and had been owned by two other companies before OCM purchased them in 1988. As a result the plant work force which had an average tenure of nearly 20 years had seen a lot of change, and a lot of programs come and go. The management team, led by the consultant, felt it important to clearly convey that this change process was different and would last. They wanted people to be willing to try it.

Kickoff - shock and awe.

In pursuit of this, a kick-off event was held that was designed to get people’s attention and to shake up their sensibilities. This launch was uniformly described similarly to this operator’s viewpoint.

They started some kind of funny things, I guess, to get people excited and get management going and so on. Like one of the first things they done was they brought down the senior management from Cleveland (division headquarters), [the FBU] manager and some of his department heads, along with local management.

They put some speakers outside and they stood inside the door and we come to work and when you walked in the door they was playing loud music. They jumped and shouted and hollered and screamed and shook hands; jumped up and down and scared
some of them half to death. They (GC workers) didn't know whether they'd (upper management) lost their minds or what. And they made their management stand out there and do that shook hands and welcomed everybody. Eventually they asked the people to sign (a large board) that they were with this new thing, this new team work concept and to commit to it." (I D b, line 54.)

This behavior was very out of character for the existing culture in GC. Both those doing the jumping and shouting, and those observing it were uncomfortable with it. But they did it and eyes were opened. The white board of commitment that was about 6’ by 8’ in size, was signed by most, without any idea of the true meaning of the undertaking. This rather blind agreement was in part a reaction, a hopeful and positive reaction, to the risk-taking done by the “welcomers” that morning.

This kick-off was the first step in implementing the change process designed by the consultant, called MARI, an acronym for mobilization, assessment, redesign and implementation. The entire effort rested on getting a critical mass of workers to get on board with the change, to personally commit to it and ultimately own it. The message from the division general manager was clear.

He (GM) said, ‘I mean he just pretty flatly told everyone in the shop this is what we’re going to do. We have to do this, we can’t survive. We’re just going to have to close it up eventually if we don’t do something.’ And he was just thrilled with this program and he seen it implemented in a couple of other shops and he was just thoroughly convinced that this was the way to go and he was didn’t make any bones about it. (III C a, line 109).

This particular consultant was selected not only because he had a demonstrated track record at a sister plant, but his approach was seen as having “leave beind,” tools and techniques that would enable GC to continue improving the production and other processes. The operating vice president recalls -
One of the things I liked that I saw was that he had a leave behind methodology. Which one of the problems I’ve had with looking at consultants over the years was they want to come in and sell you themselves but when they walk out the door you don’t have anything left. Other than whatever you got between your ears and you figured out to how apply on your own. The one thing that FMA had was he had a very definite methodology. [It] looked pretty basic. I mean it wasn’t rocket science, but it got people trained. (IV A a/b, line 222)

After the consultant was hired and the kickoff was held, upper management receded to ground in a Gestalt sense (Perls, 1973). The FBU manager, who was located remotely at division headquarters, visited on occasion, but the baton of change had been passed, clearly, to the consultant, the expert from outside. As he became “figural” in the change process he began telling people what to do, giving directives, and wielding power, moving people out of and in to different jobs. These actions of top down “barking” of orders and unilateral decision making, were, of course, inconsistent with the ultimate social change that was being espoused. What had been taught in the formal training and outlined to the executives who decided to go ahead with this process were frameworks for decentralization, participation and collaboration. This dichotomy created a tension and sometimes confusion. It gave pause for thought about the commitment of the organization to the new principles and therefore the ultimate success of the effort.

**Formal training – “lean” and “team”**

The consultant’s methodology was taught in formal training classes with the objective of developing partners in the change process. The consultant and division management recognized that the local workforce would need to be involved in the redesign in order for it to work both technically and socially, both now and into the future. The primary technical change was lean versus mass operations and the social change was working in as a team as opposed to the “we”
“them” attitude that had prevailed between the line and the staff operations. For three months people attended training sessions, which were held on-site and run primarily by the consulting staff, though some of the material was presented by the division staff near the end of the training cycle and were involved from the start in order to customize the material for OCM and the GC plant.

All workers, both floor and office were assigned to a team and put through a training process. This process varied but essentially started off with a long session consisting of 2 to 3 hours of basics in the MARI process. Training was continued during shorter weekly team meetings. The training consisted of both technical and interpersonal, behavioral, or social concepts and skills. Technical training was about the principles of lean production such as managing the production flow, reducing buffers, reducing inventory, scheduling through a Kanban and using takt time as the vehicle for evening the flow. In addition to presentation of these principles, experiential exercises were used to assess the current process, including actually counting the number of steps involved in doing a task, sometimes drawing it out with string and pin diagrams. The social or behavioral training revolved around the change in norms associated with working as a team. Individuals were assessed in the same vein as was the workflow. All GC people, line and staff, were given a personality assessment in order to again, understand the “as is” condition relative to capability in the new organizational structure.

Most teams had a few people from staff and adjacent functions, like maintenance or engineering, as part of the departmental team, as though it were a cell, though classic cell structure, which consists of representatives of each function involved in the complete production of the product, took somewhat of a back seat to a resource constrained, pragmatic composition that made sense for this particular facility.

We broke the plant into what we thought were the most logical teams and the concept there was to say these are a group of people who supply each other makes sense to make them maybe a cell or a team we try to get a job before and after the one in the middle so to speak so we developed the teams. (II B, line 146)
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But the issue of the commitment of the management team, the concern by the GC workers that this was just one more program, just another attempt to get the plant to improve on a limited, short term basis, became a real constraint. As mentioned earlier, the material learned in the formal training was not seen as “rocket science” and for some, was not even novel or new. This was true for floor workers and staff alike. But while the "shock and awe" campaign did get people's attention the question remained, ‘will this organization do what it takes to win the war, not just a battle?’ It is not unlike nation building after the disposition of a leader, and for this, to a certain extent, only time will tell.

Implementation Prioritization and Redesign

Having completed the formal training and the assessment of each functional area of the plant, a decision had to be made as to which area(s) would be converted first, given that resources were limited. They looked for the most serious bottleneck across the whole product flow system and cost structure. The finishing operation was selected primarily by the consultant. There were three reasons that were commonly accepted for why it was chosen:

a) high impact from a waste/salvage and return on investment (ROI) perspective, since most of the value added cost was built into the product (in a non-reversible process) by the time it reached finishing,

b) “closest to the customer” and leverageable in the sense that no matter how well the rest of the plant “flowed,” if finishing didn’t operate effectively, product could stack up at this station and customer due dates could be missed, and

c) Considered a key current bottleneck based on the formal assessment and analysis performed by the consultant.

Looking at finishing from a value stream perspective it was considered to be on the critical path from upstream operations to satisfying customer on-time delivery needs and at the same time reducing inventory and salvage costs. For example, the value stream for “flex” hose
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consisted of four prior operations, extrusion, braiding, curing, blow out and test. It was then sent to finishing and finally shipping where it exited the entire GC production system. In fact, it is a fairly common industry practice for lean production transformations that focus on cycle time reduction to start at a pivotal "end-stream" place like finishing since much of the cash flow benefit is derived from inventory reduction.

The redesign consisted of analyzing the process, looking for waste (primarily of people time), redesigning the production sequence and moving machinery in order to save time and space, and creating more visibility among work groups. The consultant team was highly involved in leading this and putting forth ideas. It is noteworthy that the consultant has been hired on a short-term contract and that his remuneration is based in large part, on inventory reduction. This puts him in a position of seeking the shortest route to cost savings, which is not objectionable to the client, but which can jeopardize the very principles of the culture change that revolve around teamwork and joint problem solving. It can also create distrust on the part of the client staff with regard to the motive behind consultant recommendations. Managing this perception was critical because the success of the redesign needed to be viewed as the result of collaboration of all of the interested actors.

However, in order to effect change, it must to some extent be imposed. In the process of directing the change, the knowledge of the consultant is often valued to a greater extent than the knowledge of the incumbent. After all if the existing organization could have made the improvements, it probably wouldn't have needed the outside expertise in the first place. The new plant manager who was brought in six months into the change effort, in the summer of 2000, reflects the general feeling in the plant about this. “John [FBU manager] realized that it [improving] was beyond us locally [the GC staff] because we could not change ourselves.” (II A, line 80)

This required a blending of the knowledge held by many of the actors. For example, the consultant knew general principles of lean and had tacit knowledge, from other projects, of how these conversions are done; the GC operators and staff knew their specific machines and "as is"
state of the GC production system; the division staff knew the focus and experiences of the larger context, the hose division, in terms of improvement goals, future plans and current macro-level programs, though division staff member often specialized in an area like quality or purchasing. These knowledge bases of manufacturing process, operations, local and corporate goals, OCM social history, and change management techniques were admittedly not resident in one super boss. While individuals had strong views on certain aspects of the conversion, it was generally acknowledged that it would be successful only if contributions were made from many of the disparate group members.

At the same time that “finishing” redesign was occurring, other departments were not actively engaged in implementing the conversion. Essentially all of the “extra” resources were committed to working in this one department. The rest of the plant continued their team meetings, reinforcing the principles of teamwork, but they were not performing substantial tasks towards production transformation. This created somewhat of an action vacuum for the majority of the plant and produced a tremendous focus by all plant personnel on one department or production component. The finishing team was the focus for the hopes, expectations and promise of success, that were created during “shock and awe” and the initial formal training. Most change processes work just like this one. There are many areas that will require change, an embedded work force that needs training and motivation, and scarce resources or organizational slack with which to innovate. This combination of some people being highly involved and others involved not at all is not uncommon and creates an environment where learning by some is not direct learning or learning from their own personal experience of the change.

Learning about the Commitment to Change - Three Critical, Personal Questions

It is in this context that actors at GC began addressing their own personal need to understand and test the promises. People wanted to know whether or not they should make a personal commitment. The first two key questions were “is the organization committed?” and
“would this work?” GC personnel looked for evidence that “they” (which typically meant management or the person a level or two above themselves) were going to stick with this change process and that “they” had picked one (a consultant and his techniques) that would work, that it actually would improve the operating environment and results. These questions would only be answered only in the course of rolling out or implementing the new production system. This came about, obviously, not through promises and words, but through action and deeds. And finally, the third question, “what’s in this for me?” Given an understanding of the objectives, goals, commitment and viability of the change, actors determined what the best personal course was for themselves. While all of these questions are important to the ultimate individual choice around their own willingness to opt in or out and to what extent or degree they do either of these, the threshold question is whether or not this “program” or emphasis would still be around 6 or 12 months from now. If there is but a shallow commitment to putting this in place, then ostensibly it doesn’t matter whether it works and it would have no personal impact, work would return to the status quo at the time of the change.

Is the organization committed to this change? Believing in commitment

The shock and awe approach of the kickoff certainly indicated to the GC workforce that this change was important - at least on that day it was important. The question about commitment was, ‘will it continue?’ Many interviewees said that they were told that this was not the “flavor of the month” approach to improvement and of course the Division General Manager and others had conveyed that this initiative was the last before having to close the plant. None the less people sought proof, evidence, indicators.

In the initial stage of the project, the only real evidence of commitment was the fact that the effort was being resourced. This is an important indicator for organizations going through change (Boddy & Macbeth, 2001) signaling the workforce of the serious intention of doing whatever it will take to ultimately be successful. There were three major resource commitments made. First, a decision was made to bring in a specialized consulting team from Texas, second,
division staff would be on site at GC for some period of time and third, all people in GC were put on a team, irrespective of their direct association with production. A machine maintenance technician put it this way. “And you got somebody come in here [the consultants], that’s drawing a lot of money and you say, hey, this is where we’re going.” (I D a, line 112)

These resource commitments were an important first step. They provided a clear organizational intention. Investing both dollars and resources was recognized by GC personnel as being different from past efforts and as an indication of the urgency about which change should happen. Moreover, it offered support to the GC people in recognizing that making this change or for that matter making any change, particularly after a long period of “sameness”, is difficult, and is difficult for everyone involved, including management. This technician who knows that “this is where we’re going” continues, “But I’ve been doing it this way for 20 years and it’s hard to get people to change. Change is the hardest thing for people. Managers are just like the people on the floor [in this regard].” (I C b, line 112)

But the deep question of commitment to the change on the part of “management” or the initiators of it could be answered only by learning if the espoused theory regarding changing the organization was becoming the theory in use. The major organizational principle of “teamwork” was about to become scrutinized. Evidence beyond intention to operate as a team, such as actually seeing actors walking the talk, was sought. Teamwork, which could also be considered to be collaboration or a kind of “jointness,” (a term that would be more acceptable to the few who said they wouldn’t use the word “team”, exactly) is both the primary vehicle for moving the culture at GC and is for the work force the salient indicator that, in fact, there is a sustaining and sustainable commitment to them, to the organization, the plant. Following are vignettes that tell the story of how this evidence was gathered, what was looked at, what was considered significant, by whom.

Managers left their comfort zone and modeled the desired behavior
In an effort to operate in a more collegial or participative mode (rather than authoritative management style) in support of the team principle, the FBU manager modeled new behavior and changed expectation for GC managers, here, observed by the plant manager.

Yes, the FBU manager just walked around [the plant]. He solicited communication. He felt and as the consultant actually suggested, that’s what he needed to do and the main reason was the fact that if they looked at him as a person that would help change the office, break the wall down [between the production floor and the office staff]. So if he’s out there, then he’s expecting us to go out there too. Woo, man, show us where the door was! [didn’t want to do it] But we’d [management and staff] go out there. The thing was the fear factor; they [management and staff] learned a lot of it. But are they willing to change the office? (II A, line 217)

Then the plant manager picked up on the modeling techniques and used his staff meetings as opportunities to communicate to his organization what was important, reinforcing the new organizational principles. Here in conversation and questioning he draws attention to the need to have many people involved in making a decision.

... and it’s well wait a minute, ‘you [a staff manager] didn’t even involve them with it and you’re making the decision.’ You have the peer pressure there. The peer pressure of the group going back to the individual. Going, ‘hey, you didn’t follow our own set of rules that we established.’ We didn’t get them involved. So people felt the peer pressure of change.

... More or less that our place may be here in the office but it isn’t always in the office. There’s a floor out there, go see it. also that’s when the other things were, when you make decisions you involve them kind of setting down a directive that
reinforcing the training that we were actually getting in lean the true meaning of empowerment is don’t say the word empowerment do the deed. (I I A, line 223)

And over time this modeling done by the change leaders (which included the FBU manager, the consultant and the union president) of listening, positive interaction between staff and line took hold and spread broadly.

They [floor workers] was being listened to their ideas was being told and someone was listening and going out there and doing it that meant a lot and that when they first started it everybody said we tell them what we want and they’re never going to listen to us anyway because we don’t know nothing well it was just the opposite.

Well there are certain channels you go I mean you can’t just come in here tearing and beating on his desk and say you’re going to do this, you’re going to do that. But you can get a group of people together and sit down with like the production supervisor, the plant manager, the HR manager [named] and discuss things rationally and point out exactly the things you want. (I D a, line 182)

However, at the same time that decision making is passed down to the “guy closest to the machine” who theoretically has the best knowledge about needs and solutions in his/her area, it is also a reality that these tactical improvements must fit into the overall plant plan. Here is a braider operator who was also on the lean “Steering Committee.”

So that when there were changes implemented or changes agreed to by the teams they would either be on a list that was called a can do list or needs help list and that list would go to the Steering Committee and they would discuss those changes and send them and say you can do it you’re allowed to spend so much money on some things and you don’t even have to come back to us you can just go ahead and implement it then they were other needs helps that had to be figured out how it could be implemented how could we do it or how can we get the money to do it and so on they participated quite heavily in that process the teams did. (I D b, line 110)
Not that this was easy. Deeply held behavioral patterns and belief systems, often tacitly held, were affected. The plant manager struggled with the dichotomy of using the old authoritative decision making “protocol” to install the new norm.

Right now remember you’re thinking you still got that mentality you’re working with lean but also you still have the mentality of protocol. The protocol is same way that he is telling us to work with him he’s working with us so he’s doing by example but to start the ball rolling you have to still revert back to what we accept as normal which is you think of dictatorial. No, it’s setting a direction now you and I’ve had discussions where we set directions for them right now with an idea and kind of even give them a detailed idea well John would do this he came across in saying you will we heard we started and yes but we first started out it was a grudge match but the ball started rolling but then that’s the culture that you have you move from to you have to start with what you already to get thick skulled managers to listen to you and then move towards after a while it becomes second nature.

After that it became a behavior change and before you realized that you were just going to get up out of your chair and dictate what you want done now one thing that is hard to get it takes longer this way but actually the implementation is shorter because then you don’t spend all the resistant time dealing with the resistance. (II A, line 267)

How people communicate with each other, both verbally and non-verbally, and what they communicate indicates the level of cooperation and respect. In a plant where machines are running and there is perpetual background noise, it is recognized that it is difficult to talk, so it is accepted that people don’t, often. As a result what people do, the action they take, “says” a lot in this environment.

It (lean) doesn’t cause stress on my job. It does cause more work, but it's more satisfying... Nobody likes to be pushed, nobody likes that. To me one other thing with this lean manufacturing is, I think that’s part of the teamwork. They try to make a point to me; management tries to make a point. Between my supervisor and the scheduler, they don’t come out and see you in the middle of it [when she’s busy], because I do get large orders, sometimes it may take a whole day to do one order. But they don’t come out and
see me in the middle of that order and start hammering ‘I need this and this and this.’
They will show me they’re putting Kanban cards [assigning new work] or they will hand
me a Kanban card or note, ‘if this comes through, will you be sure you get this much of it.’

I think everybody tries really hard you have close neighbors out there now you try
really hard you don’t inconvenient anybody by putting things in their way or being rude. (I
C a, line 79)

A coach is a problem solver.
My supervisor, we call them a coach now because they are. ...A coach passes through
several times a day. My previous coach didn’t. If you have a problem you say ‘have you
got a minute?’ Sure they help me out. If it’s not in the computer, they help me out. They
don’t just walk through like you’re not there. If I have a problem they’ll help me solve it. (I
C a, line 83)

Problems and differences of opinion are, of course, a natural state of organizational life.
This facility tended to work separately, keep to themselves, and generally avoid having to
collaboratively address a problem. A problem well solved or opportunity comprehensively
addressed often requires multiple skills. The principle of teamwork is reflected in inviting many to
the problem solving table, and working in a give and take manner.

Here a member of the GC staff talks about the natural tendency for different functions, to
misunderstand each other and become frustrated, and how this is operating now in more of a
team fashion.

We don’t actually point fingers or complain. if we have problem we’ll talk about it I work
directly with the Quality Manager a lot and with Terry and if we don’t agree on something
well we’ll get together and talk about it and decide what to do we don’t it’s not a personal
thing and a lot of times you got to realize quality is going to be got to kind of be the traffic
cop against engineering and manufacturing at times so but we all get along well we
understand it but we do work together. (II C, line 237)

By having everyone in the plant assigned to a team, including all staff, not just the
production people, all actors had an opportunity to see how others were responding to the
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changes. But more importantly, everyone had a chance to influence the direction of the discussion and in turn be influenced by it. Here, a floor operator recognizes the value of multiple perspectives in the problem solving process.

Yeah they know how to change a manufacturing process you don’t just walk up and well I think it’ll work this way you get a group of people together you take everybody's input the people that work on it and even the people that don’t work on it because sometimes they’ll see something that the guy that’s working on the job would never even think of and so the more people you get discussing it and the more ideas you put up on the wall the better off you are. (I D a, line 188)

There are many examples like these here told of how the use of the espoused theory of the change process, in this case teamwork, gradually convinced GC personnel that “management” was committed to the process, but there is one that stands out. His story gave credence to the concept that OCM would pull out all the stops to make this change happen.

Early in the change process there was manager who violated the principles of lean production and of joint decision making, who was taken out of his position of responsibility. This was done as a result of his flagrant disregard for the new operating system and his unilateral return to operating in a mass production mode. In fact, this was the incumbent plant manager (IPM) at GC, but not the one to whom this document refers. This was the incumbent plant manager who will I call IPM to distinguish from his successor. This individual was the highest level of management on-site, reporting to the FBU Manager who was located at the Hose division headquarters, which was over 150 miles away. He was a long time OCM employee and held the position that was most central to leading the transition. Given the strong top-down culture that had been in place in the plant, it was not surprising that all eyes were on him as people tried to determine their own disposition toward the change.

While the GC plant had had a sorry record under his guidance, the IPM had been included from the very beginning in assessing the need for change, visiting the sister plant who had installed the new production and social system that was under consideration for GC, and
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developing the program for GC. The number two manager in the plant, the production supervisor, talks about the way the IPM got involved.

We knew we needed some serious changes. The people that we had that were our production schedulers and stuff really didn’t have a grasp on things. We just ran, I mean it was just a lot of chaos quite honestly, a lot of infighting amongst all of us. You know what I mean? It was a dog eat dog kind of thing; finger pointing all the time - all that kind of stuff.

Well we got a tape one day from a General Manager of a sister division of ours. This tape came and Pete asked me if I’d take a few minutes and watch it with him. So we sit down and we watch this tape and this General Manager of this sister division, he was kind of saying, he was telling us what great things that this consulting company had done for him. And he went through a whole bunch of stuff. Well to be honest it was very interesting. A lot of the things they talked about were things we knew we needed to change here. So our FBU Manager at the time, he’s the one that went to corporate who backed us on doing this for the plant, spending the money to get these people [the consultants] in here.

[The IPM] and I went down there [Texas] for a couple days. I met the FBU manager down there, took a tour of the plant. The President of the consulting company joined us. We like what we saw. I mean we really liked what we saw. We were impressed by what they had done, what they had accomplished. I spent a lot of time out on the floor there at that facility talking to individuals not managers not just talking to people and they were really very positive with the changes they had there. They really liked it. (II B, line 108)

A few months after seeing the tape and visiting the sister location, the consultant was hired, training began and functional implementation teams began to meet weekly developing their skills in joint problem solving, etc. This was in mid fall, 1999. Redesign and implementation of lean production followed immediately. This meant that hoses were built to order, a goal made possible by increased throughput, reduced cycle time and other principles of lean. Within a month the amount of finished goods inventory began declining; this was visible to anyone walking
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the plant floor. The new system seemed to be working. The key promise made by the consulting company (and upon which his compensation relied), reducing inventories, was being delivered.

OCM plant managers are paid a year end bonus based on a full absorption cost model. The shortest route to winning this game is to make as much product as possible to lower the unit cost of fixed expenses and overheads and the IPM knew this as the current plant manager describes.

The IPM’s philosophy was more the traditional batch size absorption model versus the lean model which the FBU manager told both of us we had to use now. Pete had a rough time working with that.

Everybody in the plant knows that it was hard, it’s that culture change because in the past we just ran every machine three shifts a day whether we needed it or whether we didn’t that’s why we had that hose everywhere half the stuff we ran we didn’t need but we were absorbing we were hitting that number that accounting people wanted us to have. (II B, line 94)

During the Christmas holidays, when the consulting team and the division staff who had been on site went home, the IPM, without conferring with his management, the outside consultant or his own staff “team”, ordered the plant to run full out, irrespective of customer demand. Inventory started piling up as did IPM’s yearend bonus. A member of the GC organization called the consultant who called the FBU manager and then flew into town to find the reversal of the inventory levels and an entrenched plant manager. The FBU manager while disappointed, was not surprised.

[the IPM] was close to retirement. He was going to retire in a couple of years or less. It was clear that the IPM was an old time hose manufacturer, wanted to make things work, but at that point in his career he didn’t want to put a lot of time and effort into changing... He didn’t want to be around see the benefits. (IV B, line 142)
And referring to the requirements of the "culture change" like collaborate rather than command, he thought about the IPM this way - “he didn’t really fit into that type of approach it wasn’t his thing” (IV B, line 146)

The consultant put the plant back on the lean process and from that time on, the IPM was displaced at first by the consultant and the FBU manager who provided the leadership for the plant. Four months later when the consultants’ work was complete, a new plant manager was put in place and the IPM was put out to pasture until he retired a year later.

I gave [the IPM] another assignment I can’t remember exactly what it was. The whole thinking was that it would show people that we’re going to put the guy in charge that they respect the most.

That all happened around the time that FMA was exiting we needed to have somebody else in charge other than Pete Broadwater so that’s when I appointed Brian. (IV B, line 152)

[The IPM] was still here but he was kind of moved aside to do some special work and then [the new plant manager] was involved, was the guy in charge. (II C, line 76)

In the past, the entrepreneurial, though top down, culture of OCM supported the power of the plant manager in making local decisions. That the plant manager was over-ridden in support of lean production methods and collaborative participation, carried out in an open, candid, authentic manner, with the goals of the collective in mind, was a most convincing argument that management would stay the course. The confrontation on the plant floor surely did not go unnoticed. The subsequent replacement and shuffling off to the side of the IPM had great meaning in an organization where seniority mattered. This was the sort of example that made people believe that the espoused theory delivered during shock and awe would prevail.

Belief that the organization is committed: Through courageous personal change in behavior and keen observation and appreciation of these changes by others, people gradually came to believe that “the organization” was committed to doing lean. It started
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with the investment of financial resources in the hiring of an outside consultant and continued with the investment of individual and collective action to make lean work. Its original form was pizzazz and rhetoric which morphed to day in and day out efforts to make the organizational behavior conform to the goal, the teachings of the consultant and the objectives of the executives.

These behaviors centered on building a team out of a deeply divided line (floor operations) and staff (office workers) operation. First the management team modeled the behavior that had been “espoused”, for example listening to floor workers and staff workers alike and making decisions based on this input; the action matched the desired specified goals of operating as a “team.” As described above, participation was replacing command and control, groups were used for problem solving and communication was in general more respectful.

It should also be noted that the “organization” itself is changing as time goes on. Rather than organization being a structure, in this case it is also a collective, a collection of members. So as the question of witnessing the will of the organization or the commitment of the collective, is being addressed, it should be noted that not only the observer may be changing in attitude or belief, but that the object being “observed” is also organically changing or being reconstituted. On any given day an actor may or may not indicate commitment to the change process, though in the main the whole, as described about has tended to move toward commitment. This leads us to my first category, belief in organizational commitment.

Category definition: Belief that organization is committed
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Organizational members saw changes in attitudes and behaviors of peers and managers that were consistent with the original message about the change incorporating new communication, decision making and problem solving behaviors.

Codes:

- People behaved as though they were on the same team, striving for the same goal.
- Communication was more civil, candid, helpful and frequent; and was more work, rather than personality focused. Listening became as important as talking.
- Several people were included in key problem solving tasks, even though it would take longer and invite conflict.
- People on the floor made decisions that formerly were made higher in the organization.
- Trustworthiness is used to describe “management”.

Will this new process work? Believing in lean implementation.

Concurrent with the concern about the organizational commitment there was also the question of viability of the “solution” that had been selected. The stakes don’t get much higher for a worker in a plant in a rural area, than potentially having your facility closed. This is what was on the line at GC. Even though it had been explained candidly that this investment in lean production was the last stop, workers still wanted to be convinced that what the consultant was offering would work. As mentioned in the previous section, it didn’t take long after the plant was redesigned for improvements in quality, speed, cycle time, and reduction of waste for inventories to decline, which became a highly visible indication that the new process was working. But there were other indications which were more or less apparent depending on where you were in the value chain or organizational structure. In order to understand the confidence and belief that
developed about the new "system" it must be seen across a broad spectrum of members in the value chain. Following are several vignettes, starting with the GC machine operators running to the Division general manager, and concluded by a comprehensive description of "coming to believe" by an operator.

Operators are perhaps the closest to inventory management and throughput of product. They are also the population with the greatest stake, the most to lose or win. And they are the most knowledgeable about the existing system, both technical and social. One operator described the change in throughput like this.

Oh yeah but we still shipped off of orders that came in just like we do now I mean that part of it’s changed just to the different type of a paperwork over what we used to do but the thing we noticed is we don’t have near as much stuff on hand as we used to I mean it comes in and it goes out I mean it don’t sit in the rack too awful long where sometimes before it might sit there six months. (ID a, line 50)

And a second, "What I see differently is and this is amazing sometimes you see a piece of product here today and tomorrow you come in and it’s way over here. Things move faster people see things actually move, where before you couldn’t.” (III A a, line 96)

A Division quality control staff manager sees the same product flow improvements through the lens of improved floor worker relationships.

and I just think that the working between those folks and him has it never would have trying to do a one week supply of something wouldn’t worked two years because of the fact that you wouldn’t had those guys working that close together and now it works because the only way it’ll work is if they work close together and don’t let things pile up. (VA, line 121)

Production coaches find inventory management to be more user friendly and customer responsive and the pulling together (teaming) to be a vehicle for producing cost saving ideas. It isn’t aggravating. It was aggravating before because you had to jump through hoops, almost everyday, to get something down (from some obscure inventory location). Now it's
once in a blue moon a customer calls, but when it does happen now, we can react, where before it took weeks to react. (III A a, line 161)

I think they found out real quick how smart the people on the floor are by their ideas, the money they had saved the company, ungodly amount of money because some Joe Smo’s ideas out there worked and it saved hundreds of dollars of waste. This would never have worked if it wasn’t for everybody working together, hourly, salary, everyone. And either side could have shut their eyes and done nothing, but everybody wanted to pull together and give it a whirl and lot of people were scared and didn’t believe in it. (III A a, line 126)

While quality in this rather low-tech product line was not nearly the issue that it is for many manufacturers, the quality did improve according to the floor worker responsible for quality control. This individual was not wildly enthusiastic about lean, because it increased his workload. GC lost a tester at about the same time that lean was installed and they did not replace him. The remaining tester, RD, became responsible for the entire testing function which was particularly difficult during the change period when machines were being moved and recalibrated. Yet, when it came to his belief that the new process was an improvement he acknowledges the decrease in rejects.

The quality of the hose is much better. (Q: By what by how much would you?) I’d say 20 percent. (Q: So you have 20 percent fewer rejects?) Well I don’t really measure it. I can see there’s a lot of different that the hose quality is better. I don’t have as many rejects as I used to. (III B a, line 123)

A staff manager in accounting saw the improvement in the “numbers”, the reports that monitored the progress and characterizes the way people “came to believe” to be a contagious reaction to the early success.

We obviously saw it way before they (floor workers) did, and the numbers and the reports that we get. And they sometimes don’t see all the reports that we do initially but when
the first team got together and the first major project worked out for benefit not only to the management of the plant but to people on the floor. One team came around the other one next one and it became like a virus and finally it spread it through the facility but this is working we’re going to keep doing this. This is actually a good thing. (III D a, line 70)

A scientific explanation was needed to convince the new plant manager. “I could not see it until someone finally and this is our consultant sit and mathematically showed me and being an engineer mathematics mean a lot so you when start showing me if you go and build this you build this finally you will reach the stage where you’ve whittled down your inventory and your running to a customer demands it is not an overnight thing that’s when I finally realize it is feasible and probably it did kind of destroy all my excuses.” (II A, line 90)

The Division general manager, who initiated the entire change effort, hired the consultant and put up the money, came to recognize that he can trust decentralized decision making and the people who are implementing lean. “And I now trust the people that are part of these lean initiatives to do the doing to get a lot of the things done that just a short time ago I would have been asked to make decisions on.” (I A, line 28)

And here is the kind of new thinking that allows the general manager to trust, in this case, coming from a machine operator. Putting it all together, this long-time employee, an operator, connects the espoused theories of improving the flow and reducing the buffers to the activity of redesigning the machine layout which led to improved results.

In our meetings we drew charts we put tacks on a board and took yarn and drew from it how many steps it took to do this or that and all of sudden you’ve got a chart that is full of yarn moving all over anywhere but everywhere but you’re not accomplishing anything and then you make a chart that with the yarn that you can go from step one to step two to step three and I mean they moved all of my department around it’s all located different than it was it was just amazing after doing the job for so many year the same way that you could still do the job and that machine doesn’t have to be sitting in the same spot it was amazing that could be done. (I C a, line 55)
Belief that lean works: While not necessarily known to the floor workers at GC, OCM in the past had used a customer (specifically a Japanese auto manufacturer) as their vehicle for process improvement, as was customary in the component manufacturing industry (see Helper & Kiehl, 2004). This was done at low or no cost, but also had not been effective in bringing bottom line improvements. To spend hard dollars, out of pocket, on improving the results at this facility was recognized for what it was, a significant statement of commitment. But this “espoused” intent alone was not enough; it needed validation and consistency, over time, to be considered sustainable, to be believable.

Remember, the shock and awe part of the program asked people to personally commit to the program; they went up to a white board and signed it, while the rest of the plant watched. Because of the downsizings over the years, the workforce that remained was fairly senior. An individual who had 14 years in the plant, referred to himself as “junior” and based on his work assignment this seemed to be true (in a bidding system such as this, assignment usually indicates rank given the uniform desirability of some jobs over others). So this workforce perhaps more than others, was clearly proud and protective of their status and expertise and moreover, operated as an in-tact workforce with regard to familiarity. To each, walking across the floor and taking the pen, again an out-of-culture activity, and writing their family name, Tallman, Dillinger, Scheinfurth, and so on, indicating a personal commitment, was a powerful experience.

Now, as it became evident that this program was not going to go away, people began to scrutinize the program to which they were dedicating themselves and perhaps the success of the plant. Was technically workable? That is, if inventory is reduced, waste
is taken out of the process, and so on, results would improve. Through the demonstration of results, actors saw that the consultant’s process would work (with their input, of course) and that following the directions would yield the desired operational improvements.

As noted earlier, not all people were involved in the actual improvements. While all were trained in the beginning and had an expectation, only the finishing department and shipping were addressed in the first six to nine months of the redesign. Therefore, during this critical early period, many had to rely on the enthusiasm and judgment of others. It should be noted however, that one of the design principles, reducing waste and shortening the distance between work stations resulted in moving equipment around and changing the floor layout, which of course was visible to all. Likewise, anyone walking by inventory area could see first hand that there were fewer inventories. But the fact remains that many people came to believe that this would or would not work based on second hand information. Even those who worked in an affected area might not know first hand how the reduction in inventory was affecting the ability to service short term customer request, or how it affected the vendor supplying production materials, like the wire bobbins used near the end of the process. As a result, the information that was considered in answering the viability question came from others views and incomplete data. The trust in the process came more as a result of believing what one saw and what others say and do than from a factual analysis and deduction.

Category definition: Believe in the new process

Organizational members came to believe that implementing lean production techniques could improve the operational results of the plant.

Codes:
Learning to Change

- People saw that the numbers were better, e.g. there were fewer inventories.
- Customers reacted positively to the change and actors felt they could meet customers needs better.
- People were impressed that new ideas could be implemented in an age-old process.
- Processes became more user friendly.
- Lean production as a model and objective had benefits that made sense on the face of it.

If we take these two categories together, management commitment and process viability, we can say that the organizational actors learned that they could trust the “system” the “they’s” of the world who had brought this change to the plant. In the aggregate we can say that people came to believe based on seeing that the promises that were made, were kept.

*What’s in it for me? Choosing.*

If it is true or at least believed, that the transformation is on solid ground, if this is for real, actors then asked “what does it mean to me?”. For those who have come to believe that OCM is committed to executing this change and that the selected methodology is working or workable, a final choice is required, should I stay or leave. This question is answered by learning or understanding the implications of this change for each actor, personally. Some decided that the change would work in their favor and some, a few, thought otherwise. While this research did not specifically probe the sense making of individuals about their choice, it did yield explanations given by those who continued working for GC. These explanations when taken together yield a fairly consistent view of the reasons for leaving, for opting in or out.

The view of the local human resources manager, who was a veteran and was co-located at GC, there is a recognition that the decisions of the employees to stay or leave were difficult,
personal decisions and that everyone would be impacted in some way. The key difference for managers was the participatory aspect of decision making as opposed to the existing command and control structure. The floor workers would be running essentially the same equipment, but the scheduling and work assignment would be different, and like the managers, they were expected to share ideas and contribute to problem solving, to be a part of a team. And the local engineering, production and other staffs had to adjust to both lean and team as well. So everyone in the plant had a decision to make and the H.R. manager provided alternatives for each situation.

The things that we were faced with, trying to facilitate involvement, you've got many of the people in management, supervisors and middle management, all of sudden, who were used to directing things, having that authority removed. And their concern for their jobs, they're threatened by this whole thing. Their whole world is changing. And quite frankly there were some of those people that were so threatened, they came to us and said 'I want to go back and operate the old way’ and I had to find ways to either fit them in(in the plant), or put a package and help them find other employment.

Some were due to retire so to help facilitate this I put an early retirement package together. Some left for other opportunities and a few were encouraged to leave.

[of those salaried employees who are no longer there] I would say that there is a percentage; it might have been 30 or 40 percent that were not interested. Some were interested but couldn’t change.

We had, probably, a third of the employees bought into it because they liked new ideas and change. We had maybe another third of the employees say well I’m neutral on it. And the final third was ‘ain’t no way until you prove it to me.” (III B b2, line 69)

The workforce that remained with GC gradually committed and took ownership of the process, the results, and their future. Again, from the perspective of the human resource manager, who speaks in a voice of the whole organization -

We had to facilitate, through the union and through our coaches, and through discussions and a lot of floor walking, ensuring that these people went to the meeting, that they
participated in the meetings, that there is minimal disruption. We even put a committee
together of a couple of hourly people and if somebody was very disruptive, rather than
write them up and get people all ticked off because we wrote somebody up, they [this
commitee] would meet with the disruptive individuals. They would explain to them what
the benefits are for the plant and their sisters and brothers out there, in terms of their
future. And we started to get their buy in. Interesting thing is, as you have time [doing the
change process] people started to see, ‘Oh, now they [management] listen to us, and
they’re starting to make the improvements we’re suggesting. I like this, maybe I’ll start to
participate. (III B b2, line 93)

Watching and observing these floor workers turned “idea generators” and interacting with
each other, people began to believe that management was committed based on how quickly
action was being taken on their input. In some case what they saw was not direct evidence of the
system working, but evidence that others were getting excited and felt that it was working; they
borrowed from others’ belief in the commitment of OCM to this project.

But like the case of the incumbent plant manager, even when it was “proved” that
benefits accrued by using the new system and that the new system was working, some people
took that as a sign to leave because it did not fit their personal agenda, which was more of a “top
down” management style. The burning platform developed during shock and awe tended to
bifurcate the organization around this choice.

Right away you could just tell people that were receptive to doing things a new way and
people that weren’t and there were several coaches that were let go they either quit or
were let go and so I guess the biggest change I saw was with the supervisors and with
the people in the office…

It [lean and team] would require them to facilitate meetings. It would require them to keep
everyone involved require them to meet deadlines on things that were due at certain
times be a leader and a lot of them were very, very uncomfortable with that some people
the wiser ones that were uncomfortable with it got themselves reassigned within the plant
and then the people that weren’t so wise put up a huge fuss and ended up being let go.”
(IV C, line 195)
But not all of the actors found it easy to decide to commit to the new, to be ambivalent, or to leave. Following is the story of a production coordinator whose group “was the only group that just got totally discombobulated” as lean and team were implemented, and as Kanban became the scheduling vehicle. This is the most tortured decision making process of all people who were interviewed which makes it the vehicle for understanding how hard this transformation was on some individuals.

The procurement manager (PM) at the GC facility handles about $25 million dollars of annual purchases, 70% of which actually goes into the product. He has a small staff, is located in the plant where he reports on a dotted line basis to the plant manager, but he reports, straight-line, to a staff manager in the division. His division manager was intimately involved in and actually on-site at the beginning of the transformation effort, based on the fact that procurement was a major area of change.

The PM was on two different teams, the raw material team and the small braider team, since those are units that his function serves. He is a certified lead auditor, does vendor audits using ISO 9000, and helps suppliers in the certification process. He is a 15 year employee of OCM. When the consultant came in his group was essentially disbanded, he was put in a job that he had previously managed and he didn’t appreciate the style of the consultant. He struggled mightily and thinks that others did too, though recognizes that his case may have been a worst case.

I had three people that worked for me that were over 35 years of service and ready close to retirement and were very much stuck in their ways if you will, which created a lot of roadblocks between myself and my people and the consultant. We’re at a point to where we are doing a lot of things right, some things we could be doing better, some things we didn’t have the tools to do. So basically under the restructuring one guy retired, he was afraid he wasn’t going make it through the process.
Another gal retired... it just came time to retire, I think she felt it was a good time to get out. There was a lot of the consultant’s philosophy that itself was a good thing for GC or it probably would have not survived. But how it was presented and forced, in a lot of ways, was offending to a lot of people.

He’s [the consultant] very knowledgeable, very smart guy. Some of his personal attributes and the way he went about things could be questioned, on he handled people on occasion.

[Interviewer: What would be an example of that?]
...my way or the highway type of attitude.

[Interviewer: How did it affect these people that we’re talking about here?]
Well I think they became offended to some degree because they’re sitting there looking at okay we’re going to change okay I can deal with that but then I got this guy telling me that if he doesn’t if I don’t do it his way and start doing it that right now I’m not going to have a job. And that little extra, and don’t get me wrong, quite honestly, in no uncertain terms, that’s probably the way it was going to be, but with that presentation he could never achieve the buy in. Because of that they looked at him as a threat versus a comrade in the whole venture. So that I mean that was tough he and I had some discussions too but the fact and the combination of all the thing my department got hit first in the realignment and basically they dissolved my department as it was and basically removed me off the staff for a period of time and said you’re going to go do this and this came through the consultant and it was quite a story there for a while and I lived through it six months. I was back on the staff after consultant left.

[Interviewer: What did they have you do during those six months?]  
Basically everything that the people that had retired were doing I knew what to do nobody else knew how to do it I handle all the this is where I found out that if I did not create something to better utilize the system I was going to lose my mind this is when vendor managed inventory started and a lot of the ways that we’re doing things now.

Well I had it before but I keep in mind I had three other people I mainly handled the scheduling and worked with the outside warehouses and customers and division in my previous job I did not deal a whole lot with raw materials I oversaw it now all of
sudden I’m not dealing with division as much I’m dealing with GC and I’m responsible for basically everything that goes into a hose and anything else.

Some of the people that were still here went through that realignment with me and they decided they didn’t like what they saw so that’s when one of them retired and another one retired a little while later and another became a medical issue because of the strain and stress and he decided to retire too so after all that was said and done plus the girl that I had got moved to another department. (VI D, line 299)

Right I spent a lot of long hours. For quite a while until I decided I got to find a way out of this and make the system better. Right and basically I mean and that's to some degree that's the way the that process made you feel as you’re in my case I was fighting for my survival and but I hadn’t done anything wrong it was just the way it was just part of the fall out and it was an interesting time.

[Interviewer - What did you learn personally that made a difference for you?]
Well it’s somewhat of a humbling experience and I think a lot of the staff felt that way to because we’ve got one of the best staffs now here that we’ve ever had I think I think a lot of people feel that same way.

[Interviewer - How did that happen?]
Uh back under the old regime and the way of doing things there’s a lot of finger pointing if something went wrong regardless of the situation everybody was so busy chasing their tails they didn’t have enough time or took the time to understand where the problems were all they knew there was one now when those incidences occur we jump on it as a team and try to help one another find out what’s going on and beat it to death until we resolve it. (VI D, line 341)

But in the end, not that there really ever is an end in a learning process that is interactive and develops through social interaction, this procurement manager did figure out how to make the system work for him. It was by him working with the system. He became a key contributor in a change that was undertaken in the inventory management system. He overcame his personal anguish and possibly anger at how he and his people had been treated, choose to stay and fight, to commit to the team and participate, and was excited about his ability to contribute.
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Yes that was my next thing we usually have quarterly meetings and that’s even when things are going great so sometimes obviously due to logistics and travel and everything they’re in here more than that but as a standard procedure we try to meet with all of our major players every quarter and review good bad the ugly.

So at the same time we’re going in and introducing them to a whole new set of goals that Parker has put forward concerning ISO certification or compliance vendor managed inventory and lean and how it all tied in together so if these programs would not have developed as they had and made the time available to put together those programs because obviously those were we actually held four hour symposiums with like we’d take our top 20 vendors at GC and invite them in down at the airport and we’d go down there and spend all day with them this kind of thing I would not have had time to participate in or take part of under the old systems and one of the things that I brought to the table was at the plant level which they had not had before they’d always talked in this regard to the topics that we’re discussing now at a much higher level but at a division level or corporate level so I was able to bring all this kind of tie it all in together since I was the one that was ultimately dealing with it anyway. (VI D., line 236)

Choose to commit: Having seen the evidence about the change and of making sense of it, people then chose a course of action. Most decided that there was something positive in this change for themselves, personally, and stayed. Of those who stayed, most became personally involved and committed to support the change Taken together most actors saw or came to believe that the actions matched the words (commitment) and that the words and actions lead to success (process works)... most, but not all. As with any group, there were a few outliers who simply never did believe that there was a commitment by the organization and/or a hopeful process change that was worth their consideration. These people adopted an attitude of compliance rather than cooperation; and did not exemplify the behavior coded above. They never really stepped up but operated in a satisficing way, ambivalent to committing, as seen in their lack of participation and trust as they performed their everyday task, though not sabotaging the efforts of the plant on the other hand. “… and there is still a few people out there that
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just don’t trust no one for nothing, and they never did. And they don’t attend the meetings and blah, blah they just don’t believe in them.” (III A a, line 124)

And finally, some just left the organization. It is interesting to note that people only left the organization if they believed that it was going to work. In no case, did anyone report that people left because they thought things weren’t going to change.

This is the critical choice point for success in the change effort. If people chose to stay and satisfice, they are going to adapt to the new structure and do what is necessary to adapt the new structure to be successful in their plant context. This is essentially a choice between implementing individual double loop learning and committing to increase behavior that supports the espoused theory of plant operations or disregarding it.

Category definition: Choose

Most people chose to commit to the new way of doing things and the underlying belief system that less is more (lean) and teamwork works. They became willing actors on the stage of change; they continued to work in the plant and operated voluntarily in the new context.

Codes:

- Express that change is hard, but necessary; possibly indicating that even if it isn’t great for them personally, they think it will be good for the plant and that in turn is good for them.
- Indicate readiness to be team players and give up command and control structure.
- Enthusiastic about what is going on now, how different it is from previous behavior and that this is desirable.
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Now, willing to participate, people started acting out of a conviction that the “new” was going to or was already happening. Willingness to change became the foundation for “operating congruent with” and “engaging in” the new principles of production and teamwork.

_Taking possession, owning the change._

When the prevailing attitude became one of willingness to change or choosing to commit, based on mounting evidence that this new process or system was trustworthy and believable, one more step became inevitable. The actors at GC wanted to control the change to the extent possible. Particularly during times of change, there is that natural human desire to reduce uncertainty. So at GC they not only began changing, but they began influencing the changes and trying to control the outcome. They did not want to accept the prescribed plans of the consultants, they wanted to shape the ultimate approach and new operating systems. So while they started operating out of a willingness to, for example, produce goods in a different way, use their “supervisor” as a “coach”, and consult with others while problem solving, the change in attitude did not stop there. They became more interested in affecting the system that they would inherit and for which they would be more responsible long after the consulting staff was gone. They took possession of the change, they owned it, not unlike our procurement manager discussed above, “I got to find a way out of this and make the system better.” (VI D, line 307)

The consultant and others listened to the ideas and implemented many of the worker suggestions. The workers saw their peers, most notably those who were considered obstinate, become enthusiastic and participate in a way that had been unimaginable before the change to lean. For example, as the new floor layout for the finishing department was being developed, people, some of whom had had improvement ideas rattling around in their heads for years, started sharing them. As the Floor coach said “I mean that were a lot of people there. There
was people was getting excited about it. And you’d see a lot of drawings. And there’s people still
making drawings out there of different things.” (VI D, line 134)

They owned it, pushed back, and in some cases compromised. It wasn’t personal
anymore if your idea wasn’t accepted, this was a result of the trust that had been built. It was
about the success of the plant, the future jobs, and the satisfied customers. The consultants
weren’t the enemy, though their misdirected ideas were. So they dug in and took charge, they
owned the change. This is different from seeing the vision and sharing the values of the
management team or the consulting staff, though in fact they may be the same or congruent. No,
this is the emotion of ownership, not the analysis of accepting or rejecting a laundry list of goals
and objectives. They owned the vision and wanted to create the values. The word participatory
came to mean creating my own destiny not just buying into theirs.

Lean as a production method and set of principles came about through the joint
construction, by the consultant, the management and the floor workers of a system that fit the
needs of GC, not just the technical needs, but the social needs as well. Because they now took
this change seriously, they engaged. The actors at GC had learned that the consultant knew how
to do redesign and the consultant learned that operators and staff had valid ideas about flow,
particularly as it related to their proprietary operations, which all plants have. There was a never
before seen give and take of redesign and worker assignment. One described this in fighting
vernacular - the operators felt that they got heard and “won” when they “stuck to their guns.” In
fact, it was a fight, and it was the emotion that goes in to a fight that makes the “learnings of” and
“learning in” a change effort as proprietary as the plant operations themselves. It is this
conflictual experience that reminds people of the stakes, of their role, of the need for them to be a
part of the group or operation, which means participating, owning, bringing their unique
understandings and contributions to the change, to shape what is learned, to worry that the “new”
might go away.

At first some of the operators were reluctant to participate. But after a while they began
creating new ways of looking at the issues, generating ideas, and telling their secrets. They
made explicit, the tacit knowledge that they had accumulated over many years at the plant. This was information about which they didn’t think anyone had interest, since they had had most of their ideas rejected in the past, about which some were bitter. There were years of being denied input into the manufacturing process and they were distrustful of the new espoused theory whereby supervisors were coaches and listeners, and problem solving was a team effort. The team meetings were a key barometer of ownership. “I mean it was a very busy meeting and we started off at like two hours a week for these meetings and still a lot of people just felt that wasn’t enough time. But as we kept going on we kept seeing improvement on the floor because people’s ideas… we’d talk about it today, and they’d start on it tomorrow and people was getting excited about that. They [his peers] really liked that.” (III A a, line 60)

How, when, on what and most importantly by and with whom, decisions got made were key indicators of the shift in ownership of the success of the plant as well as the change. As a concrete demonstration of the desirability of passing ownership of the problem recognition and solution down in the organization a new purchasing procedure was put in place. Each team was given a replenishable pot of money (credit card) to use on improving their area which could be spent without oversight of management, unless solicited. Following are accounts of this phenomenon from the perspective of an operator, a GC staffer and a Division staffer that indicate the shift in the ownership of the problem and solution.

GC plant operator –
Well, people on the floor, I mean management, attended (meetings on solving an operational problem on the floor) but they pretty much left it to the people on the floor to hold the discussions I mean there was times that ever had to override something and there was times they had to not just come out and kill it but there’s a certain amount of money you got to spend so you have to stay within those guidelines. (I D a, line 118)

GC staffer -
We gave each sector team coach a credit card they can spend up to a $1,000.00 on any idea without even asking for permission that helped to facilitate improvements but they
have to ask for a battery and get approval signed by X number of people, that’s all gone away we took the roadblocks away.  (III B b, line 134)

Hose division staffer –
In the past they would even have like if you have to order something special tool a wrench for doing your job you’d have to go and talk to somebody … would have to write a requisition … get approved… go to purchasing … it’d probably get lost when it got received.
[ Q: How is it today?]
So now the guy… goes through the McMaster card catalog … he picks up the telephone hey I need that wrench … when it comes then he starts using it.  (V B, line 141)

And the operator, C.T., above, is perhaps the best symbol of taking on responsibility and owning the results.  This individual, when interviewed, was 8 months from retiring with 42 years of service at this plant.  Moreover, he had been a Union officer for over 20 years, including being president, though he was not currently involved.  He easily could have resisted the change, actively fought it or simply ignored it, but he didn’t.  He had been a central figure in the old management style and represented the floor workers when there was a great divide between salaried workers or “management” and the union.  He could have opted out of the “teaming” part and questioned management’s motives, but he didn’t.  As indicated in the quote above and the one that follows here, they looked objectively and compassionately at the changes in techniques and the difficulty in taking them on, being responsible, owning the success.

Managers are just like the people on the floor, you get a set idea in your head, this is the way it’s done, we’ve been doing it for the last 10 years and you got somebody come in here that’s drawing a lot of money and says, “hey this is where we’re going.”  But I’ve been this way for 20 years and it’s hard to get people to change.  Change is the hardest thing for people.  (I D a, line 112)

I guess it was about the like when flow management come in they was telling us how this had to be in I had to be and flow management changed some and they backed off a little bit and the people backed off they started thinking well maybe these guys do know a little something about what they’re talking about which they did I mean it’s the
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cancept of flow management though is hard to grasp I mean it’s as hard for management as for the people and that's why I'm saying change is hard. (I D a, line 160)

We did realize lean had made a difference in finishing they realized hey we’ve got a chance to help ourselves and they had input into what was being done. (I D a, line 170)

People have a tendency to drift back into the same bad habits I mean there’s no one set thing that I can sit here and tell you... but it, I do notice, a lot of it is from talking to guys at break time, that some of management is starting to get back into some of the same old habits they’re not thinking where they’re heading. (I D a, line 233)

In the end, this operator, a former Union leader, is concerned that the plant keeps moving forward, specifically that the managers keep moving it forward. While this is not the same sort of ringing endorsement, enthusiasm and personal commitment that I heard from

Figure IV

Difference in commitment to implementing new process at beginning of change and one year later

% of total GC personnel who were perceived to be committed

Perceived by 5 Functional groups

others, it is telling in the distance that this individual traveled in coming to this point. There
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actually was little change in his specific function and task area, though he did actively participate in two different teams. What’s telling is that he recognizes and applauds the initiative of those who did have more of an opportunity to actively take the reins of change, and take personal responsibility for new ways of running the plant.

This owning can only come about if relationships in the plant are such that learning can occur. The wall between management and hourly workers had to come down and working relationships had to be established in order for joint problem solving and resource commitment to develop and this was the basis of learning or knowledge creation in the plant.

Here an operator discusses how the relationships changed making learning possible.

[before the change] I wouldn’t even thought about walking up here and just knocking on a Plant Managers door and saying hey we’ve this problem back here and this just isn’t right and we need to figure something out. And now I wouldn’t do it all the time but I have a couple of times and he’s [manager] said that he’s always accessible… now it’s just a lot more open I don’t know how to describe it it’s just a lot more open relationship more interdependent it’s just more like they’re just it’s more or less they’re there for guidance… they’re more of what can I do to help you do your job. (III C a, line 100)

And from the perspective of the someone at the center of the procurement process and the forward and backward channels of communication to other players in the value chain.

From the staff level there used to be the independence if you will, of the staff that if it doesn’t affect me I don’t need to do anything with it now it’s yeah it does affect me even if maybe indirectly and if I have some fruit to bring to the table I’m going to offer it I’m not going to hold back… we got to talking about it one day and decided we need to do it. I don’t think that without a full staff meeting and a Kaizen event in the past, it would have been that easy to get the team formed to make something happen. It’s the accountability and the willingness to accept responsibility that is much more evident now than it ever was before (VI-D, line 347).

Now there’s some flexibility in that because it’s opened up so much that everybody kind of understands how it all interacts with everyone now, and their departments,
the projects and the bigger picture of events overlaps so much more that you’ve got to interact and interface and it’s got to be without sitting down and giving out detailed work assignments it’s something that’s got to flow. (VI-D, line 349)

Without the supportive relationship between and among management and workers, the ability to learn and change, to communicate and reach understanding and to commit was limited.

**Owned the change:** That there was a change in the commitment level, the buy-in to the lean production initiative and in turn their own future success, can be seen in Figure IV, which indicates the beginning (before) and “end of study” (after) commitment levels, broken down by position type (operator and so on). These were offered as assessments of the interviewees as they saw the GC collective, in response to questioning the level of commitment to the change. So for example, the first grouping of bars means that people who were operators felt that at the beginning of the change process 50% of the whole GC organization was committed to the change, 80% were committed after about one year and the difference between these was 30%.

It is widely held that about 80% of the individuals in the organization have bought in to the change and are working on behalf of the new production process. Of the other 20% there was no mention of sabotage or working against the system. They may not participate in team meetings as much, may not even attend (since it is optional now), but, in general, they are following the dictates of lean operating principles, just not contributing in the spirit of the new mainstream culture.

This data supports the notion that there was a substantial, measurable increase over time (though I don’t know the shape of the curve). This in itself is an indication that there was “organizational learning”, in that people were behaving in such a way that others believed
them to be more committed. It is also interesting to notice the variation in the perception among the five categories. It appears that those closest to the operation who had the least involvement in the original decision saw the perceived the lowest difference during the year and those who are furthest from the operation and had the most influence in resourcing the project (spending the money and time), saw the greatest change. This change across the categories is an area ripe for future investigation, but for these purposes, I notice that in all cases, the perception of ownership or commitment increased during the project period. Also, the unit of measure here is the individual’s perception of individual commitment to the collective.

Category definition: Owning of the change
People operated out of the belief that the change was positive and that they needed to be a part of the design and implementation specifics. Individuals engaged the organization in a fashion that indicates that they recognize that they will ultimately be responsible for the success of the changed processes and norms.

Codes:

- Participate in team meetings.
- Offered novel ideas.
- Confronted peers.
- Independently seek ways to improve the operations.
- Expressed concern that the organization might backslide or that the leaders of the change would not keep forging ahead.

*Where, when and how did learning happen? Assessing the environment.*
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The categories that have been described to this point depict how individuals came to believe in the change, became willing to participate and then actually owned the process. But how did this learning, this change in belief and behavior come about. The short answer is that it happened everyday. People came to believe spontaneously, informally, in team meetings, on the work floor and in the locker room. Sometimes as they drove to work they realized that they were actually looking forward to the day rather than dreading it, further shaping their belief and willingness. This learning is not done in a formal setting, but is taken up, implicitly, intuitively in the course of people doing their work or living their everyday lives.

They became ever more excited and committed. As the finishing department started designing and implementing a new work flow, moving equipment around to be more efficient and in closer proximity, many people became engaged in and excited about what was happening. They volunteered their ideas of how the flow would work best, running these ideas by others, even at the risk of being laughed at, ridiculed, or rejected. This is reflected in many of the quotations above where people are answering these questions and gaining evidence to make their choice about their personal commitment. Following is a concise example of what ownership and participation, the team concept, came to look like as people considered each other’s actions and assessed the opportunity and challenge that was being given them.

At first it was still some of that ‘Here we go again, same old thing. They’re not going to listen to us.’ But when they started listening, people said hey man. And that’s all they started talking about. In the locker you go in there sometimes you got kind of tired of hearing it [interviewee smiling] because you’re in there for a break but they was talking about their ideas. They was drawing pictures, they was doing all this stuff. (III A a, line 134)

As a testament to the everyday nature of the commitment process, it should be noted that some people have gone back to that “commitment board” that they had signed during the “shock and awe” phase, the mobilization phase, and crossed their names off. They are indicating, in a free and open culture, in a visible demonstration, that they have issues. This is to be understood
and expected. What might not have been expected is that some people talk about their concern not in terms of how soon they can dump this flavor of the month program, but rather, how can they be sure management will continue to push us ahead, looking out for the future!

Throughout the quotations used to describe the other categories we see the nature of this assessing or evaluating the words and actions of everyday practice. Here are a few examples from the previous category discussions –

- “the FBU manager just walked around [the plant]. He solicited communication.” (II A, line
- “…but the thing we noticed is we don’t have near as much stuff on hand as we used to I mean it comes in and it goes out I mean it don’t sit in the rack too awful long where sometimes before it might sit there six months. (I D a, line 50)
- “But they don’t come out and see me in the middle of that order and start hammering ‘I need this and this and this.’ ” (I C a, line 121)

In each of the stories that have been told to describe the other three categories there is evidence of people actively interacting with and questioning what was going on in their environment, they were looking for clues about where certain individuals are and what the collective is doing relative to the transformation process. The terms people used, among others, were “watching”, “listening”, “observing”, “perceiving”, “seeing” and “realizing”. One of the best situated actors to portray the assessing story was the Union President (UP) who had been consulted in the beginning at the time that the FBU manager was considering bringing in a consultant and attempting to make both the social and technical changes. The UP had held this position for about two years when this change was contemplated and was a working braider operator. He walks as easily through the plant floor as he does into the office of the plant manager and the other support and operational managers and as such regularly had the opportunity to observe the everyday activities in all functions of the business. In the following interview sequence he describes his own “assessing” and by deduction, implies that of others.

I think the biggest example is when we first started talking about this program coming to this plant. This is an old plant, been around since the early 50’s. We felt that most people
would sign on but we felt that there would be a percentage that would be hard cases that they would not get any cooperation, wouldn’t want to come to meetings, wouldn’t offer any input.

What we actually seen or what I’ve observed was there was some people that we thought we would not sign on that did and made a complete turnaround. And some of them even were leaders in this system where people would come in and they could take them over and show them what we’d done. Explain to them, look at the boards, and show them the process and so on. I think that was the point that I felt like the plant as a whole although there still were some that didn’t, but the plant as a whole was pretty well accepting the new process, the new way of doing things, the new way of thinking. There were some employees that really surprised me as far as their cooperation and really jumping on board saying let’s make this work.

[Interviewer: When you say surprised in terms of their cooperation and so on, what was your evidence, how was it made manifest to you that they were on board?]

Well they attended meetings they had input. These were people that in the past may have been real obstinate what we would call hard case probably would not cooperate. The management come out and say we’re going to change this. What they were doing was participating, giving ideas and suggestions. Which is probably one of the main things that make this process work is the input of people on floor. They were participating in the process. They were working together as a team and they were making the changes and they were accepting those changes on their own jobs. They were doing their jobs differently than what they had done before and they accepted that change without a whole lot of complaining and so on. Because usually when you go change someone’s job you going to hear a lot of complaints.

[Interviewer: So when you say team they’re acting as a team what does that look like how would I know that?]

You would see if you went out on the floor and you might see someone leave a station that they generally do. In the past if they didn’t have nothing to do or they’d run out of work, they would probably go somewhere and sit down, go smoke a cigarette, sweep the floor, go tell their foreman ‘see I don’t have nothing else to do.’ Under this new process if they completed all that they had behind them to do, they started moving to the other area and helping the other area, start working together, two people on one job or this person helping the other person. That they normally wouldn’t do. In the past they normally would say that’s your job, this is my job. I don’t have anything to do I stop, but you continue to do your job but that to some extent that stopped, and people began to move to the next area or the next function and began to help. (I D b, line 82)
While this vignette depicts all of the stages of how this organization learned, it highlights the role of assessing the everyday practice of the organizational members.

Assessing practice: It was not through formal learning that people came to believe. They didn’t sit in the classroom, hear the message and own the change process. It was through hundreds of small exchanges, observation of what others were doing, and recognition of their own reactions that gave them the data to assess and evaluate the change. Many of these interactions and experiences happened spontaneously, in real-time, on the job, in the lunchroom and locker room. They didn’t happen in the formal classroom, nor did they happen overnight, or over a weekend or a month. Practicing the new “team” and “lean” techniques required constant care and feeding. Frameworks and routines changed as discussed previously, only as people lived their everyday lives of winding bobbins, packing hoses and changing production schedules.

Category: Assessing practice

The actors “observe,” “notice,” “watch” and “realize” changes in behavior or lack thereof, of themselves and others, during the normal course of conducting their business, implementing the new production and social system (lean and team). This learning happens informally in the locker room rather than the classroom.

Codes:

- People give attention to what is going on around them relative to the change process.
- People are self and other observant.
- People express an understanding arrived at from the experience of daily work practice.
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Summary of the Open Coding Findings of Organizational Learning

There are four key categories that describe the learning in this study of process improvement: belief in commitment and process, choosing to change, ownership of the change and assessing practice (see Table 2).

Table 2
Grounded Theory Categories for Learning in the Context of Change

<table>
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<th>Categories</th>
<th>Codes</th>
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| Believe    | • People saw that there were fewer inventories.  
            | • Customers reacted positively to the change and actors felt they could meet customers needs better.  
            | • People were impressed that new ideas could be implemented in an age-old process.  
            | • Trustworthiness is used to describe “management”. |
| Choose     | • Express that change is hard, but necessary; possibly indicating that even if it isn’t great for them personally, they think it will be good for the plant and that in turn is good for them.  
            | • Indicate readiness to be team players and give up command and control structure. |
• Enthusiastic about what is going on now, how different it is from previous behavior and that this is desirable.

Own
• Participated in team meetings.
• Offered novel ideas.
• Confronted peers, disagreed with each other in constructive way.
• Independently sought ways to improve the operations.
• Expressed concern that the leaders of the change would not keeping forging ahead.

Assess
• People give attention to what is going on around them relative to the change process.
• People are self and other observant.
• People express an understanding arrived at from the experience of daily work practice.

The four categories of the learning experience relate in the following way. People come to work and do their job, while doing so, they recognize changes in attitude and behaviors of the bosses and their peers, they notice improvements in results and they attend to the impact that the changes are having in turn on others. Each week they gain more information that indicates that this is for real and it may work. They search their own aspirations and motivations in the context of this newly gained understanding of the work context and look for what is best for them in terms of their involvement with the organization. They leave, comply, or increasingly commit and own
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the consultant led process, which results in new behavior and attitudes to assess in the next time period.

This is a process apart from the formal, planned, scheduled classes. It occurs in nature, in the "wild" where people operate, everyday. It couldn’t possibly be planned, for the work of the day dictates the focus of the decision or problem solving task. In the uncertainty of change, these tasks occur spontaneously and people improvise solutions, hopefully with the frameworks that have been espoused in mind. Power struggles, old and new, boundaries, fortitude and sincerity are tested and possibly reset. Welcome to "locker room" learning or "on-the-job" learning, where the changes that result are based as much on the interpersonal, real time, day in day out, interaction of the actors, as the guidelines and the “taught” lessons.

While this study delves into the how and why or the process of learning, it is important to note the learning that transpired, the what, in this specific change project. The knowledge that was created during the lean implementation fell into four areas:

1) The principles of lean production such as redesigning and managing the production flow, reducing buffers, reducing inventory, scheduling through a Kanban, using visible metrics of performance and using takt time as the vehicle for evening the flow – This area was the key technical change in the plant and was presented in formal training and then fully developed over time and learned through LRL. There were actors who learned it conceptually, concretely and on both levels. And there were parts of it that most people held tacitly, like the Kanban scheduling system, and others that were more explicit like the reduction in inventory that came about as a result of building to order.

2) Teamwork involving traditional participatory management of collaboration in problem solving and decision making, decision making at lowest level, and respect, civility, and candor in interpersonal communication – This was the key social change that was presented in formal training and like lean had all of the characteristics of the learning
types, tacit, explicit, conceptual and concrete when viewed in the aggregate of the GC collective.

3) The trustworthiness of the organization in that it a) kept its commitment to keep supporting the change over time and b) selected a viable consultant and process for improving operating results and the operating climate – This was not taught or better put, presented, in the formal training. It was not expressed as an expectation per se as were lean and team. Yet, in the main, it did develop through the LRL process. It was rarely reported as trust, but it was indicated in action and attitude. It was expressed at all levels in the organization starting with the Division general manager who discussed explicitly how his trust in the GC organization developed during the implementation of lean. This was acknowledged at the front-line level by operators expressing that they believed that they are considered to be more trustworthy. However, for the most part, it was not expressed, but through other descriptions of concrete phenomenon, was indicated to be held tacitly. For example an actor describes that after talking with some people, he gained confidence that they knew what they were doing and therefore changed his position, really based on trusting the other person.

4) Change management process techniques that address the goals, structure, resources and control that was put in place to manage the process of changing the organization, and are separate from the specifics of the change, in this case, lean and team – As with trustworthiness, this was not something that was presented as a learning task for the GC personnel. These techniques were designed by the consultant and the FBU, the champion of the change effort. There was no indication of collective learning or common knowledge that was created in this area. However, there were a few indications of individual learning. One was developed by the FBU manager and was consistent with the “prescriptions” of change management theory (Boddy & Macbeth, 2000), and one was
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construed by two staff managers having to do more with the teaching process than the change per se. The latter, to the extent that it dealt with change process, namely the speed at which change should be introduced, was not consistent with the research based “prescriptions”.

As characterization of “the what” of the learning at GC, it seems that what was articulated as a learning expectation, namely lean and team, was learned, and moreover, it was learned in all forms, concretely and conceptually, and held by some as tacit knowledge and by others as explicit, depending on the individual. Further, it seems that LRL fostered a reflexive trust that while not expected, was a group or interactive experience and was therefore “visible” or became known to the members of the organization, though often not expressed in terms of “trust”. And finally, the domain of change techniques was not set as an expectation, nor was it experienced as a group. Moreover, the individual learnings (which were either few or totally tacit) were not processed or assessed by a collective, leaving the newly created knowledge isolated, though available as a node in the sense of knowledge networks. The central differentiators in what was learned then, seem to be the expectation of learning and the interaction of learning.

The transfer concepts deal with moving these four “learnings” from the original lean project to another area, namely procurement, accounting, GC office or non-production areas, and to other OCM plants or facilities. What this study addresses is the transfer of newly created knowledge, not just any existing knowledge or best practice. It therefore has a property of “local origin” that most knowledge transfer studies and theories do not address.

*Knowledge Transfer Open Coding*

This study also seeks to determine how the learnings from the implementation of lean manufacturing made their way to other similar or related change situations. Specifically I want to know how and why learnings about the change process got applied or transferred elsewhere.
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The original intent was to look deeply at one area, namely procurement to understand how and why learning transferred, but the data didn’t indicate that there was a flow through. What became more interesting was the data that indicated transfer attempts were happening in several spheres. The result of my data collection is a story of how dependent transfer of newly created knowledge is on the ease with which it can occur and the motivation of the transferring entity.

There were three areas or potential areas for learning that were prominent in this study. The first two were “lean” and “team” which were designed, defined, taught and implemented, as was discussed at length in the previous section. The third major learning opportunity was that of learning about the change process itself, what works and doesn’t work at OCM. This change process can be thought of in two ways. One is the informal everyday spontaneous change that was described in LRL and two is the more structured elements of a plan for change. The data indicates that there was a great deal of common learning informally developed in practice by a community. But there was very little learning about the formal management of change process (which deals with goal setting, resource allocation and the like), and none of it was based on collective or community learning. In this section I will discuss transfer of individual learnings that resulted from the shared experience since it was a major interest area of this research. This section explains and illustrates the important concepts from the data. Following this section is the “analysis” section where I will introduce a model depicting the antecedents of transferability.

Created Knowledge is “Transferred to” Other Contexts

Transferring the learnings or the knowledge created during the implementation of lean at GC to other areas, was always a part of the plan at OCM. Both the Group Operating Vice President and the General Manager of the Hose Division indicated that they expected improvement to continue based on the knowledge gained there and that other organizations, beyond GC, should also benefit. Interview data indicated that, in fact, some other initiatives were
undertaken either in the spirit of teamwork and/or in the interest of becoming leaner. The key characteristics of these transfers of learnings were 1) the motive for undertaking the transfer and 2) the ease of actually doing it. But overall, the learnings at GC were for the most part held at GC. It was startling how few examples were brought forth in answer to the specific interview question asking about other places where the learnings were used.

As an example of how this appeared in the data, following is a response to the question regarding transferring or using some of the learning in other areas. This GC staff manager provided this explanation only after I had asked the question in three different ways, allowing for the pregnant pause that followed the first two -

I'm trying to think of one [transfer example]. I'm not, I'm not sure of the example. I guess just basically most of the things especially in process design or look at anything, we're kind of thinking lean all the time in how can we eliminate wasted steps and movement, and such. So you're just kind of thinking about that all time. (II C, line 27)

This response is noteworthy for three reasons. First it was so very representative of the responses throughout the GC facility and from Division staff as well; from all levels and functions. Second, this particular individual was essentially number three in charge at the plant and had a wide lens from which to detect change in other areas. And thirdly, later in the interview, he did identify a change, albeit it a minor one, in the office (discussed below as the rearranging of the GC office space), in which he had personally played a role, yet he did not connect the two.

This begs the question of the level at which the learning occurred and the explicitness of the created knowledge. This manager didn't recognize the rearranging of the office as an example of the lean principles that address waste, visible management, and improved flow, or teamwork techniques of collaboration and multi-functional decision making and problem solving, all of which accrued from the office redesign. This could be the result of the phenomenon being stored concretely rather than conceptually or abstractly. Or it could be that it was held tacitly rather than explicitly. This individual level analysis is beyond my scope here and could be explored further in the context of LRL and knowledge transfer. What can be said here is that the
transfers that were unearthed in the interview process, were probably the extent of the transfers that occurred. This finding was not contradicted by any other data, for example from non-GC interviews that were conducted.

There are four directions in which knowledge created in the lean change was transferred (Figure V). I'll briefly describe each of these and then discuss the major categories that came out of these transfer scenarios, using examples from each of the categories to illustrate the nature of the transfer. The first “transfer to” situation was procurement where a new system was put in place to align supplier processes to meet manufacturing needs (OCM) for timely delivery of quality products. The second area that was affected by the change to lean was the accounting system. The drive to be able to operate in a lean fashion caused a reassessment of accounting systems in the plant. It was recognized that the existing systems were counterproductive to motivating behavior and managing operations in a lean environment. Third, there were everyday decisions, problem solving situations that were inspired and considered differently based on knowledge developed in the lean initiative. These are not production related, but are in the same organizational loci, the CG plant. And fourth, knowledge gained during the conversion at GC was intended to be used in other OCM facilities.

Conditions for Transfer of New Knowledge (Learnings) to Other Entities and Functions

There are two main concepts that developed from the exploration of learnings transferred. First is the ease of transfer and second the motive for the transfer (see Table 3).
Table 3
Grounded Theory Categories for the Transfer of Newly Created Knowledge or Organizational Learning

<table>
<thead>
<tr>
<th>Categories (Conditions)</th>
<th>Description</th>
<th>Codes</th>
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| Capacity/capability to Transfer | Knowledge that was created in the implementation of lean transferred more easily when people were proximate physically and relationally, and when they had confidence in the created knowledge. | o  Physical proximity  
  o  Relational proximity  
    • language,  
    • explicitness of knowledge & knowledge sharing,  
    • mental maps |
| Motive for transfer | People sought to apply learning to other situations when it benefited the larger community of practice, when it was perceived to have an impact on the bottom-line, and when its application provided hope for the future or an improved work climate today. | o  Collective Effect  
  • Benefits  
  • Involvement  
  o  Perceived affect on the bottom-line, operations.  
  o  Hope and excitement about today & tomorrow. |

Capacity and capability to transfer.
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There are three aspects or dimensions that affect the ease with which concepts are transferred from the lean change process. The first two both have to do with proximity.

The first is geographical proximity, the actual physical nearness of the ‘transfer from’ and the ‘transfer to’ entities, a dimension of physical space.

The second dimension is “relational proximity” which involves language, explicitness of knowledge sharing, and mental maps. Language includes the communication of thoughts and feelings through a system of symbols, words, gestures and the like; jargon, acronyms or shorthand references. Explicitness in this context has two meanings, a) the availability of the knowledge to actors in the collective based on forthrightness and unreservedness expression, and b) Individual knowledge that is not articulated has no ability to get transferred. However, organizational learnings that are embodied in routines, task and even beliefs, can be observed and therefore transferred. For example learnings like scheduling the floor with a visible Kanban process can be transferred de facto even though individuals may not be able to articulate the learnings. And the last property of relational proximity is mental maps which in this study take on the classical mathematical definition of “correspondence of elements in one set to elements in the same set or another set” (American Heritage Dictionary, 2000). In the organizational knowledge transfer setting the elements are the business concepts that were learned, the sets are the functions of the value chain.

Codes:
- Physical proximity
- Relational proximity
  - language,
  - explicitness of knowledge & knowledge sharing,
  - mental maps
Motive

Just having the capability to easily use lean and team principles, though, was not enough. Because these were new norms and behaviors, because people sometimes still felt uncomfortable exercising their ownership “rights” or privileges, and because outcomes still were uncertain there also had to be a propelling force that drove the new behavior. This force I call motive and it is the reason that people were willing to change behavior in other spheres, functions or places. It was true that the plant was on notice that they had to improve. The experience of “shock and awe” and the pronouncement by the General Manager that if this transformation didn’t work they would have to shut it down was broadly recognized at this point. So it could easily have been that people were motivated by fear to try and find other ways to improve, using the new principles of lean and team. But that is not what the data showed. The energy that drove transferring the principles to other contexts seemed to come, for the most part, from a positive source. That is not to say that the possibility of closing the plant wasn’t lingering in people’s minds, particularly as the downturn in the economy dragged on in the early 2000’s. My data indicate that it was there, somewhat, though less than it had been before the lean implementation when the plant was considered to be the step child of the Division if not OCM, when it was called an “albatross” by its own Unit Manager. But in spite of this, what people were focused on was what they could do to improve their chances for success.

There are three major ways in which this positive motivation to use the techniques learned during the implementation of lean, appeared. First, there was a bias toward taking action when it would help their fellow workers, when it would benefit their immediate work organization. The more people in the community that would be affected positively, the more energy the idea had behind it. In this vein, people wanted to “do the right thing” for the organization rather than themselves alone. What had changed during the LRL process was the definition of “the organization.” Now ones coworkers rather than management or supervisors were the center of the organization, the motivating force.
Second, there was a focus and attention paid to those actions that were perceived to be important or central to the bottom line. This, of course, depended on knowing what affected the bottom line and caring that the plant works toward the bottom line. The significant dimension of this is that the actions of the floor workers, that is the choice they made, the behaviors they employed, actually impacted results. This realization is a direct result of seeing how the LRL process worked in the lean implementation. That is, they saw cause and effect in how improvements were gained, had reason to believe that it could happen again, and that improving the bottom line was a good thing, an accepted collective goal. When people owned the process of change, the implementation of lean, employing a team culture, they also began owning the results. Just like signing their name to the board in the beginning, they became identified with the outcomes of the plant. And finally, the system at OCM rewards bottom line performance at the plant, business unit, Division and on up, level. This is in the form of both recognition and reward, namely a bonus. For new knowledge to be made available across domain boundaries there must be motivation to make it available.

And lastly, people were motivated by their hope for a better future and enjoyment or satisfaction in the present. Drawing from the excitement and enthusiasm that developed in the collective during the lean implementation, people allowed themselves to think of terms of what good results can come from making advances in the operations. Moreover, people liked coming to work in a place where morale was high (higher) and there was improved communication and spirit de corp. They had already made progress in this area and believed that if they continued along the path of improving operations, the organizational climate would also improve.

Codes:

- Collective effect on or involvement in the transfer.
- Perceived impact on the bottom-line; Alignment.
- Hope for future; satisfaction today
Following are illustrations of how these characteristics of the transfer process took place in the four “transfer to” settings. Again the newly created knowledge or learnings that are being transferred are “lean, team, trustworthiness, and the change management process”.

Transfer to procurement.

The procurement needs of GC in the production of commercial/industrial hoses are fairly minimal. The main raw materials are rubber, yarn, and various types and grades of wire. There is a staff person in GC who oversees the purchasing function and buys from a few suppliers none of whom are in Ohio, the location of the GC plant. With the main objective of eliminating buffers, the ideal situation would be to have no inventory in the plant, bringing in components and raw materials just when they are needed for production, often referred to as “just-in-time” inventory management. As the inventory levels were lowered with the advent of the new lean design, it became even more critical that the supply chain be effective. That material be received at the right (planned) time and that it be of high quality, since there was little excess inventory from which to draw in order to replace a defective component, was essential to the smooth flow of the entire plant. The benefits of the lean production conversion would not accrue, if now, the upstream or feeding process did not improve.

But while this low/no inventory was an appropriate “organizational” goal, it made some floor workers and staff managers nervous. It is much more reassuring to see lots of raw material waiting to be used than to count on your vendor to get what you need, as you watch the input to your task dwindle to next to nothing. There was no question about the technical systems that could support such a goal, but getting the workers on board, in the new climate of participation became the pivotal task. The strategy was to establish a direct relationship between the floor
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workers and the vendor, to build trust and confidence in working more closely and with less slack or inventory buffer.

Following are two stories that indicate how this new relationship was developed and how the newly created knowledge at GC regarding teamwork, lean thinking and the learning process was extended to organizations external to OCM. Vendors actually became a part of the team, permeating the inter-firm boundary and enabling more informed, timely decision making between organizations.

The first story is set in the context of problem solving, improving working relationships with vendors by extending the previously learned concepts to ordinary transactions that are conducted with GC suppliers.

We had a problem with a vendor. The vendor was winding the master spools of wire and there were some with problems. So what I did was I got a hold of the vendor, had him come in and attend this meeting with the folks. Well they were tickled to death because what happens is on the floor if you're a wire runner and you have problems with a supplier you tell your supervisor and the supervisor [coach] passes it on you don’t know if anybody, once you tell your supervisor, you don’t know what's being done basically. Well the team enjoys it because as a team, this is a problem. And now we got to the point we had the supplier come in…

He sent his quality manager in, we discussed the problems. He came back a couple weeks later, sat down with the team and told them what they’re doing about it. And now we have an open line. That very team sits in this room every other Thursday morning and they get on the phone with that supplier and we have a conference call. And that supplier is now telling the team what they’re doing and they actually have his operators in that room, so they say ‘Yeah, you know that problem you told us about, well we’ve worked on it and this is what we’re doing to resolve it.’ And I hope that's working out for you. Our folks are saying, ‘yeah, you know as a matter of fact that’s working better for us, we like that.’ So they love this. They’re excited about it because they’re not talking to a supervisor. They themselves are now talking to the supplier. So it really gets to everybody if you know what I'm saying. I get excited about this, but those are the neat things that we do, it's direct…

You get the people first-line, with the hands on, that’s been a huge asset. I’ve done this a number of times, we actually bring the vendors or a person of their team into
our [team] meetings we’re talking raw material teams, large rigid teams, small flex teams, whatever team may be... [vendor] brought their supervisor, sales rep and one of their technicians in, and they sat in our meeting. They were here at 7:00 in the morning and sat in on the meeting... went out on the floor at 8:00 after the machine started running and stayed out there all morning..... Corrected the problem within a couple of weeks. It was just something simple in the way they were stringing out the machine on their end, but otherwise we’d never had known it. (II B, line 182)

The vendor became a part of the team. The physical proximity of the vendor being in the room, on the floor, problem solving side by side enabled the GC actors to relate to them in the same way that they related to co-workers. And this visible presence supported the transfer of teamwork concepts to individuals, vendor employees outside of OCM.

The GC people involved, both line and staff, all seemed comfortable with the idea of communication without hierarchy or formality (direct to vendor, without the supervisor) which can be considered part of the capability or capacity developed in the lean implementation. The team "enjoys" having the vendors involved, not unlike how they became more willing to work more closely within the GC boundaries; they appreciate the different ideas and contributions of a variety of people from different functions, including, now, having the supplier on the team, they bring problems to the surface and use conversation to solve problems, all of which are transferred from their previous experience with lean production. The production unit manager assesses the success of doing this with one vendor and then does it with many, employing the same LRL process. Moreover, he is motivated by seeing the excitement and hope of the “collective”, the floor workers and staff alike, who appreciate working directly, openly and collegially with the vendors. He describes this in very emotive terms, though his responsibility is financial, operations and engineering - “tickled to death”, “the team enjoys it”, “So they love this. They’re excited”, “I get excited about this.”

“Excited” about trying something new was not the norm during the “shock and awe” phase of the original change process. In this area, however, the language and mental maps of the vendors and the factory; goals of high product quality, low inventory (un-buffered as ultimate)
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and timely delivery are very similar, making the ability to communicate and understand fairly easy. Still this had not been done in the past, even though it seems like an obvious improvement. It was only through transferring the concepts and techniques of lean, team, and locker room learning that this partnering with the vendor was undertaken.

The second story is about building a more formal link and structure of support systems between GC and its vendors. At the same time that lean principles were being implemented a new procurement system was being developed. The objective was to let the vendors manage the inventory levels by knowing what GC was producing and when. Here the GC floor workers identified ways to improve the flow of the product in the plant in conjunction with this conversion. Because they understood the concept and process of lean, they had the confidence and ability to figure out albeit “nuts and bolts” improvements. And equally important was their understanding that their views will be listened to, that they have as much right and responsibility to design the work conditions as anyone. Being empowered rather than “stuck” transferred to redefining the working relations with the suppliers of material as well as the flow of material.

Is the culture from the floor, are they [floor workers] really coming up with ideas on how to help the vendor managed inventory go smoother? I think on some things they probably are and that’s like the nuts and bolts of how the tubs come in, how they’re marked. You know what I mean? Like is it easier to read this kind of tag or that kind of tag? If someone has a problem with the way something comes in from a vendor - ‘it’s too hard for us to get it out, it’s too hard for us to move it around, could the vendor do this?’ we, as the people that contact the vendors and talk to them, go back to them and say ‘hey our people on the floor asked us could you change your label from this to that?’ something simple like that, even say from this color to that color... That’s the stuff that is still going on and that’s where you can say that the organization has changed. Before I don’t think any of that would have happened they [the floor workers] would have just said ‘Oh, we’re stuck with it I’m not going to say nothing.’ ” (V A, line 153)

There is no question who owns the production process, and the inventory management process that feeds it – all of these workers do. They believe that a different way of managing the tubs in
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conjunction with the new inventory process would be best for the bottom-line. They make this known and in part because it is the collective voice which calls, action is taken. Moreover, they see results.

…and the reason I say that is because vendor managed inventory will make you lean that’s part of the how that’s part of the reason and ways we got to where we’re at raw material end of things to make like I said we weren’t lean in raw materials in whip or in the warehouse dollar inventory until we started this I went back and looked and if you look at the graph it was 1.24 million a year ago March when we started it and the graph continually went down until this past June were at $480,000 so 65 percent of our dollar inventory went away in a year and a few months. (VI D, line 435)

Customer service that’s measured in two ways backlog dollars which is the value of product that we still owe customers all customers and the days number of days late time frame we have goals of 3 days 7 days 14 days 30 days and 60 days our oldest order here is about averaging around 22 days our backlog goals we’re averaging around $45,000.00 down significantly from where we were running around $400 to 600,000.00 that’s the other major measurement really that is the number one measurement in OCM’s eyes right now.

Well on the building side of things our cost our cost for making a foot of hose is dropped tremendously our customer service levels have increased tremendously we were running a $400,000 backlog and 40 to 50 some days late on customer service levels now we’re maintaining around 100 maybe a little over right now $1,000 in backlog and we’re hovering around 25 to 30 days late on our oldest orders an on occasion we’re much less than that right now which is a good thing we just got to react as business is improving a little bit.

…and its made it easier for the vendor, number one because they see exactly what’s going on with our inventories daily on the products they provide secondly it’s freed up time at GC for us to do other things… but we’ve got such confidence in our vendor since we’ve been on this program over this period of time that the only time that there’s been a hiccup is when they had a raw material on their end that feeds our product and may have had a delay their for whatever reason… and they get the call outs and let us know the situation and we take appropriate action… but we have that notification the day that they realize we need more product. So that’s our checkpoint… that says okay we know G-K
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understands and realizes that we need more of this particular compound… so anyhow might be very simple but very workable equations that goes along with all that and so I go on site and do all the training get the right people involved and it’s been tremendous.” (VI D, line 98)

And over time, the perceived benefits motivated use of the new procurement system with more suppliers, the ultimate indication that a workable, desirable system had been developed. The top procurement specialist felt that the change happened quickly.

“We started like I said with G- K our custom mixer and we moved it onto our wire vendors. All of our major three wire vendors are on the program now and all of our yarn vendors. Our last one came on in October, I believe, of last year. So it moved quite quickly and you could see within six to eight months I had all of our major players on vendor managed inventory.” (VI D, line 52)

And finally, there is more of an understanding and appreciation for the need to keep moving forward, continuous improvement, and with it hope that even more enhancements will benefit GC. Actors are focused on results and can connect the dots of the supply chain. The type of hope and excitement that was experienced in LRL propels action and motivates. People began looking forward to the next “best thing” that would make the operation more successful. They were motivated because this project was a way to leverage all of the work that had been done in lean production, aligning the procurement function with the next link in the value stream.

The supplier basically says if we can learn to put your demand forecast into my system and take each part weight, I can actually take your forecast, convert it to pounds, required dates, and have the product for you, and all you do is enter your forecast data, a part number and time. My system receives that, converts it,… and I can always have what you need ready before you need it... The ultimate, and it’ll come in time, is when our planner sits down and says this is what I’m scheduling, bingo! (VI A b, line 150)

Transfer to accounting systems- extension of lean production to lean management principles.
Having redesigned the flow, installed a Kanban production scheduling and inventory system, and established the teams for continual improvement, the need for measuring results in a different way became clear. In the mass production model, which was used previously, the objective was to use the equipment to its fullest, produce long runs or large volumes of product, hoses in this case, and inventory product that wasn’t required by the customer immediately. The system that was used to account for costs at the plant level was a full absorption standard costing system. And this cost absorption metric based on fully utilizing the capital assets was the basis for bonuses for the plant managers. This accounting and therefore incentive system does not motivate the appropriate operational decisions, and leads to poor results and counter productive behavior in a lean production plant. Without these, there is no way to make sense of the impact of the redesign, there is no way to see the benefits. This was very frustrating to the original champion of the change, JF, who was the FBU manager at the time.

We don’t have consistent measurements I mean there’s the old accounting rule that says even though you’re not really improving a lot of these numbers our absorption for example is not improving. When you go lean, although you’re reducing inventory, that reducing inventory affects the run rate. It doesn’t affect earnings the way we calculate. So, I think, the biggest challenge is to get the management support if you’re doing things right to have management recognize that you’re doing it right and to get to that you’ve got to come up with the new criteria for measuring improvements. (IV B, line 213)

We were coming up short with the division staff, my peers. I’d go back to the GM’s staff meetings and they were mostly very critical of what we were doing. So the support wasn’t there and the reason the support wasn’t there, they didn’t understand. They never went through the change management. They never went because, again, I reference like from an accounting standpoint they’re looking at the absorption numbers out of GC and they’re not any better. They’re worse than they ever were. So the corporation is now [2002] in the midst of changing some of those accounting measurements with a lot of resistance from division level controllers and things like that. But the good news is, it’s changing. (IV B, line 225)
But it was really the plant manager who had to take the initiative and he did. He came to recognize that operations changes and accounting changes need to go hand in hand to create a financially viable environment. Alignment of goals and measures from the business unit to the work cell is critical for sustainability of the new behavior that was gaining traction in his plant. In a lean environment where production is geared to customer need or customer orders, and where the objective is to design the flow to make production of a single unit profitable, new accounting and incentive systems were needed. He notes the need to appeal to his colleagues, key operatives outside the plant who were neither physically proximate nor in some cases, able to share the mental map of the LRL or operations change. This made communication and understanding difficult.

Even as the operational results were improving, several months into the change, the financial results and some key OCM measurements were not. Trying to understand and fix this was recognized by the new FBU manager as being difficult.

And when our Plant Manager at GC recommended that we do this accounting change I knew that this was a big animal and we've got accounting guys that don't change that easily. Our GM has to get some buy-in on this thing, so I had the plant manager come in as part of our planning process and present to the entire staff. This is something that he'd like to recommend we do. Now [2002] there's some help that he's getting from a corporate level. He's getting some assistance, being driven from the corporate that says this is something we'd like to do. The GC plant manager is raising his hand and said I'd love to be the first guy to try it. (I B, line 90)

The FBU Manager gives the GC plant manager a lot of the credit for driving this move to lean accounting, really pushing for solutions and support. This plant manager was known to be an old school, command and control manager, who went through a personal conversion during the lean implementation. Now his focus is on the survival of this plant, on the bottom line, on the perception of his organization or collective and he knows from experience that this organization is capable of understanding new ideas and changing. His boss describes him as not taking no for
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an answer, as working with whomever to get accounting and operational measurement systems to align.

They want to go to the next step and that's happening. I mean these guys want to put in lean accounting, they want to put in lean purchasing, they want to drive as much waste out of this because now they're addressing the profitability side okay. They don't believe that they're not profitable at what they're doing (indicated by the current performance measurements) so now they're questioning the principles of our accounting system. So they're not stopping at the hierarchical bureaucracy, they're pressing the envelope they want to get things done. (I B, line 78)

The plant manager found a resource on the Division staff that could help him. He asked this accounting expert to get involved in figuring out at a detailed level how to get the reports and numbers to reflect their true progress when viewed from the perspective of a lean operating philosophy rather than from one of mass production. Even though this individual served the entire Division which had 11 plants, he spent time on-site at GC, trying to understand the operation well enough to understand how to make adjustments in the cost accounting system, and other systems.

But progress was slow going and the plant manager continued to be frustrated, though at the same time enthusiastic about his growing understanding of lean accounting as he takes great care to explain it to the interviewer.

What we're bringing to it is, we have all these benefits that we have in our minds, but we can't explain the financials to anyone. No one has yet seen and nor will you see this, if you go into lean to improve your bottom line... but you're not going to get there. What you end up doing is improving your cash flow that's what lean does; improve your cash flow, where you're never actually tying up huge assets based on an inventory. But we never had the pieces of the pie on the accounting side where we showed a financial benefit in that way. What we're building today and yes it's a hard change because it's entrenched in corporations, it is the basic economics that have been taught since the 50's. 'Thou shalt go and have asset-based.' And you go and figure out your standard costs etc and your return on your assets. Okay, we still do the same thing in your lean accounting, but what your main thing is you only
make sure that you have the assets that you really do need to service your customers. Number one is inventories you do not have to have huge inventories you actually do not have to have huge WIP’s on the floor because you are running to what only you need for customers. So what you’re doing is freeing up your accountants, your production and control people. They’re not busy doing transactions to verify that you’re meeting the standard that you established for somebody. Again you simplify. (II A, 341)

But this plant manager was an operations guy, an engineer by training, not a finance guy. There were small improvements in there numbers simply based on changing the accounting of certain transactions in the plant, but these were not significant in the whole of the financials. Nor did this effort, at that point, address the dis-alignment issue. But in part through the plant manager’s drive, the Group staff (to whom the Division reports) finally began to address this need and lead. They began offering seminars and courses to address the accounting needs of lean production. Following is a description of goals and direction from a Lean Accounting Workshop which was run by Group headquarters (for multiple divisions within the Group) in March of 2002. This is over a year after GC had begun to recognize the incongruity between the production and incentive system and over two years after the problem had begun, with the advent of lean (shock and awe was in the late fall of 1999).

…we’ll describe what’s wrong with full absorption standard costing and the need to change to a method that is aligned with lean. In this section, we’ll describe how to move from a current standard costing approach to a direct costing system that is based on average actual costs. We then introduce how to identify constraints, how to match features and characteristics to constraint capacity and then how to calculate conversion costs of individual products. The end result will be for each division to create a table that can be used to answer not only ‘what does this part cost’ but also ‘what drives cost?’

Our final section lays the foundation for why direct costing with features and characteristics provide a clearer picture of costs and how that information can be used to achieve customer-focused price targets through continuous improvement. In this section, you will have a chance to use tools that help understand customer needs, how our
products match those needs, understand value and to calculate target costs. OCM memo, date.

This workshop and the development of the new accounting system was facilitated and directed by an outside consultant, different from the consultant who did the redesign and in-plant production changes. This consultant was hired and charged by the Group rather than the Division and was a specialist in accounting rather than production, creating the opportunity for more disconnect between these functions that are now tightly coupled in a major strategic change process.

The story of this transfer is really the story of one man, the plant manager. He was the driver of this change as he tried to gain legitimacy for the improved operational results at GC by aligning the measurement system to the new production method. He wanted this for the benefit of his entire organization or collective for two reasons. First his organization certainly had delivered against the goal of improving operational results and he wanted this to be recognized by all functions at the Division level, particularly the staff heads that after two and a half years were still skeptical that the bottom-line (financial measurements) had improved. This would also benefit GC’s self assessment and their enthusiasm about how they can shape their future. And second, as we saw in the case of the incumbent plant manager (IPM) the current plant manager wanted to gain a position personally where he could compete on an even playing field for the year end bonuses.

The lessons of learn were used as he tried to integrate the two bodies of knowledge. First he teamed with a staff expert, he asked for help, he took initiative recognizing the need for change from the bottom up rather than waiting for the “corporate” program. Second, he used the principles of lean production as he worked to understand how accounting could also be streamlined and simplified. And lastly he worked iteratively with his accounting expert and his staff managers as they together learned how to align these fields.
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Taking the concepts of lean and applying them to a distant function was difficult for several reasons. First, the language of cost accounting is not the language of lean. And the perception of a distant staff is not the perception of the GC located personnel. Second, the confidence that this could be transferred never developed beyond at most, the drive demonstrated by the plant manager. Staff who work in GC and report to division, as do many including the small accounting staff which is more of a bean-counting or tactical than strategic, simply aren’t in a position to advocate for GC. The lean accounting consultant has no connection to the lean production consultant or the GC experience. So there are three distinct resources working from three different frameworks (“pieces of the pie”), a fourth if you add chain of command like the FBU manager. The management, both FBU and plant, do not have financial backgrounds, they come from engineering, operations and marketing experiences. The division staff accountant who is now working closely with the plant manager has no operational background. While highly motivated to gain alignment, not only for the success of the organization, but for individual compensation and recognition purposes, the plant manager struggled with this until and even during the effort that the Group level staff put into installing lean accounting. While the information that was used by the plant manager was created in the collective learning and change to lean production, it was not transferable by a single person to a foreign function.

Transfer to non-production related changes.

The changes in attitude and focus that occurred as a result of the production change were also applied to non-production situations. Here are two stories of how willingness to commit to change in other arenas and understanding the value of cross functional communications were applied in the office at GC.

The first, addresses the layout of the office space. Here a manager talks about a change that came about after the plant change and as a direct result of the awareness of the benefits of improved communications.
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Well I think one of the surprising things we did, and how much it made a difference, is we reorganized the office the layout.

[Interviewer -Tell me about that?]
Well, if you see where we’ve got the office now it’s kind of open in the middle a lot. Well we were the exact opposite. We had a wall going right down the center and everybody sat on the outside. Well what you almost had is you had that side of the wall which was engineering and you had this side of the wall there was everybody else. Well there was no way to communicate then and even the engineers, we had were drugged out were spaced out along the long wall but dividers between them so they couldn’t even communicate. It was same with the people on the other side the Purchasing, people in scheduling, payroll, they couldn’t communicate. So we kind of did a complete opposite of put the wall on the outside and let everybody on the inside communicate. (II C, line 243)

The goal here was to improve communications across functions and within the engineering function. However, this took a long time to come about. The staff manager, an engineering manager, talked to the plant manager about it off and on over the course of several months. The “collective” was never really engaged in the redesign which was a creative idea and very similar to the visible management concepts of lean production that were designed into the shop floor. In fact, the idea was taken to the boss, rather than to those affected, the plant staff. This is more old school, top down, rather participatory. The techniques of teamwork did not seem to be employed and the reporting of this in the data was limited to only two interviewees, though all interviewees were asked for examples where the principles applied beyond production. It is likely that this was not seen as benefiting the bottom-line and perhaps as benefiting the collective only marginally or not at all. The lack of mention of this in the data indicates a lack of either enthusiasm or recognition of this change.

The second tells the story of a change in a non-production area in what could be called workplace hygienic. There was a problem with the vending machine provider. Like the floor layout issue, an individual choose to own the problem and take action.
And what happened most recently in my department, we’ve had major issues with our vending service. They [provider] took out our attendant, the cleanliness of the machines and the quality of the product, the product mix, the quantity of product all went down hill. So we put a team together made up mostly of our employees. They [the team] took surveys of employees, what they wanted. They interviewed other vendors and we came up with a new vendor.

We used the team concept. We continue to do that versus where we’ve in the past have had engineers here who said well I know how to fix this I’ll start the project and then go talk to the people on the floor. And what they would find out is the people on the floor wanted something entirely different their excuse was, well they don’t know what they’re talking about I’m going to do it my way. When they went to implement their final version, the engineers’ version, it didn’t work because it wasn’t well thought out. (III D a, line 178)

The objective of improving the quality of the snacks in the plant and at the same time doing this using the team concept, specifically, joint decision making is a good example of how these principles carried over from the conversion to lean production to non-critical areas. The use of a survey forced the issue into a collective process rather than having a dominant individual work on it as in the past. The woman who brought this forward, clearly felt secure in using this new approach.

Both of these examples show an appreciation for empowerment, ownership, and the need for communication. The method of how these ideas got implemented or engaged in the organization were similar in that they used they used the collective or engaged the group in the decision making process, even though they were initiated by one or two people. These projects were not of a size or scope to require formal change management components as defined in this study. And appropriately so, they were not seen as having a strong affect on the bottom line, even by their champions, yet were accomplished as a testimony to the ownership culture that was developing.
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**Lean to other facilities**

The real payoff that was seen for making financial and personnel investments in the lean conversion at GC went far beyond improving the results there. The hose division is the largest in OCM and had expected to leverage this across their 11 other plants, and to others (including the Mexico locations) in their sister plants within the Group. The plan was to develop knowledge about this internally, in the division staff organization, and then port it or transfer it to other locations. The Division general manager who had argued the case for the expenditure at GC built this rationale into the business case for attracting funding. “We’re going to take that knowledge, put lessons learned in GC, we’re going to transfer that over into these other plants.” (I A, line 133)

And other staff managers involved in the original planning support this. Here the staff quality manager who was intimately involved with GC .“When we did Cleveland and GC we used a consultant to implement the change. Since then we have defined our ‘lean team,’ quote unquote, have a lean manager, and based on the lessons learned is how he’s setting up the rest of the plants.” (II D b, line 146)

But two and a half years after the GC project began there was not one single “lesson learned” that was given by the participants in the GC effort in a way that could be considered a learning of and by the staff collective, nor was there any other interviewee who corroborated that other plants are going through the same process based on the alleged lessons learned. For example, a key staff manager was still talking about “probably” doing it differently in the future. Vague description of how learnings and which learning was going to be used in other settings was predominant in the data, when there was acknowledgement of learning transfer at all. “When we look back, we probably will want do it different and we are planning to do it differently. For instance we did the overall, this is where we’re at we set the benchmarks and said here’s where we’re at and this is where we got to go and this is how we’re going to go about doing it”. (V C, line 125)
Moreover there was explicit evidence that actual transfer is not the norm, that leveraging learnings across divisions or plants is a goal, is talked about regularly, but is rarely accomplished. I had a lot exposure to all the operations that OCM does across the board the other thinking behind that was when I would go to a new division or existing business that would solicit our help then I would be able to at least transfer that knowledge that I had gained from other divisions to kind of be the conduit sharing this is what this division do does this is how they do it this is the guy that's expertise in it the right guy to call so you’re not because a lot of times our divisions don’t necessarily collaborate between their manufacturing processes or methodologies.  (VII b, line 28)

So while this major transfer of learnings was the plan of record at the Division level, reality, it seems, was that the transfer of newly created knowledge to other facilities has been attempted not by a collective effort, but by a few key people literally being transferred with the knowledge that they personally gleaned from the process. This is not to say that some of the other plants haven’t benefited by training about lean that was conducted by people in the Division who had been a part of the GC experience. But these are of minor impact to the organization, are very concrete and specific in nature, they tell “how to” rather than why do, they bring answers, rather than questions; major change efforts have not been undertaken. Moreover, the training manager for the division is now in the process of trying to locate “lean production” training that can be bought and administered locally. This is in lieu of the staff taking this over as planned and therefore, leveraging the process and social learning of GC. Lean is viewed essentially as a commodity. So even this simple step of transferring lean techniques and principles is being outsourced. It is inevitable that individual learning is being transferred, that were not developed by the collective and therefore cannot be considered to be organizational level learnings. These individual learnings fall in to two categories, individuals who are specifically asked to take their experience of the lean process at GC and apply it to other places and those who simply continue to practice in the same context, the GC plant, following the principles of continuous improvement.
The latter are simply continuing the process of LRL. The former are a part of an explicit strategy to transfer newly created knowledge to other facilities.

Given that the only non-trivial opportunities to transfer organizational learning to facilities other than GC is through individuals this becomes the story of transfer rather than the staff collecting lessons. Two key players have been promoted to other functions where their GC lean experience is being put to use. During this period there were almost no other promotions in the Division due to the downturn in demand, consistent with the overall US economic decline of the late 1990’s and into the early 2000’s. These rare promotees both had been involved in the GC implementation. While it is too early to tell how successful these efforts to transfer the knowledge will be, the data does give us an indication of how the conditions of transfer might apply.

The champion of the program, the original business unit manager, was first moved to an important newly created position of “integration manager” for the purpose of integrating a recent acquisition, and within a year promoted to a general manager’s position. Another person was on the division staff and was promoted to staff vice president at the Group level. And a third individual, a young division staff expert who had been on the core team at GC was promoted to plant manager within the division shortly after the data for this study had been collected. So in the course of about 18 months, individuals who had played key roles in the conversion were moved to positions of greater influence and responsibility relative to the lean enterprise goal. This kind of promotion activity was distinctive in that these were the only promotions heard of during the interviewing, all to higher level, broader responsibilities where lean production and change were in needed. Each of these is discussed below with examples of what they considered to be the learnings of lean at GC that they will transfer or are already transferring to the next facility.

A) The FBU Manager gets promoted. The original champion of the GC conversion was promoted to a highly visible staff job as integration manager of a newly acquired company, a former competitor. When this planning was complete, after less than a year, he was then promoted to general manager of the newly created division, “industrial hose” reporting to the
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Group Operating vice president. His personal knowledge about change and lean was clearly seen as an asset. Of his function at GC he says, “I guess as the leader of the Business Unit it was established pretty early on and this was a recommendation by FMA that J.F. as the Business Unit Manager has to set the vision for what we’re about to embark on in GC so I was really the if you want to call it the overseer but I was intimately involved in the actual implementation.” (IV b, line 77)

He had been both the strategist and the tactician. He had more broad knowledge of the GC change effort and personal familiarity with it than any other single individual and attributes that to his movement in the organization. “I think it helped me get it helped me get the job I have today without a doubt. I think with the CEO pushing lean so hard he’s made it pretty clear that people are going to get promoted that are showing improvements in the measurements we’ve identified, that need to improve through lean initiatives. So from a personal standpoint it helped me there.”

As an example of what he transferred, an excerpt that indicates personal learning and understanding of the new concepts and their application.

So I think the biggest challenge is to get the management support if you’re doing things right, to have management recognize that you’re doing it right. And to get to that you’ve got to come up with the new criteria for measuring improvements. And that’s in the process again... I think as we change the measurements as a corporation it will get easier. And beyond that, and even within an organization there’s different opinions on how lean should be. And that’s why to me in my organization I hired a lean champion for my staff, who’s got a lot of experience in implementing lean in different organizations in OCM. And the first thing we’re going to do is make sure as a staff we understand that this is what we’re trying to accomplish and this is how we’re going about doing it. And everybody, I mean different Plant Managers, could put their own little twist on it but there has to be a consistent approach and a consistent measurement so that you see your improvements.

When this GM had to find a replacement for the plant manager at GC near the beginning of the lean implementation, this is how he did it -
I said, Dick, [Dick was a plant manager at a sister plant within the division] why don’t you come up and run the GC plant. And of course the first thing he said was, well, I don’t anything about hose. I said that’s what I don’t want somebody that knows anything about hose that’s been part of our cultural problem, because another part of the OCM... and I thought, you take a guy that’s got Plant Manager experience knows how to handle people, and doesn’t know anything about hose which is a good thing because then he can truly rely on his people, his management team, but more importantly the hourly people which is what we taught him in GC, and that would be a perfect scenario. I mean to this day I just think Dick has done a phenomenal job. (IV b, line 168)

This individual held views about the change process that contradicted established norms. He knew how important it was to break down the hierarchy and “command and control” management style, for example in hiring a plant manager with no experience in the product category that GC produced, therefore forcing reliance upon others. He had great confidence that the plant could come together, learn and work together. He was visionary, in the sense of seeing the disconnect between what lean manufacturing delivered in terms of results, and what OCM measured in terms of success. And he was pragmatic in seeking to fix this by modeling behavior in the original change at GC (which was discussed in the LRL section) and by staffing his new organization with the resources that he felt was needed for change management. Many of the components of the newly created knowledge, namely, team, lean, and change management were a part of this individual’s mental map and experience and this was recognized by the organization through his promotion.

I think it helped me get it helped me get the job I have today without a doubt I think the again Don Washkowitz with pushing lean so hard he’s made it pretty clear that people are going to get promoted that are showing improvements in the measurements we’ve identified it that need to improve through lean initiatives so from a personal standpoint it helped me there I think it’s helped me it certainly helped me understand operations as simple as I don’t want to overemphasize how simple it is.” (IV b, line 227)
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It is yet to be determined how this will translate or transfer to a new organization. So much of the learning done at GC came after the consultant, the executives and the staff left and was done on the job. And this LRL learning is the social learning that drives the excitement and hope that makes a conversion easier, possibly doable at all given the difficulty and conflictual nature of major process change.

The substantial organizational level learning happened after this individual had moved on. Moreover, while the motives to transfer the lessons may be very powerful, the dimensions of the capability/capacity category are not the same at all. At the new location there will be a totally different workforce, with their own set of experiences, separated physically from the original learning site of GC, perhaps with a different language, one not affected by the lean production terms and jargon of GC, and no personal experience of success in a conversion of this type. This new GM has already hired a lean expert to deal with the technicalities and recognizes that it is the
cultural or team issues that will be the hardest to manage and that are precisely what are being left behind at GC. As can be seen in the schematic of the Network chart (Figure VI) which identifies task type and responsibility by functional group, the FBU Manager is embedded almost precisely in the middle of the activity. However, the FBU manager was not physically proximate, was not a part of the everyday practice of lean, and in fact, was not as close to the knowledge creation at a tactical level as the consultant. He leaves this limited exposure environment to carry the message to a work group who has no experience with a transformation like that done at GC and with whom he has no personal history or connection.

B) A Division “project coordinator” is promoted to Plant Manager. The second story of the transfer of knowledge from the GC experience to other plants is embodied in an individual, a division staff “project coordinator,” who was a member of the core team and had spent about six months on-site during the initial conversion. He has both detailed and conceptual knowledge of how the lean manufacturing and culture change was implemented (see Figure VII). He was sort
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of a handy man, clearing roadblocks back at the division and coaching “coaches” (so named now, formerly known as floor “supervisors”) and floor workers in the new methodology. Following are two examples that are representative of the learnings that he has available for transfer to other locations.

This individual was a junior staffer, though very bright and observant. Of all those interviewed, he was by far the most articulate in describing the need for change and in understanding cause and effect, even though he had not been part of the change process design. He was unusually objective in his analysis, though did not indicate that his understanding was shared or tested by the collective.

Well the key thing is when we first were initially introduced to and started to look at the process of change there was a major issue between where the problem stemmed from and where the problem was. If you would talk to pretty much most anybody in the factory or the office they would say that geez this factory is not doing good and then if you’d ask them well what do you want to change they’d say somebody else is got to do it. Take any factory person and say well what do we have to change, well, ‘it’s the office people that have the whole thing bunged up.’ And if you went into the office, ‘oh well the office guys are doing a great job it’s the factory floor people that are having a serious problem.’ One common thing was that everybody knew that there were issues with the factory and everybody knew that it wasn’t their problem it was somebody else’s problem. So through the change management process and through the training we identified that the first thing that needed to get was to get the everybody in the factory and the office to realize it was their problem not somebody else’s problem, and what are they going to do to change the current situation what steps are they going to change what are they willing to do differently than they did yesterday to make improvements and get rid of these problems.

All right well the attitude change the basic piece of the puzzle is the question of how when a problem occurs or an issue arises how does it get resolved okay and the ownership of a problem that piece is where through this change process and identifying of what happened this ownership of a problem became instead of pointing a finger at somebody became something that said well okay I have control of this problem and it’s part of the whole concept of empowerment. (V B, line 70)
He also was able to provide specific concrete examples of his conceptual understanding and theory building, certainly indicating that he had gone through the classic individual experiential learning process.

Yeah well, I’m sure if you talk to people specifically they’ll have different feelings but in generalities I think that that structure of office factory floor shifts departments job classifications all those very delimited pieces are a lot less defined now if you need to get something done for instance you might be able to not have such an issue between well that’s a factory flow thing or that’s an office person thing or whatever people are more willing to identify that if it’s a problem and needs to get solved that they’re willing to just do what it takes to get it done. (V B, line 54)

So you know what a bobbin is and what a bobbin winder does, okay well, there are small bobbins and large bobbins. They used to be two different jobs the small bobbin guy only ran small bobbins and the large bobbin guy could only run large bobbins. I mean that’s pretty, I mean if you can only do that you’re underused, so but anyway there was an issue that hey we need small and large bobbins and whatever we need to do they need to get done. The guys on the factory floor decided on their own pretty much that there was an issue here and that the small bobbin guy might be able to run some big bobbins and the big bobbin guy might be able to run some small bobbins if the situation occurred that you had to do that. And they were willing to do that on their own and they developed their own rules on how that happens and implemented it themselves. I think that’s great. (V B, line 113)

When asked specifically about what was learned about the change itself, he said that there were many examples and then launched into a generalized discussion of concepts.

Well, there’s a certain piece that if you’re looking at this there’s many dimensions to this, okay. And if you look at the dimensions, one of the dimensions is speed of change okay and the faster that you speed change the more people won’t be able to grasp it at the rate that you’re changing.

I think that there’s a real link to the dimension of speed and how you change people’s attitudes how you change how they do their work how can you change how they accept
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ideas and it has to be you have to push people hard enough that they will challenge themselves but not too hard that they get discouraged. (V B, line 88)

He was asked in a few different ways for specific, concrete examples and this is the most salient, relevant, actually the only, change management learning that was offered -

Yeah, oh well, for instance you don’t need to train somebody for 20 hours on something 4 or 6 hours may be enough but I think that there’s not a generic amount of training, it has to be tailored to the group... and I’m sure Mark [the Division training manager] will attest to this because both of us are on the same page with this. You got to learn and implement, learn and implement, learn and implement, and then you have the core skills. You’re training somebody that doesn’t know PowerPoint. You click through these PowerPoint slides and give this presentation and do all this other stuff. They’re so intimidated. So if you’re going to train somebody make sure that the training amount of time is tailored to the people that can absorb it correctly and then are the materials in a format that they can understand. (V B, line 88)

Another staffer, whose office is about 10 feet away from the interviewee’s office, does, in fact, agree with this. If more people agreed, this answer would have been phrased differently, more like what we find in examples 1 and 2 above, the use of “we,” “they,” “everybody knew,” and the like. This appears to be a linked view developed by an on-site implementer of change and a staff expert of training, who had been involved in the original rollout of the lean training at the direction of the consultant. Moreover, this example isn’t truly a change management component in the way that we are looking at it here. This is more of a tactical decision, though could remotely be related to the question of management decisions about resources, perhaps.

This project coordinator, come plant manager (see the arrow on Figure VII), has clearly been a part of the team and lean development at GC. His on-site personal and direct experience during the critical “unfreezing” period of the project gives him insights into how the fractured, finger pointing climate became responsible and collaborative. He easily connects concepts of lean production, like “no waste” to practical requirements of change, like have work rules that allow bobbin winders to work on either small or large bobbins, depending on customer demand.
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for product. However, his articulation of the process of managing the change is much less robust, being able to cite only one example, which in fact is only marginally and remotely related to the category, and having more of an independent “I” orientation rather than a strong sense of a collective view found in the observations of lean and team.

In looking at the characteristics for this transfer which are below, it must be remembered that there certainly was ongoing day in, day out, transfer of knowledge, by all players who interface with other organizations who are trying to implement change. For example, during the process of this study, the manager of two plants in Mexico visited GC, to learn the dos and don'ts of lean. There was also a “debriefing” session held at one point, which got into lessons learned, which yielded very tactical and frankly inconclusive information about what was learned. Yet, this was an attempt at capturing a knowledge base for transfer to other plants.

In addition to the in situ, informal gathering of learnings about lean discussed above, there was an overt attempt to understand these. A few people mentioned that there was an attempt to capture “lessons learned” in “a two day debrief.” This was a convening of the key staff from the hose division, the CG plant and the sister plant which had used this consultant and process earlier. It was held in the fall of 2000, about one year after the initiative began. It was structured and conducted by the original consultant who had done the original design and management of the change process.

It was posthumously after we went through it. Then we got together and did kind of lessons learned where there was a number of individuals from the hose division and we spent two days debating the lessons learned. And... Well, I think he [the consultant] broke the subject down into: the approach was very aggressive, and some of the teaching on our side from the management level not on the hourly level, was done too quick. The speed in which we proceeded, in other words, when the decision was made to do something there, caused countless hours in GC supporting, removing the roadblocks, assisting people. (VI A a, line 112)
As mentioned earlier, there are exchanges of information where operators and staff from GC go on-site to other plants to teach them how to do lean. This is more training, that which the consultant did at GC, than transfer of created knowledge, though of course, this is hard to separate. And finally, in this same vein, the division staff managers and the business unit manager, in particular, but others who were involved as well, conduct their integrative role, taking top down directives and messing these with bottom up initiatives, they can’t help but transfer both individual and group learnings from GC to other venues. To the extent that GC alters their mental model, they become transfer agents. But in an institutional sense, these two transferees are really carrying the load of moving the learnings, actually their learnings about lean production implementation, to other Group and Division facilities.

What is being transferred is a desire to figure it out and a confidence that it can be done, based on the results improvement and the collectively developed practice of lean at GC. Though these two individuals were not a constant presence in the GC transformation, they had come to believe that it was a sound system and that it was a worthwhile endeavor for the organization. They were all hopeful about the opportunities to improve both the technical and cultural systems through their new assignments. The main question that will be answered over time is whether or not these individuals have or can find or produce the organizational capability, the ease of installing lean and team, and of course the ability to manage change in a context other than the “founding” one of GC.

There is certainly great desire to be able to build the organizational capability to transfer the specific though conceptual learning's from one to another, but little evidence of success. For example, the champion of the GC project, the FBU manager, was promoted to Division general manager and talked about the struggle of bringing along the ideas that were learned in that original project. He couldn’t do it on his own and in fact, throughout OCM there was continuous buying of the expertise.

There’s different opinions in how lean should be and that’s why to me in my organization I hired a lean champion for my staff, whose got a lot of experience in
implementing lean in different organizations in OCM… I don’t know how much you’ve been told about lean but we now have a lean person at every division level, every group level, and kind of, sort of at the corporate level. Well there’s a lot of lean people and they’ve they’re all new most of them the majority of them are actually new hires from the outside. (IV B, line 229.)

This study focused on the transfer of knowledge that had been created in the lean conversion at GC. It appears that learnings that were collective in nature transfer much more easily under certain conditions than individual learnings as in the case of these two individuals. Transfer of lean principles and team attitudes came about pretty easily moving down the value chain to the supplier when engaged by essentially the same group of people who developed them initially. Where transfer is done not by the collective but by an individual, who in these cases was at least one step removed from the “day to dayness” of the learning and change, what is available to transfer is different. Rather than attitudes and concrete experience created during the original change, it is more ideas, concepts and principles that are available for transfer. But these untested, possibly isolated or even inaccurate ideas developed remote from the “whole” experience of change and held by single nodes or individuals seem to have had a more difficult time traveling, spreading or diffusing.
The opportunity in doing a single case study, qualitative research study is the ability to draw out or tease out of the data, the “story” of the domain that is being investigated. Grounded theory analysis enables rich description of the phenomenon and allows the researcher to get at the heart of the matter through the constant comparison method. Using this technique my study has yielded an explanatory model that demonstrates a goodness of fit with the data, “meaning that the categories [are] readily (not forcibly) applicable to and indicated by the data under study” (Glaser & Strauss, 1967, p. 3).

In analyzing the data about learning and knowledge transfer at OCM, a process emerged that describes how social interactions over time and in an iterative fashion enable organizations to change their beliefs and behaviors. Individuals’ actions affect the capacity for change at the organizational level, and in turn this “collective” or “organization” is viewed and considered differently by individuals. This process creates new knowledge which is then available for transfer and which actually gets transferred if properly motivated and skilled. In this section the model for both learning and transfer are presented and the relationship between the conceptual elements of each are explained.

The Emerging Model of Locker Room Learning and Knowledge Transfer

This analysis yields a schema about how and why organizational learning occurs in the context of strategic change, in this case, the implementation of lean production. The key attributes of this form of learning are a) “willingness to adapt” which is based on a construction of the actor as a whole person and b) the act of learning as an interactive process with the environment in which one operates. This schema, simply stated, says that during the process of strategic change, new organizational knowledge which becomes manifest in behaviors and norms
is created through an iterative process of interaction between individual organizational members and the environments in which they operate, the collective. This schema produces hypothesis that are developed in propositions 1 and 2, below, but first I discuss the overall schema of locker room learning.

Schema of Locker Room Learning

The process of learning in the context of change is described using the four categories developed in the previous section: believing, choosing, owning and assessing. While there was formal training at the outset of the change process, attribution of learning came primarily from the iteration of these categories over time. At the beginning of the change people had been told that the objective was to install lean production and a team culture, but many questioned these promises or espoused theory. Based on past experience they believed that management wouldn’t persevere with the changes that initiates like this came and went more like the “flavor of the month.” In order to contribute to the change they would have to “unlearn” this (Argyris, ) which most were willing to do, but based on demonstrated action or the theory in use by “management” or the advocates of the change. They set out to learn the answers to three questions, the answers to which determined the collective’s ultimate disposition to and one could say the success of the change effort. These were

1) Will management and this organization persevere with this initiative,

2) Will this work, is this technology and consulting team appropriate to the needs of our business, and
3) What's in this for me?

In addition to learning the answers to these questions, they, of course, learned the technicalities of the new technical and social system, for example, how to use the Kanban cards and how to participate in a team meeting. But these were not important or even relevant if they didn't have a positive disposition to the change.
The flow of the learning or the directional relationship of each of the elements of learning is indicated in Figure VIII. This change in the production process at GC happened concurrently with operating in a normal or regular production mode. While the changes tended to slow production on some days, the plant was at no time closed. Therefore, it was during normal operations, the day in, day out activity, assignment of work, procuring the correct raw material inventory, etc. that people learned what the change actually meant. This is called “assessing” the practice and is a vehicle for gathering data and is a condition for making some assessment about the change process.

The next step or activity is to consider whether or not the commitment to the change and lean process were appropriate and capable of delivering against the change objectives that had been set out. Here one could either believe that it was, or not. As discussed in the Open Coding Chapter, believing came from either a) the direct experience of the new system or b) from the second hand experience of the reports and actions of colleagues who had had direct experience with the change. If they didn’t believe at first, people tended to keep assessing, observing the everyday performance of tasks and atmosphere in the plant or they just waited. With few exceptions, the most noteworthy of which was the yearend over-production instigated by the incumbent plant manager, people didn’t rebel, and they simply were ambivalent.

Having assessed the situation and concluded that the change process was viable, each then decided whether to stay or leave, whether to be willing to try it or commit to it, or not. Here the belief became a condition of being able to choose to participate or embrace the change, rather than questioning it. Belief, though a necessary condition was not a sufficient condition, as some left even after believing that this was going to go. It is interesting to note that according to the interview data, there was not one person who left because they thought it wouldn’t work. As discussed above, people left because they thought the change would succeed and that it would diminish them in some way.
All of those who stayed, who choose to stay, essentially bought into the change at some level. Some just “complied”; they continued to work and observe the change and most importantly they were open to changing their previously held beliefs and took seriously the change process. They searched their own mental maps, values, and operating norms, and many over time moved to a committed position. The procurement manager whose group had been decimated, who personally was demoted and put off to the side for a period of months, took a long period of time in determining his willingness to embrace or question the change. Others, having chosen to stay, began to operate out of the new belief system, which is the classic indication that learning has occurred. They not only complied by they owned the process. They realized that this was going to go, that the only way to influence it and make it meet their perceived needs was to own the process, to wrest it from the initiators, in this case, the consultant and the FBU manager. So they began behaving like stakeholders and expressing this in the group. And as they did, they de facto, changed the group, or the collective. The change the very environment in which the group was operating. Needless to say, choosing commitment over abdication is a necessary condition of owning the change.
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Simplifying this model by eliminating the issue of staying in the organization, I have the learning flow depicted in Figure IX. Here I continue with the same flow depicted above and include the four major elements. I call this the individual learning process associated with organizational change. This then is the basis for organizational learning which parallels these steps as shown Figure X, just at a collective level, as an aggregate of individuals. It should also be noted that learning is accomplished with each element of the overall learning process. For example, there is learning that goes on just with “assessing.” In the case of an operator, she sees that another operator is having an enlivened, serious conversation with a coach and learns that this can be
done, that it is accepted and that she herself could solicit such a conversation. This, in itself, is a learning experience. This is true for each of the four elements in the model. Individuals and the group cycled or circled through these four steps in learning in an iterative fashion as depicted in Figure X.

Iterative Nature of Change Source and application of logic and emotion regarding change.

First I notice that "owning" and "assessing" are both done in relation to the collective. When one “assesses” they are essentially observing the operation of the plant, the people and the process. When one behaves in an “ownership” manner, this is done in the same way, in relation to the plant collective, or the community of practice. Similarly, "choosing to commit" and "coming to believe" are both done in relation to one’s personal thoughts and feelings. This difference between interpersonal and intrapersonal forms an axis representing the sources of input and expression of belief or conviction that the individual and the collective use in negotiating or navigating the change. Both of these types of processing are required in order to realize the complete experience of learning.

Willingness to adapt.

On the other hand, the “assessment” and “coming to believe” steps have in them the notion of considering, but questioning, the change process. Whereas “choosing” and “owning” the process take on an attitude of “embracing” the change. This describes an axis of willingness to adapt to the change. Together, these concepts form the basis for the learning that is required in a change process. At once, actors interact with their own mental models and those of others in the collective, and they take a position, which may and for many did, change over time, on the degree to which they will personally adapt or adjust.

Obviously, in turn, the intersection of adaptation and locus of interaction defined the state of mind or the learning stage in this model. This is a dynamic model in the sense that on any given day individuals and the organization could be in any quadrant. Understanding precisely
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what determined this positioning is a fruitful area for future research. What I can say from this study is that actors while interfacing with the daily environment and making sense of it, moved from considering to embracing to considering and so on. Not all, but some. This leads us to looking at the nature of the interface between the individual level of learning and the collective.

Proposition 1: Locker room learning is an iterative process of assessing, believing in, choosing and owning the strategic change and is a necessary condition for changing norms and behaviors at the organizational level.

a) Actors and the collective adapt to the change by embracing it and getting involved, or by questioning it and remaining ambivalent (willingness to adapt).

b) Actors and the collective take in and process data from both an intrapersonal or mind/heart source, and an interpersonal or activity of the collective source (source of change logic and emotion).

Interactive Nature of Learning

Like turning cream to butter, individual and organizational learning are catalytic and reinforcing. Learning that generated a willingness to participate in the change was more important than any technical learning about lean production. People changed individually in their willingness to participate through interaction with other members of their community which in the aggregate yielded changes in organizational norms and behaviors. Willingness was contingent on two factors as outlined in Figure IX. One factor was the interpretation of the commitment of the other actors in their community and the second factor was the viability of the proposed changes. The relationship between individual learning and organizational learning which has been long been hypothesized and assumed in models of organizational level learning (Kim, others) begins with individual learning about these two factors. This process of moving from solitary learning to
organizationally shared routines and beliefs is characterized by a chaotic progression of self-generated commitment or ownership by actors, who while interacting with each other on everyday tasks, learn from each other, as they observe and take cues from others in the community.

Systemic and strategic change is predictably somewhat of a chicken and egg process. At a macro level some external force often initiates it, in this case, the inability to compete in the existing market. The firm responds with an action, here a manufacturing improvement program that is designed to make this plant’s capabilities more salient and viable to this very same audience that gave it the input, the market. As the change is implemented results are monitored and adjustments in the plan are made. This is also true at a micro organizational level where the action is driven internally by someone who is the pivot point and catalyst, a change agent or change leader. These change leaders drive and lead the adoption of the new principles. But they in turn react to the affect that the “plan” is having on the organization in meeting the ultimate objective. They themselves come to believe in a way differently from where they began.

In the circle of change, the management team had taken the first step in breaking the old norms by instigating this lean and team process, showing an earnest intent to do what it takes to try to save this plant. Some of the old norms, such as, top down decision making and doing only what you’re told to do had been decried as states of the past. In response, the floor workers at GC showed an earnest intent by attending and participating in the team meetings and offering suggestions on redesign. And it is in the interaction of these responses that learning occurs and as such can also be viewed as an interactive process that begins in one state, cream and ends in an altered state, butter, but only through constant stirring and interaction.

That organizational learning is preceded by individual learning is widely recognized in the literature (Lahteenmaki, 2001). What is acknowledged as being less well understood is how IL turns into OL (Kim, 1993; others). Most theoretical model’s point to IL as being the key input to OL. This study has found that, in fact, there have been changes in the routines and frameworks, the norms and behaviors at GC. Therefore it follows that, if these models are correct, individual
learning must have also occurred. What is discovered here is that the IL that seems to contribute most to OL is about the “promise” of the change. As we have seen, this promise takes two forms:

a) the assurance offered by the organizational environment that this is for real, that there is a serious long-term commitment by the decision makers, be they executives at division headquarters or co-workers at the plant and

b) The potential that the solution offered will solve the problem that they understand the plant to have.

Looking at the key constructs of the story about the GC change, we see the following relationship in an iterative, interpersonal, interactive process where the whole experience determines the learning of the organization, rather than a simple addition of the learning of individuals.

In their own words…

Like cream to butter, you can’t separate the reaction of one worker from the reaction of another, though they are not necessarily the same reaction, they are connected.

And they turned them in [redesigns of work flow] and in no time it was done [ideas implemented]. So I thought, wow, this is all right. So they go on with their next idea and it got the next person thinking and the next person. Floor coach.

A member of the GC staff speaks to the intention to persevere, to not let it “fall apart.” Implicit is the concern that it could easily fall apart, that change is hard and fragile, and not done over night. It is not an event, but a process.

We kept doing it. We kept, as management, we held together and we kept going. We weren’t going to let it fall apart. We saw a good idea. We saw the change that was
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happening and we knew that once the people from the floor saw this change as a positive one that they would get behind it. BP

Actors search for information, they learn, in order to determine if the change is going to be successful, after which they then decide if they are willing to commit or buy-in. Much of this information is conveyed through informal communications on the shop floor, in and around team meetings, and actually in spontaneous discussions in the locker room. This “locker room” or “on the job” learning takes the organization through a shared experience from one way of operating to another that is driven by the friction of the experience itself. While the experience and goal is broadly shared, the tactics may not be. Individuals vary on many criteria - short term versus long term, priorities and speed of implementation, values that influence decisions dealing with fairness and tradition. Reconciling these differences is the friction that elicits the emotion that actually grounds the experience and makes it personal, like the heat of the churning that transforms cream to butter. The learning task was not just about understanding the MARI process or “leaning”, it was about committing to do it, becoming willing, which created its own social rather than technical learning journey. When people started owning the changes and the ultimate success of the new production process, they began collaborating in ways that changed the behavior and norms of the organization, which is by definition OLL or organizational learning. For example, at some point it became more normative to support the change than to question it. The learning process associated with “testing” these promises becomes, itself, the link connecting individual level and organizational level learning. As we shall see in the section on knowledge transfer, it also sets up the contingencies for transferring this organizational level “created knowledge” or “learnings” to other organizational domains or functions.
The relationship between individual learning and organizational learning which has long been hypothesized and assumed in models of organizational level learning (Kim, others) begins with individual learning about these two factors, voluntary adaptation and interaction. This process of moving from solitary learning to organizationally shared routines and beliefs that is portrayed in Figure XI is characterized by a sometimes chaotic progression of self-generated commitment by actors, who, while interacting with each other on an “everyday task” performance basis, learn from each other, as they observe and take cues from others in the community. In this study it is the enactment of the newly created norms and behaviors, using a) lean principles and techniques, called “leaning” and of b) working collaboratively, called “teaming”, that draw together the levels of learning. Individual learning becomes organizational learning through a process of conversation and action, challenge and conflict, hope and frustration. Thus it is the actual practice of the new norms that connects individual and organizational learning (see Figure XI).
Proposition 2: The interaction of actors with the environment and the environment with the actors collaborates to create new knowledge making individual and organizational learning catalytic and reinforcing.

a) Ordinary everyday interaction among organizational members during the change process, creates new understandings (learning) and feelings that tend to unite or bond the group or organizational unit (cohesion).

b) The more frequent, candid, and visible the interactions, the greater and quicker understanding and emotional cohesion are created.

c) The more visibly successful and continually supported the interactions, the greater and quicker willingness to learn and commit will develop.

Locker Room Learning as discovered in this study and constituted in this analysis is more appropriate in some contexts than in others. LRL is most useful where there is a collective task which is changing and where the in-place people will be responsible for the success of the change. In this context an embedded workforce must re-examine it’s mode of operation, attitude and interpersonal relationships relative to job performance. This requires examination of long held views and normative behavior, much of which may be held as tacit knowledge. LRL, by its interactive and iterative nature, brings this knowledge to the surface making it available for the change and learning process. Unlike declarative knowledge that may need to be learned by groups or collectives, like new case law or changing industry practices, process knowledge requires agreement or buy-in in order for implementation. Further, process learning requires ownership by the collective in order for it to be sustained within the collective. Process change, then, is another dimension of useful application of LRL, one that captures the notion that LRL fits well where both cognitive and emotional capabilities are needed for the change.
Finally, the longer the process chain that is affected by the change, or the further apart the mental models of the elements of the process change, the more important LRL is to successful learning. Examples of these contexts are: outsourcing of functional areas like information technology and customer call centers, supply chain management, and lean manufacturing. It requires the involvement of many people over possibly a long period of time. It demands that people operate on an emotional as well as cognitive basis and interact with each other as they perform joint problem solving and idea creation.

Transferring Learning that was Created in an LRL Process.

At GC these learnings, of lean and team, were used in or transferred to other situations or contexts. In Figure XII the general model of the transfer is presented. The success of the GC experience was thought to be worthy of doing more, the same way. Even though there were some naysayers, particularly at the Division Staff, which had originally been charged with transferring the learnings, there was a period when the experience was considered to offer benefit and was thought to be transferable to other areas. Opportunities to take lean and team to other places were sought. For example, the manager of two plants in Mexico, which were in the same division, came to GC looking for ideas. But the main areas for transfer are those listed below, which were discussed in the results section. The main vehicles for transfer were the GC workforce and the promotion of managers to other, broader responsibilities. In the aggregate the variables upon which these strategies depend are the 1) the motivation to apply these principles elsewhere and 2) the ability to enact these learnings this newly created knowledge in other places (see Figure XII).

The key transfer characteristic that comes that comes out of the locker room learning process as we look at each of the learning events in the context of the conditions for transferability is the bonding of the actual experience of learning or construction of knowledge. This bonding creates boundaries. The phenomenon that affects transfer I call bond-aryness and
is based on the experience of locker room learning that demands candor, honesty, and difficulty in the constructing the new knowledge that will subsequently be transferred.

**Bond-ary of locker room learning.**

Figure XIII depicts the transfers that were reported. Here each of the applications is plotted relative to the degree with which they met the conditions of transferability that came out of the data, motivation and capability. The motivation index runs from high to low indicating an overall sense of the “involved” worker universe to participate in and carry out the change. And the “capable” index reflects a sense of the ability of the “involved universe” in enacting the newly developed norms of “lean and team.” What is striking is the axis that is created by positioning each of these events against the transfer conditions. Starting in Hi-Hi quadrant with “procurement” at the top left, running to the Low-Low quadrant with “other facilities” at the bottom right.
Looking at this continuum, there is a key distinguishing characteristic about the how and the why of the knowledge transfer. This is the number of actors, or better, the percentage of actors who had been involved in locker room learning at GC and who are now involved in the transfer. In the procurement situation, the bulk of the “involved” actors were people from GC, both floor workers and staff, all of whom had gone through LRL. In the case of implementing lean production in other facilities, the bulk of the employees had no experience with LRL, in fact, it was most often a single person going into an embedded organization. The FBU manager went into to a division which was comprised of hundreds of essentially in-place workers; the staff manager promoted to plant manager had about two hundred people and the service manager promoted to VP Manufacturing had just a few subject matter experts, but worked in a heavily matrixed fashion with many other staff and line operating people, most of whom had no LRL experience.
This correlation of experience with LRL to the conditions driving success in transfer means that in short “you had to be there.” And this is particularly true for a learning process that revolves around “believing”, and “owning” rather than simply “understanding” propositionally or declaratively. And the change process, in order to be sustainable after the experts leave, after the initial rush of excitement, after the easy improvements have been achieved, relies on learning that engenders ownership. As one GC manager said, “they” meaning management and the consultants weren’t even there when the real stuff happened.

When the outsiders left, is when the real deep level learning occurred at GC. This is when the change was owned, when this plant as a community grew up and into the responsibility of implementing “lean and team”. And this is when the badges of common experience, were passed out, metaphorically, of course. But you had to be there to get one, to be a part of the bonding process (Figure XIV).

In order for knowledge, as opposed to information, to transfer, it must be engaged, recalled, made explicit or carried. It must be proximate in language, function or geography, though not necessarily come out of the same “mental map” or revolve around a shared vision.
This study indicates that above all, you simply had to engage, you had to be there. It was not something that could be mailed in, taken in an online course, at least not independently. The dynamic nature of the learning, the spontaneity of the day to day involvement produced an emotional or affective connection. This emotion that is associated with locker room learning, with having the “badge of common experiential learning,” makes it easier to port or transfer knowledge to new domains using the original actors. And by the same token it creates barriers to transferring to “outside” organizations.

There were many emotions exhibited throughout the assess-believe-choose-own LRL cycle. People not only spoke of them during the interviews, but some relived them. Many practically came out of their chair as they talked about how the culture and behavior changed. Another leaned back, as though tired, when recalling the transition period where machines were moved and each carefully recalibrated by an undermanned staff (which consisted primarily of himself) unconsciously reflecting the heavy weight of the work and perhaps the responsibility he alone felt. Some of the more prevalent emotions that made their way into the coding scheme had to do with the trust that developed over time enabling actors to believe in the new system. They came to trust that managers were going to stick with this new manufacturing and teaming process and that the process actually delivered performance improvement. This change in emotion from the deep division between floor and office workers was profound and in itself energized the organization. From executives to floor workers, interviewees’ eyes lit up when they talked about this change.

Other examples of specific emotions are the excitement over the success in the shipping department and at the same time disappointment or sadness over not having more change involvement in other departments. As the redesign was occurring, there was a tremendous pride of authorship about the new layout, the problem solving and lay engineering undertaken enthusiastically by some of the floor workers. Some were angry when they realized that they couldn’t operate as in the past, by simply “barking” orders and at the same time others spoke of changing from negative to positive anticipation of the day as they drove to work. And finally, as
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the intense focus and activity of change began to fade, some spoke openly of fearing that "management" might take their eye off the ball and not keep looking ahead. Anger, fear, excitement, sadness, joy, the lubricating oil that made learning anything but a mechanistic process. As people became more authentic and disclosing with each other, this oil not only made things run more smoothly, but it also became a connector of the various parts, people. While the specifics of the tasks and process, the cognitive learning of lean and team, were somewhat different depending on your role and responsibility, the emotions were held in common. Smiles or frowns as you passed each other in the plant or office, sharing about your family and weekend plans at the end of the day offered a universal connection. Not only did these emotions lubricate, but they actually energized the process, they became a force in the learning process. When an idea was challenged, anger and frustration often developed. This drove people to use the techniques of team to try and resolve differences. When improvement was made and some were excited, it drove people to ask questions and try to use learnings in their own environments. It is the emotions that distinguish LRL from typical modes of "learning about", learning about something that's out there. LRL is very personal; it is at once agitating and exciting. It is this personal attachment to and embeddedness in the learning context that influences the ability for it to be transferred.

As we noted the population of the low-low and hi-hi quadrants, we note the absence of events in the Low-Hi quadrants of the conditions. This implies a strong correlation between motive and capability. Therefore, learnings that have been created through LRL seem to not transfer to widely varying contexts or through widely varying methods. The procurement group at the plant used the same process of involving the vendors, face to face meetings, as did the consultant in involving GC personal in the lean design and implementation. This resulted in incremental improvements in contiguous value stream processes. Likewise, the FBU manager who ported "lean" manufacturing to the other facility, hired a lean expert for his staff, which is similar to bringing in a consultant, which had been his major responsibility in the original GC change. This is also seen at the management level as discussed in section 5 in the description of
the promoted FBU manager. It is as though the original experience created a positive motivation and a finite set of capabilities that were not extended far beyond ones point of view, historically. There were no real breakthrough changes that came about as a result of the transfer of knowledge. Allotropy - The existence, especially in the solid state, of two or more crystalline or molecular structural forms of an element (American Heritage, 2000, p. 48).

**Proposition 3:** The LRL process aids the transfer of learnings that are allotropic in nature (functions within or nearby the original “involved” organization or collective), and inhibits transfer to “outside” organizations.

a) Motivation and capability to transfer newly created knowledge or learnings are positively correlated in the transfer of organizational learning.

b) The cohesion that results from locker room learning improves the likelihood of successful transfer to other contexts when done by the original organizational unit.

c) The cohesion that results from locker learning restricts the ability of any single individual, to comprehensively transfer the learnings and the learning process to another entity.

*Organizational learning transfer sustains learning in the originating entity*

As I have noted, learning in a change process has a voluntary dimension, namely the willingness to change. People move between questioning and engaging in or embracing the change. This “believing in” and “choosing to commit” is both a cognitive and emotional process which can change in disposition regularly if not daily. This study revealed that the point in time that GC chose collectively to commit to the change could not be identified. This question was asked specifically and people said “it just happened.” Some said it happened at the beginning, some said after a year or more of working at it. There were also varying opinions on how far
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people had come collectively in committing to the change process from its inception to one year after it started. In Figure IV we saw that those closest to the change, the machine operators, saw the least difference in the commitment level, 30% and that it steadily progressed across functional groups to those furthest from the change, the division staff heads, who perceived the greatest difference (72%).

Many attributions could be made about this difference, but what are germane here are the size of the gap and the pattern of variance between those closest to the machines to those closest to the planning of change. This difference indicates the lack of visibility into the collective mind. I don’t suppose that any one group is necessarily “correct” in its assessment of the commitment difference, but take at face value the fact of the difference. This disparity is actually a difference of perception since there is no “hard” data that indicates the change in commitment level. But it is a statistical or mathematical representation of perception. And what this says is that the further you are from the change process, the greater your perception of the change in willingness to carry out and continue the change. Or put another way the less concerned you are that the commitment to the new process will continue. The Division staff heads see a massive “winning over” or unlearning and relearning by the GC plant. However, the shop floor sees a minimal amount of change, perhaps not so much that they couldn’t go back to their old ways. And in fact, some have taken their name off the board of “commitment” that they had signed during “shock and awe”. The learnings that created the change will not sustain if the perception of what is working and what is in my best interests, the questions asked originally by the workforce, becomes negative. The locker room learning model indicates that organizational level learning is complete only if there is a collective ownership of the change goals, process and measurements. If this ownership is abandoned, the organization is likely to abandon the learnings or new knowledge that was created.

The most successful transfer that was discerned in this study was the extension of “lean, team and trust” to the supplier community. In this case an external organization, in fact multiple different companies, learned how to operate their portion of the value chain, in alignment with the
new lean production method. The several GC people involved in this, the procurement manager and the operators, essentially worked these organizations through the same LRL process that they had used, emphasizing the same principles that they had learned and installed. In this they found willing partners, even under the sometimes difficult circumstances of disagreements about quality or timeliness of delivery. This describes the allotropic nature of the transfer as laid out in proposition 3, where a second organization benefits from the learning done by the original entity, in this case the GC procurement people. But there is also a benefit to the originating organization of the application to and acceptance by a second party.

As a result of this transfer, the choices of the GC personnel, those that they had made previously, such as to commit to and own the lean improvement project, were validated. As they included, these outside “partners” in co-creating a best fit, joint process, they reinforced their own understanding of the original learnings. Additionally, as this downstream function aligned to their new technical (manufacturing) and social system (teamwork) it tended to lock in their own practice in order to maintain the mutually defined interface, namely, tasks, routines, decision making. In fact, this worked so well that a Corporate, OCM-wide purchasing system that was under development went back to the drawing board to incorporate some of the principles that came out of this procurement partnership at GC. The perception of many stakeholders, outside suppliers and OCM executives alike, embedded the “rightness” or “goodness” of the new operating principles. These in turn created the confidence and perhaps pride of the GC personnel, at least those who were involved in the procurement function, that their choice to own lean and team was correct or at least perceived well. This reinforcement embedded the new learnings both structurally and attitudinally. Because the organizations had aligned the new procurement process across organizational boundaries, Structurally because GC was committed to these protocols that were based on the learning or knowledge developed in the original change project, Kanban, takt time, team forecast and so on. And attitudinally because the GC actors believed that they were positively perceived, a desired state, for instituting the new procurement plan which was based on learning from the original project.
At the same time we look at the use of the new lean and team principles in the two examples of non-production transfer, the vending machine vendor switch and the rearranging of the office layout and see a counter example. Here while both changes were made, there was no indication that they inspired other changes or reinforced the notions of using these learning in a different context. The fact that these transfers were tried, but were only moderately successful, created a less than positive perception and did not reinforce further use of the learnings.

The multiplier effect of knowledge transfer based on the opportunity to get validation varies depending on the complexity and scale of a firm. For example, in a single-plant company, transferring the newly developed knowledge across the boundaries of the firm, inter-organizationally, or across functional boundaries like the accounting example at OCM are the only ways to multiply the value of the original learning and getting the synergistic effect of sustaining the learning in the original plant. But at multi-plant companies like OCM the transfer could be from one plant to others, as was the expectation for GC. The actors at GC knew they were one of the first to undertake this change and that it was expected that others would follow. When this didn’t happen to any great extent, not only did the benefits not accrue, but it affected the mindset of the people at GC. They began worrying that the progress would not be maintained, that others may not believe that they did a good job with the change effort and so on. This was particularly important since the organization had used precious capital on GC and the results were expected to benefit other organizations. This tended to support their initial fear of bad consequences that might accrue if learning was not successful. So while a multi-plant tends to have the organizational slack (capital and human resources) to support a change of this nature, not meeting the expectation of spreading the benefits of the investment can undermine the original sense of accomplishment in implementing a change. Strategic change is known to be difficult to maintain, it is a dynamic system and has a rubber band nature. This contributes the fragility of measuring organizational learning by looking just at the learning core. This study indicates that a better measure of stability of the learned experience is whether or not it has transferred to another operating unit.
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Past theory (Argyris & Schon, ) has emphasized the change in norms and behaviors as the measure of learning. This work indicates that learning in a change environment is a fragile proposition. While these commonly held measures of organizational level learning provide an instantaneous measure of learning, it does not offer an indication of sustainability or long term use of new knowledge (learnings) created through a change process. This work introduces transfer as a mechanism for measuring the extent of learning in an organization.

**Proposition 4:** When new organizational learning is transferred to other organizational settings it is more likely that the originating entity will continue to practice the learnings.

As a footnote to the sustainability of learning's, there is a data point gathered eighteen months after the end of the original study. Despite significant operational gains made under the four years of the lean initiative, OCM has decided to close GC plant. The reason for the closure were several: continued low demand for hoses, increased productivity (due in part to lean initiatives elsewhere), and the purchase of a competitor with a similar product line.

There is no data to indicate that the closing of the GC plant invalidates the benefits of implementing lean production. First, it meant that the plant was kept open for four years (rather than closed in 1999 as some in top management had advocated). Second, OCM management remains strong believers in the benefits of lean, and indeed has stepped up their strategic commitment to do lean in all of OCM's facilities, and across many functions beyond production. For these efforts, many lean experts are being hired into staffs and use of external consultants has increased as well. If anything, the GC experience, if understood, provided information about installing new processes and managing change that would aid subsequent changes.
Chapter 7 Conclusions

What is most interesting about this study is the insight that it gives us regarding the social and emotional component of both the organizational learning and the transfer processes. This research is specifically about learning in the context of change, and then leveraging this learning to other opportunities for improvement in the organization. Understanding how and why this comes about has broad relevance since most higher-order or non-skill based learning in organizations comes about as a result of change. The forces driving the increasing need for adaptation and change are both exogenous, such as a new technological breakthrough like the internet, and endogenous such as the need to drive out production cost and upgrade business effectiveness as we have been experienced at our study site, OCM.

The messy work of organizational change, as David Nadler calls it, has long been viewed as one of the most complex challenges facing any organization (Nadler, 1998). These findings underscore the need to consider the human dimension in all changes that affect the workforce, and even the most technical of changes DO affect the workforce. For individuals and organizations to learn and embed learnings into a long term operating protocol, actors must be engaged emotionally. Change may start with some strategic goal, that is tactically supported by a new production machine, process or procedure, but it ends with people being willing to learn, to engage and own the change. And for this to happen, learning and “passing on” or transferring learnings (newly created knowledge) must be desirable, supported, and rewarding. In short, sustainable learning and change comes about only if people engage both cognitively and emotionally.

Analysis of this single case study of lean production implementation indicates that a) there is a type of learning that comes about through an iterative process of everyday engagement in the environment, b) that this interactive process is a necessary condition for organizational level learning and c) that the interaction of actors with the environment and the environment with the actors collaborate to create new knowledge, or what are considered learning of the
organization. The key to this learning is its social rather than technical character. I call this locker room learning (LRL) and it includes both individual and collective or organizational level learning and is essentially double loop learning in the specific case of organizational process change. That is to say, it results in changed behaviors and norms, as people negotiate the dimensions of a) developing and expressing their beliefs and b) determining their willingness to adapt.

The major contribution of this work comes through the examination of the relationship between knowledge transfer and organizational learning. The results indicate that in order to transfer the learnings achieved during LRL, in this specific study meaning the lean production implementation, two conditions had to be met; actors needed to be a) motivated to pass these on, and b) capable of doing so using some combination of proximate language, geography, function, and time. These “conditions of transfer” in themselves were interesting but not surprising.

But an additional theory that surfaced, about the relationship between LRL or organizational learning and learning transfer, was unexpected. First, it appears that the “bondaryness or bonding of the actors that occurs during LRL, aids transfer of learnings to other functions within or nearby the original “involved” organization or collective. But the converse is also true. For entities or organizations outside the group that created the knowledge or too far outside it, transfer is inhibited by this same bonding phenomenon. And second, knowledge that is transferred by the group tends to validate the work done in creating the knowledge which leads to greater sustainability of the learning and change.

This section discusses 1) the contribution that this research has made to the organizational learning, knowledge transfer literature and change management 2) limitations of the research, 3) directions for future research, 4) the questions that arise as a result of this study that bear future research, opportunities for improved practice based on the research findings.

 Contributions to the Literature

There are three main ways in which this work contributes to the field. First, the key contribution of this study is to provide a more detailed theory of Organizational Learning Transfer.
Past work has developed in two separate domains, organizational learning and knowledge transfer. This work addresses a) the transfer of newly developed knowledge (organizational learning) rather than existing knowledge such as “industry” best practices, b) the transfer of newly developed knowledge by the knowledge creating entity or organization, rather than by a third party such as a consultant or trainer, and c) the implications of a transfer the relationship between creating and transferring self-created knowledge. Second, this research refines the often discussed but vaguely described link between individual learning and organizational level learning. This link is reflexive in that 1) what the group thinks, knows and does, affects the mental model of the individual and 2) what the individual thinks, knows and does, particularly during times of change and heightened awareness of or attentiveness to group norms, affects the group. And thirdly, this research provides a context specific view of learning during a change process and defines a condition for organizational learning that has not been discussed heretofore. As such, this study contributes to at least three streams of research, organizational learning, change management, and knowledge management, specifically knowledge transfer.

Transfer of Newly Developed Knowledge

The ability to develop new knowledge or what I call “learnings”, that is held at an organizational level, either in the aggregate or as a distribution of individual but connected nodes, and then transfer this is a relatively unexamined process. Theory that addresses this phenomenon has grown up in two different fields or paradigms. On one hand, theory has been developed about how an organization learns which has basically been driven by organization behaviorists (Lahteenmaki, Toivonen, & Matilla, 2001). In a separate exploration, theory has grown up about knowledge management, which begins with the creation of knowledge, and ends with the transfer of knowledge, which is also talked about as diffusion. This domain has been developed primarily by information scientists (Yoo & Ifvarsson, 2001). The former domain looks at new knowledge as the outcome of an organizational process and the latter looks at processes
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by which knowledge can be essentially used and optimized. The knowledge creation process (learning) has been addressed primarily by innovation theorists and the management of knowledge by the information scientists who look at the knowledge as a “thing” as a “black box”. This research offers two new perspectives. First, in contrast to the “black box” perspective, I find that “what” and “how” the knowledge was created is relevant to the transfer process. And second, our analysis indicates that sustaining the changes brought about by the learning, over time, depends to some extent on the very existence of the transfer of the learning to a new environment. This finding suggests an alternative measure to what actually defines organizational learning, or how do we know when an organization has learned. The commonly held view that we know this when we see changed norms and behaviors is more an indicator of instantaneous learning, or learning at any given point in time. Learning that is transferred tends to embed in the originating organization and therefore would be a better measure of learning that can be expected to be sustained over the long run rather than only in the moment. Together these findings suggest that in order to provide an actionable and useful theory, the relationships between these domains must be better understood.

The Reflexive Relationship between Individual and Organizational Learning

It is impossible to separate the individual learning from organizational learning, and it is almost as difficult to describe the interaction of these two phenomena. This work through its conception of locker room learning defines this transformation of individual learning into organizational level learning. In the most robust, comprehensive and oft-cited model of OLL, Kim argues that while we know a great deal about how individuals learn and we know much about how organizations learn, we don’t really understand how individual learning directly becomes organizational learning (Kim, 1993). This research suggests that this is accomplished through an interactive, interpersonal, sometimes chaotic process. Iterative in that many cycles of implementation experience are undergone as the new knowledge is created. It is interpersonal in
that the experience is a result of the interaction of individuals with and in the collective. And
chaotic in that the moment at which individual learning can be said to be organizational learning is
unpredictable in timing and source defining as people, logic etc., specifically the results of
implementing the change, which is how we know OLL has occurred, come about
improvisationally and largely uncontrollably. And it is these results that act as a strange attractor
for individuals as they choose their level of commitment to the change.

Understanding this helps to explain why there is a considerable amount of emphasis in
the literature on “creating” a learning environment, setting up learning labs and looking at
communities of practice. Senge’s action research has led him to the conclusion that building the
right structure, as in his five disciplines, will engender OLL, but this study is the first research that
articulates why this might be, namely the unpredictable nature of what is “learned”, by whom,
when, and most importantly, from whom (1990). This social process of learning in and from the
environment or context is what I call “locker room learning” or LRL. LRL, with all of the
uncertainty inherent in social, collective processes, stands in stark contrast to classroom learning
with its high degree of control and predictability in choosing not only what will be taught, but doing
this in a fixed formal declarative or propositional style.

In addition to further explicating the Senge/Kim view of OLL, this emerging theory of LRL
extends the “community of practice” view of learning. Lave and Wenger have theorized a form of
learning that is situated in nature (1991). Their key notion is that “participation in social practice is
the fundamental form of learning” and that this learning comes about through an evolution of
participation from “peripheral” at the beginning to more engaged and complex as the
“relationship” in the community develops (1991, p54). This theory is very similar to LRL;
however, most of the community of practice work positions or situates itself as promulgating an
embedded or existing practice, or sharing a best practice. This study extends this concept to the
domain of the joint development of new knowledge that is situated in the context of change.

What is seen in this social form of learning is the role of “the other.” The major
understandings were developed as people related to each other in a variety of ways. Learning
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was done when the floor worker asked the "coach" a question about the new system, in real-time, on the plant floor, where all could see. Learning was done when an individual noticed that the roll of wire was set out of her way (by another worker) which made it easier for her to be effective in her task. Learning was done when an operator watched other workers design new ways of laying out the floor, during their breaks. Learning was done when floor workers went into an open office arrangement that was highly transparent, to talk with staff experts about a problem. All of these practices have a relationship component and a communication or talking component, whether verbal or by action, where intention and mindset, are visible. Moreover, there were often three parties involved: 1) the learner, the teacher or teller, and 3) the “organization” or collective that was observing the discourse. In this study, it was the visible representation of what one thought and felt that allowed people to “believe” in the project and ultimately “own” the change. This could also be considered to be explicit versus implicit but that terminology seems less defining. For example, is the worker’s care to keep the wire roll out of the way implicit (tacit) or explicit? It is surely visible among and between the social entities.

At its heart then, LRL is about talking or communicating through action. It is the glue, the connective tissue of organizational learning and is hardly discernable from the work process itself. Boden puts it this way (1994).

*Talk* is not “micro” nor are organizations “macro.” The micro-macro distinction is neither empirically observable nor theoretically sensible, though it is certainly useful methodologically. Reality is a seamless web of actions, reactions and inactions... it is human agents who must select out relevant aspects of immediate structure and distant history.

Separating action and structure may thus be more an analytic academic exercise than an empirically grounded strategy. Action and structure are not simply mutually enriching and complementary, as Merton once suggested; they are one. Action creates and builds on patterned practices. In so doing, discrete human activities and the intersubjective achievement of meanings they trace take on retrospective rationality and stability. The essential accountability of action
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locates individual interpretations in the wider social arena, thus creating community out of
moment. The issue here is not one of incorporating the “individual moment” into some collectivist
whole. Institutions are talked into being in particular moments and at relevant historical
conjunctions; the relevance is a local matter, the consequences may be global (Boden, 1994,
p214).

In the same vein this work also elaborates and nuances recent theory on “conversational
learning” (Baker, Jensen, & Kolb, 2002). Here, conversation, which is a more circumscribed form
of communication than discussed above, is in the center of the learning process. In this model,
learning is “a )group process based on team members’ own meaning-making of their
conversational interactions that can encompass the full range of cognitive, perceptual, and
feeling-oriented expressions underlying the experience of difference” (Baker, Jensen, & Kolb,

There are three key assumptions that recur in their analysis that will be taken in turn and
discussed in light of this study, indicating the distinctions or variances that our theory suggests.
The first assumption addresses an orientation to learning.

A first assumption is the assertion that human beings are fundamentally a learning
species guided by curiosity (Freire, 1994), by our very human ability to wonder. Our
orientation toward learning is enacted through conversation that exposes both our
individuality and our ability to construct joint understanding with others.” (Baker, Jensen,
& Kolb, 2002, p.150)

This is congruent with my research; however, it is too narrow in two ways. I found that 1)
in addition to curiosity as a motivator, we also saw “fear” as a reason that people learned about
the change and other’s disposition toward it, and 2) two-way dialogue or conversation is just one
“vehicle” used for learning social learning. Action and observation are also routes to learning.
For example, if I draw my ideas on a piece of paper, in clear view of others, I soon find out or
learn, what the group or others think or feel. If I see someone purposely moving material out of
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the way to make my job easier and the plant safer or more efficient, I learn or get a sense of the disposition, intention or mental model of that individual.

The second assumption is about the role of conflict in learning.

The encounter of difference in conversation is essential for learning: It is bumping up against difference that can stimulate curiosity, our drive to learn, and our ability to actively try to enter each other’s experiences and perspectives. Indeed, from this perspective learning without the experience of difference is impossibility: Difference exposes us to an awareness of what we know and don’t know, without which we cannot imagine alternatives… (Baker, Jensen, & Kolb, 2002, p. 150)

This is precisely what happens in the circle of learning that produces organizational knowledge as well as individual knowledge as proposed in the LRL model. The “adaptation” axis of LRL indicates a transition between “questioning” which has an implied lack of common perspective and “engagement” which indicates an acceptance of if not sharing of a common perspective. The idea that mental maps and values need be shared to be enacted is disputed by this study. As Granovetter offers, models of economic action that suggest that individual behavior is a result of internalized “dictates of consensually developed systems of norms and values” (p. 485) paint an “over-socialized account” of individuals that ignores individual utilitarian interests. Between these positions is the “bumping up against the difference, both intrapersonally as one transits believing in the change to choosing to commit, and interpersonally as one owns the change and that is enacted in practice as depicted in the LRL model.

And the last Baker, Jensen, Kolb assumption relates to the conditions that enable learning as follows, “… concerns psychological safety and relates to how we experience and explore difference. A team with conversational space where we feel safe, trusted, respected, and able to make mistakes is one where we are more able to connect and enter each other’s experiences.” (Baker, Jensen, Kolb, p. 151)
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I have called my learning model “locker room learning” which could imply a need for the psychological safety for being in a safe place, namely the private area for the workers as opposed to the staff, but that is not a key attribute of our model. In fact, LRL has many loci which provide varying levels of safety - on the plant floor, in the open, between supervisor or coach and the floor worker. It is done in the team meetings which are held in the open and in the staff offices, where anyone could walk by and overhear the conversation. Certainly no one wants to be rejected, to have their thoughts and ideas rejected, but some of the most influential dialogue, was that done in the open, where actors were not sure how their ideas would be received. It was influential because it indicated a posture or attitude of willingness to learn and change a willingness to take a risk when it actually was a risk, when there was not safety assured. This did more to move the organization toward commitment than any other experience. It is, of course, desirable to enter the “other’s” experiences and our research indicated that this was experienced. However, in reality it is much more common for actors to observe affect of their cohorts rather than gain understanding of many other people’s experience. HERE Again, my work indicates that having conversational space can help enable actors to connect to each other's experiences and most importantly motivate behavior that operates out of the new, unsafe process. But the idea that this could be planned as implied in the structural element of “conversational space” is not part of the essential learning of this study.

Learning in the Context of Change

Thirdly I provide a context specific view of the Dixon (1998) and Kolb (1978) models of experiential learning and develop a necessary condition for change that has not before been addressed in the literature. It appears that the process of making individual learning into organizational learning is very similar to that of either the individual (Kolb, 1978) or the group (Dixon, 1998) learning process in that the same issues of adaptation and locus of focus have to
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be negotiated. I have also found that learning is conditional on becoming willing to learn which as a concept has emotional as well as cognitive implications.

*The emotions of learning in the context of change.*

Specifically, relative to Kolb, the data analysis indicates that the emotion of change, understanding it, understanding how others view it, how to adjust to it personally, how to express and so on is an important change context variation of the classic experiential learning model. This is indicated in Figure XV with the pairings of LRL model on the left and the Hay Group representation on the right (Kolb & Boyatzis, 1993). The change indicators from this study replace value with assess, think indicating cool logic and analysis with believe, decide with choose, and act with own.

This is more than semantics; it is an indication of the interactive, social nature of OLL. For example, while an individual constructs a model (thinks) about her experience as described by Kolb, what constitutes learning in LRL is the leap of faith that some take, "believing" the thoughts of a colleague rather than having direct experience of the thought process. For example, at GC, the finishing department was the first group to experience the change. While all were trained and knew the expectations, most came to believe not through direct experience with the new "lean" production process, but by seeing that their colleagues had developed a confidence in its workability.
In addition to these four categories of learning being comparable, this analysis shows that the defining axes of “learning during change were also similar. In Figure XVI the Kolb model (in bold) is compared to the model generated in this work (Kolb, 1984). Kolb posits that the “simple perception of experience is not sufficient for learning; something must be done with it… transformation alone cannot represent learning, for there must be something to be transformed” (Kolb, 1984, p42). In “strategic organizational change” the “transformation” becomes a willingness to adapt, recognizing that the task in change is alignment (perhaps acceptance rather than “shared view”) to the new. This is a new way of construction the conditions of change and adds to the change literature. This means that simply acting on new technical data will not in itself lead to change.

In the LRL process, learning developed from the everyday experience (source or taking in and expression), alternately within self and within the collective. Grasping the experience likewise is the input or data generating component of learning. Again the looking at learning in this specific context it becomes clear that there is both an interpersonal and intrapersonal
element of experiencing in an organizational change process. There is constant alignment between the collective norms and behaviors and the individual mental map. Often these are slight adjustments, almost imperceptible, as when slightly turning the wheel when learning how to ride a bike. But through the iterative interaction of the adaptation and the experience axes, learning and change develop.

*Linkage between action and outcome in the context of organizational change.*

In addition, Dixon’s model of “common knowledge” is grounded by this work, as indicated in the model in Figure XVII (2000). This cycle described as “creating common knowledge” is an extension of Dixon’s work on organizational level learning (Dixon, 1994) which presented the organizational level counterpart to Kolb’s experiential learning. This theoretical framework postulated that as individuals learn in a cyclic process, through experience, so do groups. The components of this model of information are 1) generation, 2) integration, 3) collective interpretation, and 4) taking responsible action (Dixon, 1994). This organizational learning process is the basis for the development of what is termed common knowledge in Figure XVII.

It is this “Common Knowledge” model that is validated and illustrated by the fact that some of the knowledge that was developed in the lean implementation at GC became common, primarily through LRL, and some did not. The exploration between action and outcome was at best meager and underdeveloped outside of the context of LRL where everyday practice was the
vehicle for exploring “lean and team” action and outcome. As for the learning relating to
managing the change process itself, that which could make subsequent changes shorter and
more cost effective, little carried over. There were many opportunities to capture and distill the
learnings in a way that they would become a part of institutional memory rather than individual
memory. First the division staff and their GM had proclaimed that this kind of learning and
transfer to other division facilities was intended. The data indicate that a two day session was
held for this purpose, run by the consultant and attended by a handful of participants in the
change. The most significant finding that was related in the study was that they may have gone
too fast or too slow and had too many charts or not the right kind of charts in the training session.
What were more common than a collective view of the double loop learning at the organizational
level were independent conclusions that were not tested or validated by the collective.

This leads to the second way in which the relationship between action and outcome could
have been explored. A component of the team culture was a push down of responsibility and
decision making. Any of these individuals who articulated their personal view of learnings about
change could have, in the spirit of ownership, made this a discussion, brought it to the group,
which they had done relative to lean and team. But this had not happened. This could be for a
variety of reasons including expectations that were different about owning the change process
versus owning the lean conversion process. It could have been because there was no time or
perspective or motivation. And the third natural vehicle for capturing change dynamics was the
weekly team meetings. Again, this didn’t surface in the study results. While there were many
metrics in the air about the operating performance improvements, there was no measurement
discussed in the interviews or in any of the several OCM presentations and other artifacts that
were examined. The “interpretation” phase of Dixon’s original model of organizational learning did
not develop collective understanding. There is no reason to think that this is atypical and may
point to this reflective investigative process that connects action to outcome as the weakest link in
developing common knowledge.
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The domains that became common knowledge were those where expectations were established in the beginning, in this study, learning lean and team. The learning about the change process itself, areas like goal setting, resource management, and others, never became knowledge held in common, though several individuals had ideas about how to improve the change process. This individual level learning can be thought of as nodal learning, as new knowledge that one has acquired that was a direct result of learning from the GC experience. For this to contribute to “organizational level” learning it would need to be connected to other nodes of knowledge to create some knowledge that the organization holds in a networked rather than aggregated fashion.

I recall the depiction of the various categories of actors arrayed into a business operations space that indicates their range of responsibility and task type (Figure XVIII). I notice that at the center of this intricate network of mental maps, jargon and experience are the consultant and the FBU
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manager. Not only did they have the greatest degree of what network theorists’ call “betweenness”, the attribute of linking unlikes to each other, but they also were the drivers of the change and had been the planners of it. Six months after the lean implementation the source of technical and change process knowledge, the consultant, left the project, having fulfilled his contract commitments. Less than a year after that the FBU Manager was promoted, leaving the organization with the distribution of players portrayed in Figure XIX. This illustrates the difficulty in diffusion of the learning experience through individuals. On the one hand, those at the center are in the best position to spread the learnings to other facilities and connect to other functions in a distributed knowledge through nodes and connections arrangement. On the other hand the loss of their linking role within the organization can create a vacuum that can limit the collective’s ability to identify and relate to other resources and hence ideas and capabilities to continuously improve.

In fact, this data did not reveal the network nature of connecting these individual nodes, though this may have developed later, particularly in the work associated with lean accounting, where the lean expertise of the plant manager and the accounting expertise of the staff account could be linked and recognized as lean accounting knowledge that is embedded in the organization. A view of organizations, as “distributed knowledge systems” which has been discussed by several scholars, most of whom come from an information systems perspective, is
hinted at but not evolved in this data (Yoo & Ifvarsson, 2001; Boland & Tenkasi, 1995 and others).

*Willingness to commit to the change process is a condition of organizational learning.*

In this study I found an indication that willingness to change, adapt, and commit to the process, is antecedent to both individual and organizational learning and is arrived at through affective as well as cognitive means. The gap between "knowing" what to do and "doing" it, is about willingness, not about the technical understanding of, in this case, the new production process or redesign tools. Here we see that undertaking the attitude of willingness to “opt” in to the “new” is fundamental to learning. Pfeffer and Sutton have defined a “knowing-doing” gap where “doing” doesn’t occur, in spite of knowledge having been acquired or transferred, thus creating a key knowledge management issue (2000). Their view however, presumes the ability to create new knowledge in the first instance. The study at OCM suggests that there is a potential gap even earlier in the knowledge management process. Here we have seen that during the actual creation and construction of knowledge, the very first task in the knowledge management process, actors, having learned the technical skills and concepts may not execute based on being unwilling to contribute or engage, not choosing or volunteering to be a part of the learning process emotionally or psychologically.

So I add to the body of organizational learning knowledge this notion of volunteerism, the sense that one can and needs to make a choice about their personal level of commitment, perhaps particularly in a change process, but in any adaptation process. The notion that actors exercise free will, while antithetical to Taylorism, is essential to understanding how change actually comes about. While doing routine tasks, neither the individual nor the organization is called upon to learn. However, change, by definition, requires performing new work or old work in a new context. Further in a change process where creativity and new ideas are invited and expected from all corners of the organization, not just the so called “experts”, this change needs engagement not just of the intellect, but also of the imagination. It is the engagement of seeing
possibilities and seeing the good in the new, or seeing that people in whom you trust see it, that
motivates voluntary, spontaneous, and improvised participation that facilitates novel and
productive idea generation.

In order for this willingness to develop, the organization members learn that it is in their
best interest to participate, though what is in one’s “best interest” may not be held in common.
Conversely, those who did not come to believe that it was in their best interest never did
participate; they opted out, either simply going along, complying, or leaving the organization at
some point. There is nothing in the data to support this being strictly a logical decision. Rather,
many comments were made about the emotion associated with making these choices:
excitement, pride, concern or worry for others, anger. Earlier in the conversational learning
discussion, I added fear to the motivational perspective of learning in and with a group. The
Baker et al work (2001) leaned more toward the intellectual or cognitive phenomenon of
“curiosity” as originally proposed by Freire (1994). Fear is a primary emotion as is hope which
proved also to be a motive for volunteering to participate. So willingness born out of a freedom to
choose, motivated by emotion as well as logic, is a concept that brings a new dimension to the
learning process of a collective as well as individuals.

This emotional or affective component of volunteering has been hinted at in the past, but
not grounded in empirical work related to organizational learning, until now. For example Nonaka
and Konno (1998) propose a model of knowledge creation, that is a self-transcendental process
(1998, p42). They use the Japanese term “ba” to describe the place or shared space where
knowledge is embedded and build a four phase process of knowledge creation in this space. The
beginning phase of the knowledge creation process is called socialization and here they
emphasize the communication and generation of feelings. “Originating ba is the world where
individuals share feelings, emotions… An individual sympathizes with others, removing the barrier
between the self and others…. from originating ba emerge care, love, trust, and commitment”
(1998, p46). This notion of sympathy and empathy is supported by our study indicating that
willingness comes from the voluntary and emotional nature of the adaptation process, which is
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done in the social setting of LRL and leads to organizational learning (knowledge creation). The sharing of individuals of tacit knowledge results in the group having explicit knowledge, called *interacting ba*. This study indicates that it is in this shared space that learning is conducted (*originating ba*) and externalized or manifested (*interacting ba*). The transfer process from group to group and the subsequent embedding process in the new group, which can be considered the transfer phases are also seen in this study. These are what Nonaka calls *cyber ba* (group to group) and *exercising ba* (within the new group). However, as noted, little transfer outside of the original environment or *ba* occurred. Which may be a direct affect of the characteristics of the *originating ba*, particularly elements like trust, care and so on, the emotional components, not being developed in the subsequent environments. As put by Nonaka, “*Ba* can be generated by organizational effort. What kind of knowledge is concentrated in it depends on the situation and strategy...”. While a great deal of effort was put in to the original organization effort at developing new knowledge, very little “community” effort was provided for the transfer and subsequent use of that knowledge.

In addition, learning that comes about as a result of or in support of organizational change has long been analyzed in terms of the affect generated as individuals respond to change. Recent theory proposes a more complex structure than the commonly held view of “resistance” to change, particularly resistance that is construed as being only negative in its effect. For example, Piderit has called for a new view and reframing of the resistance conceptualization, specifically one that looks at the role of attitude as more nuanced (2000). Here she suggests using the tripartite view (Ajzen, 1984) which consists of three dimensions of attitudes, “cognitive, emotional and intentional” (2000). Our study provides empirical support for this concept that emotion is an integral part of organizational change. The adaptation process developed in this emerging theory of LRL indicates that volunteering to commit to and to own the change process was essential for organizational level learning. This is congruent with recent research suggesting that the key role of managers in implementing radical change is that of balancing the emotions of the actors in a way that both attends to the needs of individuals and
also gains emotional commitment to the change process (Huy, 2002). It as though the emotion is the charge or the force that pushes people on to implement and learn. This attitude of being willing to pursue the change forms in the heart as well as the head, in emotion as well as cognition which neurologists have found to be closely intertwined (Damasio, 1994).

This research began with a guiding framework that outlined a relationship among the types, methods and outcomes of learning (see figure II and chapter 2). This framework was constructed from the extant literature on organizational level learning and facilitated the method and line of inquiry. A few comments on how the above findings and contributions relate to this framework will more precisely place this study in the literature. First, with regard to the type of learning that was important in the context of change, this data highlights the dimension of emotional versus cognitive learning. As discussed above, the technical aspects of lean needed to be understood, but this learning paled in comparison to the emotional learning of trust in “the other” whether they are “management” or “floor worker.” So this study lifted up the role of social or interpersonal learning rather than those used in the original framework. No pattern was found in the open coding exercise that indicated that the learning was of one nature or another. In fact, to the contrary, analysis indicated that all other learning types were present. For example, some people continued to operate out of their old framework of distrust which would be termed single loop learning in that they operated the machines in the new manner, but they did not believe that the managers could be trusted to carry out the change. This was done at the same time that others became committed to change and owned the success of it, operating out of trust in both the process and the champions (the management) of it. This diversity of types of learning was demonstrated for all types of learning described in the framework.

The second component of the framework is the method or process of learning. The major contribution of this work is to define the way in which the shared or saturated method actually operates. Locker Room Learning is basically a form of this method, specifically the form that is used during a planned organizational process change. This work also provides evidence that learning is done in a chaotic fashion, which was one of the original methods of learning
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described. However, it was found to be a part of both the shared or distributed method and not a standalone category.

And finally, the learning outcomes of changes in strategy and tactics that were the third component of the original framework played a most important role in the findings. First, they interacted directly with the methods. Shared or collective learning was found to be the source of changed tactics and mental models; distributed or networked process of knowledge conversion created new strategies but not new tactics. Further, the process of LRL, a shared learning method, resulted in stronger transfer potential if done (transferred) by the originating group, than did nodal or individual learning or knowledge creation which is part of the distributed or networked method. This framework was useful in isolating vertical dimensions of the learning process (type, method, outcome), looking at it from multiple perspectives particularly that of organizational behavior and knowledge management, and seeing the horizontal linkages and relationships. It provided an inclusive framework that grounded the research but did not limit the perspective, opening up space for seeing new categories and relationships.

Limitations of this Research

The case-study approach offers rich empirical description, and that has enabled inductive conceptualization of how individual learning becomes organizational learning and how learnings are transfer or knowledge is reconstructed from one project to another. However, as with any research method, there are limitations. This study has three. The first is that it may be considered anecdotal, that it can not be the basis from which drawn general inferences can be drawn. Yet some important sociological theories have come from in-depth case research. It has been argued that too much credence is placed on statistical inference that is derived from large survey results, and not enough credit is given to logical inference, that which can be found in deep relational data collection and analysis (Mitchell, 1983).
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The second research method issue is the proximity of the researcher to the researched. Here the question is one of objectivity of data collection, analysis and presentation. Using a scientific method in the social or human sciences means that humans are researching humans. This is considered to have a subjective component that does not occur when human beings study the natural sciences. Moreover, this “subjectivity” is considered to be a negative in terms of acquiring generalizable inferences. However, it has been argued that even in the natural sciences the individual scientist’s conceptions and viewpoints are influential in the research (Medawar, 1967).

Lastly, the findings may be influenced by the single case study methodology. There may be issues or events that are particular to OCM or the GC facility that have produced the findings obtained. Future research should attempt to study these same constructs and relationships using a variety of cases involving organizational change.

Directions for Future Research

While this research suggests an emergent view of learning and transfer under the condition of change, and while it grounds itself in a plethora of existing literature, it also raises four interesting questions. First what is the relationship between organizational change and learning and what organizational conditions and knowledge needs is LRL most likely to succeed? The learning and change streams of research have progressed in parallel, yet there is obviously a correlation between being able to learn and being able to implement change. What is it? How does it come about?

Second, this work exposed the importance of emotions associated with learning under the conditions of change. The voluntary engagement of the individual with the community in the change process has in it an emotional component. We have known that learning that is anchored by emotions tends to be retained longer than when it is not. Additionally, we have known that simple transfer of declarative knowledge from one person
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to another is normally a cognitive exercise that doesn’t necessarily engage the emotions. And finally, we now see that locker room learning, which addresses both individual and organizational level learning, includes interpersonal interaction in the very construction of the new knowledge. This interaction, perhaps particularly difficult in a strategic change process, elicits emotions in the day to day-ness, the face to face-ness and the competing values of implementation. The work that Argyris has classified as having two branches, cognitive and behavioral needs to be considered in light of the findings of this research. What is the role of emotions in learning about change?

Third, this research indicates that learning that is done collectively can be used again, and that learning that is done individually, what I call nodal knowledge, has less likelihood of connecting to other nodes or being either well enough formed or powerful enough to be useful in other ways, at least directly. The distributed theories of organizational knowledge do not give sufficient description to the relationship between knowledge creation and knowledge transfer. In the knowledge management process categorization done by Gold, Malhotra and Segars (2001) the relationship between the two subprocesses of knowledge acquisition and conversion needs further exploration and definition. When information was just data and not knowledge this relationship was fairly clear cut as data could easily be identified, codified and organized and then provided to people who would make sense of it using fairly standard conventions of words and numbers. When data becomes newly created knowledge formed by the cognition and emotion of groups of people, the development of standards and representations that both enable and support communication to flow across various boundaries (e.g. personal, functional, organizational) is much more complex and sophisticated because of the human factor, mental maps, group processes, feelings about the creation of the knowledge or the learning and so on. Using the variables developed in this study such as motivation and capacity of transfer, willingness to learn and the LRL process, quantitative analysis of the relationship
between acquisition and conversion in a variety of settings would provide more understanding of the role of distributed knowledge and collective or aggregated knowledge.

And fourth, a most exciting possibility arises from the results of this study. There is an indication that through this change process, the organization has matured. I use the term “mature” in the sense of Kegan’s (Kegan, 1982) and Loewinger’s models of individual maturity, just at an organizational level (Loevinger, 1976). Kegan tells us that maturity develops from the back and forth movement of the individual between integration and connectedness and independence or “selfness.” Loevinger describes that the ability to adapt and be flexible is a key characteristic of development. In order to change the norms and behaviors of the organization or collective, particularly in some lasting and sustainable way, these attributes or organizational capabilities must be developed. This integrative development is categorized in four ways: 1) impulse control and character development, 2) interpersonal style, 3) conscious preoccupation, and 4) cognitive style. As examples of how the new norms at OCM lend themselves to framework, consider the following

- Decisions are made with consultation and at the lowest possible level.
- Interpersonal interaction is positive, considerate, and professional.
- The locus of success is the business rather than individual or self; the casual conversation is about family affairs rather than criticism of “them” or “the other.”
- Broad recognition that the Kanban system drives production to meet customer need.

These changes when analyzed in light of the “development” framework, could easily be construed as a movement from one stage to the next, specifically from the “Conformist” to the “Conscientious.”

Kegan in a similar way stresses the development of the consciousness as the crux of growing, as the measure of growth of an organization as well as individuals (Kegan, 1994). The clear evolution of character in the sense of civil society or of positive social interaction that went on at GC during this change process is consistent with “growing up” as Kegan defines it. He criticizes current theorists’ inability to connect organizational development with improved
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consciousness at the individual level. The problem that develops is that the individual is not able or “ready” to learn and change. This view is totally supported by the “willingness” finding of this research. Looking at the connection between OLL, change and organizational maturation would provide a lens into the foundation of organizational culture that could be revealing and highly beneficial.

Implications for Practitioners

In general, organizations need to take the view that learning is a process and not an event, and that change is inevitable whether part of a planned strategy or in short term response to both internal and external environmental conditions. This research offers actions or tactics for improving how organizations can a) develop self awareness under conditions of change that can help them change more easily in the future, and b) create conditions that enable the re-application of knowledge that is created in a change process. Implementing these processes should improve optimization of both short term (typically operating improvements) and long term objectives (typically organizational capability, capacity, and culture) during change processes.

Strategic Change Ethnography

Capturing the learning about the change process itself, rather than the specific operational and behavioral changes, in-flight, while they are occurring is the key to learning to change. In order to do this one needs to have a sufficient “betweeness” position in the organization such that they can have access to the significant data. Tactical day to day as well as strategic planning resources must be observed and understood. The impact and affect of the change on both the specialist in the trenches and the profit center manager, both the functional expert and the general manager need to be understood. Additionally one needs to be held
accountable for collecting and analyzing data over a long term, in a completely objective manner, using research frameworks and methods.

Today many executives and specialists alike are doing grounded theory development regularly, as they build a basis for decision making. They gather information from people and analytics, conferences and consultants. I suggest that a position/function be established, call it the strategic change ethnographer (SCE) to formalize a similar but more rigorous process. The SCE would be responsible for analyzing the most complex of all core processes, the ability to change and adapt, to find ways for the organization to get better at this with each successive strategic change effort. The SCE is in a sense to the democratic, participatory organization what the AA (administrative assistant) was in the command and control structure. This is not a historical perspective of the business, or the evolution of the organization, but a real-time analysis of how and why change and learning occurs.

Many organizations so dread change that they fail to observe themselves, keep “self-awareness” to a minimum in an effort to reduce stress and fear. In this way the lose much of the important transactional data that holds the key to how they can improve this core learning/change process. This position would be responsible to the top operating officer and would therefore align to the longer term goals of the organization while researching the change of everyday practice. It would rotate on perhaps a yearly basis, and be staffed by high potential young managers who in the process of researching and analyzing would get a view into and hopefully insight about the essence of the organization that can not be duplicated with years of experience. It is a learning accelerator for the firm. It would develop critical in-house skills of theory building and build the organizational capability to chart a well grounded strategic course.

Anticipation

It is almost inevitable that when a person has a choice between doing the tactical task or contemplating the strategic choices, they do the former (Covey, 1994) Establishing an
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ethnographic function relieves an operations individual, who is measured on short term results, from patiently looking for and analyzing data that affects the long term relative to managing change. But even in this best case scenario, there is still an issue of optimizing the resources that are intimately involved in the change efforts, in our example for instance, the FBU manager and the consultant. This need begs the question of anticipation and succession planning around move-outs of these critical players who are here defined as critical knowledge nodes whose experiential learning may be most useful and essential to the adaptation process. As part of the change process, organizations need to plan alternative scenarios of personnel development that will come about as a result of experiencing the change process and the possible movement of these nodes of knowledge.

Likewise, planned change, while first targeting a narrow domain or function, needs to consider where this change is likely to lead. By virtue of changing one part of the system, the whole system may be affected and create an imbalance. This is highly likely when addressing central processes or core competencies of the firm. A common theme in today’s management literature is alignment. Companies have implemented change, become unaligned in the process, for example, rewards and incentives motive counterproductive behavior given the new goals and objectives of the business. Foreseeing the likely or logical connection to other functions, systems or resource bases and designing the initial change with these contingencies in mind is critical to sustaining and building momentum in critical strategic change efforts.

WYSIWYG

Understanding the reliance that actors have on assessing the environment in the LRL process, it is important that what they see is what they get (WYSIWYG). The role of proximity and transparency in organizational learning is critical, particularly in the context of change where week to week the context or situation is different. Many change projects involve people or communicate with them only on a need to know basis. Communication is at the heart of proximity
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which is at the center of both the social interaction of LRL and the capability to transfer information. The norm of WYSIWYG needs to be established early and often.

Love your Emotion

The trepidation and fear with which change and a personal commitment to it is approached is understandable but not useful. These emotions need to be channeled along with the logical constructs about the situation into productive energy and use. They need to be confronted and overcome or neutralized. The conversion of cream to butter, of individual reluctance and skepticism becoming collective action is accomplished through the rough and tumble of friction, differences of the heart or attitude. This is necessary for developing awareness of “the other” that ultimately enables actors to join with one another in commitment and ownership. Emotion should be encouraged not feared. We know this in life, now we know it in learning.

Conclusion

This research offers insight into the social nature of learning and the dependence of knowledge transfer on the process of learning in the context of planned organizational change. Specifically, it contributes to the organizational learning literature by proposing a new model called “locker room learning” that specifies that a) willingness to adapt is antecedent to learning at the organizational level, b) mental maps are influenced by both intrapersonal and interpersonal processes, and c) emotion is as central as cognition relative to the construction of both willingness and mental maps. Locker room learning is an interactive, iterative process of assessing, believing in, choosing, and owning the change.

An expectation of most change processes is the ability to port or transfer the learnings or the new knowledge that was created about how change works and about the specific change, for example in this case, lean production. What is most interesting in this study is the relationship discovered between LRL and knowledge management, specifically the transfer of the newly
created knowledge. LRL produces a social bonding, which in turn defines a group boundary which develops from the emotional aspects of group learning or LRL. This *bond-ary* is hypothesized to be both a help and alternately a hindrance in transferring the knowledge to other settings. This organizational analysis of knowledge transfer of new, novel organizational learning has theoretical, practical and epistemological implications.

This work neither closes nor opens the organizational learning and knowledge management paradigms. But it offers two contributions to the fields. First it nuances the work of key scholars such as Wenger, Kolb, Dixon, Argyris, Davenport and Nonaka and puts these in the context of change, a significant perspective. Secondly, it opens up a new path of exploration that connects these fields and considers the transfer requirements of knowledge created internally in the organization out of their own, collective experience. Co-creating knowledge (organizational learning) is a powerful social phenomenon that offers great possibilities to organizations as they continually change and drive toward strategic fit in a dynamic global value stream. Understanding the conditions for using these learnings in multiple other situations in the organization offers great leverage to the capability of "learning to change."
Following are the three protocols, 2 for individual interviews, and 1 for a focus group that were used.

Preview (protocol 1 and 3)
Thank you for participating in this study and agreeing to be interviewed. The purpose of this research is to better understand how organizations learn. Parker Hannifin and in particular the Hose Division has been selected because during the last few years you have made substantial change in your production process in order to become more lean (can refer to Parker Hannifin pamphlet describing this). To understand organizational learning we look at facts about how behaviors have changed, how the organization “thinks” differently about itself, how its viewpoints or beliefs about its operation, goals, skills, and so on have changed.

About the interview itself, please know that the information you offer will be confidential. Your insight is important and we appreciate your willingness to help. I’d like you to look over the consent agreement that we are using and to sign it if you are willing to participate. Our conversations will take about an hour, and we would like to tape record our discussion. Is that OK?

The first part of the interview consists of a few brief questions. The second part consists of 4 broad questions. There are no right or wrong answers. Do you have any questions at this point? Let’s proceed.
Implementing lean manufacturing, protocol 1

(This is a brief description of the interviewee, their involvement in the lean transition, and their function in the organization.)

These four questions are close-ended requiring brief answers.

- What is your current position; how long have you been doing this; what is your tenure in the organization?
- What has been your role in implementing lean manufacturing here?
- Who do you work with on a regular basis? Boss, peers, etc
- Where do you get most of your information or data to do your job?

(This is the heart of the interview content)

Now we’ll turn our attention to the actual change in operations. Here I will ask you broader questions and perhaps interject a few specific questions.

1 Please describe the implementation of the new lean production techniques in this division (plant).

As prompt

When you implemented lean you made changes to eliminate waste in three ways -

- pace your operations to customer demand,
- produce goods one at a time, or as close to it as possible,
and
- flow materials based on customer demand.)

2 Please think of a time when you realized that your group or team changed the way you were working or thinking as you were putting in the new lean production method.

What was the change?

How did it happen?

When did you realize that there was a change?

Who was involved in the change?

How do you know it was not just your thinking but that it was broadly shared?

What had the group learned that caused you to operate differently?

What information was given you or did you discover that caused you to think differently?

Where did this information come from? Same source or different sources?

When and how did you and your group get this information?

Who got it at the same time that you did?

Looking back were there any stumbling blocks to learning this?

What kept you and your group from learning this before?
3 Please think of another time when you realized that your group or team changed the way you were working or thinking as you were putting in the new lean production method.

(same as in question 2 above)

4 Please think of a time since these two examples of implementing lean when you were making a different change in how your group operates.

What is/was the change?

How was it similar to or different from the lean change?

Was there anything that you learned from the lean process implementation that you used here?

If so, which ones?

Why these? Could there have been others that were used?

If so, why weren’t they?

Who else thinks this?

As a prompt:

Often organizations make changes in some of the following and some may apply to yours. Were there changes in

- communication channels?
- info systems?
- spatial relations? (e.g. visible management daily metrics of lean)
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- routines for inquiry?
- incentives?
- the expectations or goals that were set for the project?
- the amount or type of resources that were used, (like the sensei)?
- the planning and monitoring of the project?

Closing

Thank you for sharing your time and experience with us. We appreciate your willingness to help with this study.

Implementing lean manufacturing – focus group, Protocol 2

Having interviewed several people to determine what and how learning was accomplished during the implementation of lean production, the goal here is to discuss the major themes and have the group react to them. The group will be moderated by the co-investigator in a discussion, exploration and explanation of why there are similarities and differences, and what may be the sources of these. We also will identify ideas or other items that did not surface in the individual interviews.

Transfer of learnings from lean to e-procurement, Protocol 3
The first part of the interview consists of a few brief questions. The second part consists of 3 broad questions. There are no right or wrong answers. Do you have any questions at this point? Let’s proceed.

(This is a brief description of the interviewee, their involvement in the lean transition, and their function in the organization.)

These four questions are close-ended requiring brief answers.

- What is your current position; how long have you been doing this; what is your tenure with the company?
- What has been your role in implementing lean manufacturing here?
- Who do you work with on a regular basis? Boss, peers, etc
- Where do you get most of your information or data to do your job?

(This is the heart of the interview content)

Now we’ll turn our attention to the planning of the e-procurement change.

1 Please describe the planning and design process for implementing e-procurement.

2 Please think of one element of the design that came from the insight and learning that went on when the lean process was implemented in your division.

Please describe it.
From where did the idea about the change process come? (one, many; plants, division, corporate; insiders, outsiders; functional departments; individuals.)

How did you learn about this idea or method?

How did you decide to use it?

Who was involved in this decision?

As a prompt:

*Often organizations make changes in some of the following and some may apply to yours. Were there changes in*

- communication channels?
- info systems?
- spatial relations? (eg. visible management daily metrics of lean)
- routines for inquiry?
- incentives?
- the expectations or goals that were set for the project?
- the amount or type of resources that were used, (like the sensei)?
- the planning and monitoring of the project?

3 Please think of one element of the design that came from the insight and learning that went on when the lean process was implemented in your division.

(same as #2 above)
4 Please think learning or change in the organization that came about through the implementation of lean that was considered but is not being used in the e-procurement implementation plan. Please describe it.

From where did the idea about the change process come? (one, many; plants, division, corporate; insiders, outsiders; functional departments; individuals.)

How did you learn about this idea or method?

How did you decide to not use it?

Who was involved in this decision?

Closing

Thank you for sharing your time and experience with us. We appreciate your willingness to help with this study.
Example of open coding techniques using “comments” feature of software.

Interview I C a

Question: Who do you work with on a regular basis when we talk about the team you mentioned the team?

[I consider not even just the people I work with in my job classification, but with your supervisor. I mean you are a team, everybody has to pull together. There are six different jobs in my job classification.] ------(Comment: benefits for collective, motive; ownership )

I had to learn to do everyone of those jobs. If I come I in and my station doesn’t have work when I get there, but it may have later, you don’t stand around. You have to look around and see who needs help and that’s where you go and we all do it. It’s just the way of our life to get the hose product out.] -------------------------------(Comment: physical proximity)
## Learning to Change

### Appendix D

Example of category development process.

<table>
<thead>
<tr>
<th>LEARNING Knowledge sharing (KS)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of knowledge</strong></td>
</tr>
<tr>
<td>2. Routine – unusual.</td>
</tr>
<tr>
<td>5. Simple – complex.</td>
</tr>
<tr>
<td>6. Performance usefulness.</td>
</tr>
</tbody>
</table>

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I C a, 3 They just showed a better way to do it… they showed us all these steps that didn’t need to be taken. And in our meetings we drew charts we put tacks on a board and took yarn and drew from it how many steps it took to do this.

II C, 6 the MARI process at [consultant] the four step process lot of training in that. I think some team building type training.

II C 16 when we [manufacturing people] first started having our team meetings there was only a few people that would participate say anything or talk at all even and that has progress now to where most of the members are participating coming up with ideas discussing things.

V B 12, and learning from Green Camp we applied a lot of those ideas to the Cleburne facility… there’s a Kanban card pull system we learned how that worked there’s a net requirements concept of how you clean the factory out of all the junk that you don’t need… cut a lot of time out of learning because we didn’t have to do it five different ways… that was from experience of working together as a
| V B, 13  | we had the  | II C, 11 [div. staff  |
|          | people from  | members of core  |
|          | the factory  | team] they were  |
|          | floor train  | suppose to be  |
|          | other factory  | learning it and  |
|          | floor people  | then they were  |
|          | on how the  | going to take it  |
|          | system works  | over take it to  |
|          | and then that  | all the rest of  |
|          | is going to  | the plants       |
|          | transfer on.  |                |
| I C a, 6 | How did that  | V B 12, even    |
|          | change in  | the stuff that   |
|          | mentality come| we do here at   |
|          | about this customer | this facility   |
|          | mentalit?     | we've used      |
|          | Through the learning | some of those   |
|          | process it's what | ideas in        |
|          | they stressed | thinking in     |
|          |                | team building   |
|          |                | and so on in    |
|          |                | the way that    |
|          |                | you approach    |
|          |                | getting people  |
|          |                | to take         |
|          |                | ownership of    |
|          |                | their problems  |
| I C a, 1 | We all took  | V B 13 we're     |
|          | classes       | working on      |
|          | management and| improving that  |
|          | the people    | process but it  |
|          | out on the    | was all from    |
|          | floor you     | the learning    |
|          | worked       | that we've      |
|          | together as a | done in the     |
|          | team you that | other facilities|
|          | hose that's  | you see like if |
|          | needed to fill | we wouldn't    |
|          | our orders   | have done it in  |
|          | you work to  | one we         |
|          | get them there| wouldn't have    |
|          | with the least | tried it another |
|          | time involved | one and tried it|
|          | to do it.     | another one and|
|          |                | see the         |
|          |                | difference in    |
|          |                | how that        |
|          |                | works           |
Appendix E

Example of framework used for identifying relationship among categories.

**Strauss Paradigm: Interrelationship of categories**

**Causal Conditions**
- Pulled us off-site, week long training seminar

**Context**
- Had never run that way.
- Give control to little Indians out there through joint decision making and Kanbans.

**Phenomenon**
- Taught what lean meant
  - individual; single loop declarative & processual.
  - eg. running to a

**Intervening Conditions**
- Place will be chaotic. Will run less if based on customer need.

**Action/interaction strategies**
- Ran machines outside of Kanban; ran based on absorption

**Outcome (Consequence)**
- Moved aside by upper management. Test of management commitment to Kanban and lean. Retired.
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