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**MANAGING CONTRADICTIONS FROM THE MIDDLE: A CULTURAL
HISTORICAL ACTIVITY THEORY INVESTIGATION OF FRONT-LINE
SUPERVISORS' LEARNING LIVES**

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Adult Education

by

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Abstract

This study focused on front-line supervisors in a union shop, steel-production plant and how they learn to successfully negotiate their role with in the corporation's division of labor. Negotiating their role means continued practice in how issues of standpoint, agency, power, oppression, habits, knowledge, related business concerns, mediating instruments integrity, etc, intersect in ways that shape, inform, and guide how one engages, conducts, discusses, confers, consults, bargains, agrees, and settles the various issues bounded within the workplace environment. Six front-line supervisors were interviewed and observed in their work-environment over a four month period. Cultural Historical Activity Theory (CHAT) was used as the analytical framework that informed data analysis.

The following research questions guide this study; 1) What shapes and informs front-line supervisors learning? 2) What do front-line supervisors draw upon to develop and use supervisory skill? 3) How can informal instances of learning be empirically described in light of the full, complex range of artifacts, interactions, and shop-floor situations?

Cultural Historical Activity Theory provided the comprehensive and exhaustive framework allowing for analyzing both the manifest and latent shop-floor processes. The structure provided by the triangular diagrams and the associated diagrams detailing multiple ones provided the opportunity to maintain a conscious effort regarding all the data. Analyzing how front-line supervisors addressed and resolved permitted me to empirically describe how they experienced learning. It permitted investigating the hidden world of front-line supervisors learning lives in respect to their accessing and grasping

the latent aspects related to the division of labor, the unspoken rules, and the development and use of mediating instruments

Front-line supervisors drew upon their ability to convert primary contradictions into peripheral ones and for generating mediating instruments for future use through addressing the present contradictions. They also drew upon their ability to use the artifacts in the three way of mediation. They were using an artifact as designed, using an artifact through appropriation of an existing one, and by creating new mediating artifacts. The specific mediation employed rises from their access to and grasp of the underlying conditions as well as the latent shop-floor aspects.

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Chapter 1. COMING TO THE TOPIC

Growing up in a coal-patch town in southwestern Pennsylvania, the effects of corporate exploitation and worker oppression were readily visible in every-day life. Our town was similar to others located in the Youghiogheny River valley where coalmines and coke ovens existed all serving the steel industry along the Monongahela and Ohio River basins dating back to the last quarter of the nineteenth century. Most aspects of our town exhibited such influences as the design and placement of the houses, the remnants of the old company store, the abandoned slag dumps, the old railroad tracks, and the baseball field. The creeks in our area still run a shade of orange in color due to the mine drainage containing heavy traces of sulfur and iron oxide, in spite of current mine drainage reclamation attempts, as it empties into the Youghiogheny River. Even now, the people growing up here still refer to these creeks as “sulfur creeks.” The main road leading to town experiences cave-ins due to the mineshafts subjecting it to one lane for traffic. The most recent occurred in spring 2006 and was just repaired and reopened July 2008. At this writing, the road is sinking again and has returned to one lane.

The daily talks with “the old-timers” who recounted many memories from their experiences while we were riding bikes or playing ball left an indelible impression upon me. Written, what treasures it would have been to record just one tenth of those conversations now lost in the past of the town’s children’s maturation. One of their passionate subjects was telling us about the company store and how they were in seemingly constant debt to it as a significant portion of their pay would be withheld by the company to resolve their financial obligation. The old sulfur waterfall on the hillside flowing from the old mine entrance and pooled in a creek along the old tracks prior to

emptying into the Youghiogheny River where we, as children, would swim and fish in the summer and build igloos and ice skate in the winter. We did this without hesitation even though the creek's water and the bed beneath it were orange and the area smelled like sulfur. This flow has significantly lessened due to mine reclamation projects. What all this points to are the signs and symbols from some authority-driven boundary and criteria that dictate how you should think, act, live, where to live, what to buy, etc. It kept the workers complicit and loyal to the company as one town person said, "we had nowhere else to go so we did what we had to do to survive."

Although the majority of the coal mines in our area were closed by the first half of the 1950's, coal mining culture and traditions remained a major socio-historical influence on people up through the late 1970's from both the ones now defunct as well as the ones still in operation. Those men who worked in the mines in the 1930's and even the surviving widows of the miners who started working in the 1920's would tell the town's children stories of "how things used to be" and what they had to do to earn a living. In addition, they included that, in spite of the hardships, they were thankful for what they did have. Notwithstanding their positive attitude, possibly for the children's' benefit, these people would effortlessly and tirelessly spin yarns of the poor and dangerous working and living conditions underscoring the daily struggle to survive.

In the town of Blythedale, PA, one family began to challenge the coal mining company (the Pittsburgh Coal Company) in the attempt to provide workers the necessary leverage and solidarity to challenge and change their working and living conditions. My Great-Grandfather, in 1913, assembled a group of men and started the Workingman's Mutual Beneficial Union Hall (WMBU) in town that assisted miners' and their families

in times of crisis and tragedy through offering medical and health benefits (WMBU, 1913). This endeavor ignited the already present tensions between the workers and the company to a point where fights and altercations rose. The company's Coal and Iron Police maintained order in the Patch Towns through threats, violence, and intimidation tactics. To illustrate this with a story, during the Coal Mine Strike of 1926, the company evicted the miners from the company houses and forced them to live in the local farmers' hay and pasture fields. One miner recounted the situation when the Coal and Iron Police were making rounds through the tent-city when they encountered a miner and his family and his wife was with child. They exchanged words and attitudes with the police officers that resulted in one police officer kicking the pregnant woman in the stomach causing her to lose her child (Sylhammer, 2007). Such tactics were common and were very effective to keep order and control over the miners and their families. Another miner told their experiences when, as a child, the Coal and Iron Police would discharge random gunshots aimed into the miners' houses (Chopp, 2007). This explained the practice of placing mattresses against the outer walls: an attempt to help deflect or shield family members from bullets. If the company just suspected a family member of purchasing necessary commodities anywhere but the company store, the entire family stood the risk of eviction from the company house. These are just a couple of the horrific deeds performed by the Coal and Iron Police as they performed their daily roles in strict compliance with the coal company's expectations but serves to partly illustrate the coal patch town families' reality as well as demonstrating the company's power expression in a coal patch town.

During the coal industry's boom, the mining company's buildings and associated structures were very prominent throughout the coalmining region. As Schied et al (1997,

1998) argued, power issues are present in the most subtle of ways. Presently many mining structures remain symbolically reminding the people of what once was. On the one hand, they experienced gainful employment allowing for raising a family but their working environment was harsh, dangerous, and contentious. Couple the latter with how the company wielded their power also served to keep those with the lived experience “in their place” and pushed for complicit, productive, and model citizens. Current symbols remaining are the old Herminie Jail, the Blythedale Company Store, the slag dumps (some of which are still smolder underneath), ethnic patches, the abandoned and sealed mine entrances, abandoned coke ovens, among many others. One example of this is from the time of the early 1900’s, the Pennsylvania National Guard, the Coal and Iron Police, and what was to become the Pennsylvania State Police all conducted town patrols for the protections of the town’s residents (Brunory, circa 1970’s; Campoli, circa 1970’s; Ricciuti, circa 1970’s, Vitori, circa 1970’s) . At times though, the police would physically remove families or conduct home searches in the name of the law or if a miner, or their family, would commit some infraction of the patch house agreement (Fontanesi, 1974/2007). Even until as recent as the 1960’s, the Pennsylvania State Police maintained a strong presence in our coal patch town in the name of “patrolling the town” and assuring the town’s residents experienced little to no crime. They protected us. However and more subtly, it was also maintaining their presence to keep the town’s people “in line” with no rebellions against the company or strike activities. The town’s people gladly accepted the State Police’s presence since they were interested in their welfare.

However, as the first- and second-generation Americans were born, immigrants’ social and political knowledge grew (Arico, circa 1970’s; Fontanesi, 1974/2007;

Lorenzini, circa 1970's; Martinelli, circa 1970's; Reggiani, circa 1970's; Ricciuti, circa 1970's; Vitori, circa 1970's). As the younger generations experienced education in an American school and exposure to the social and political systems, they became fluent in the English language and began to understand socio-cultural subtleties. Such subtleties were the labels and perceptions regarding immigrants and their weak language understanding by native-born citizens. Through personal conversations with one woman (Fontanesi, 2007) whose father was a miner who emigrated from Italy in the early 1900's, she offered a story when, as a child, she witnessed her father being called a "stupid WOP" by the local company store manager. She explained that it may have been that her father was not that good with the English language and had a heavy accent rendering him "stupid" in the store manager's perception. Some of the older folks and their children would tell stories of the police patrols deterring or curtailing any "questionable activity" (such as unionization or wildcat strikes) (Arico, circa 1970's; Brunory, circa 1970's; Cheisi, circa 1970's; Codeluppi, circa 1970's; Lorenzini, circa 1970's; Vitori, circa 1970's). At this point though, most of the coal company's formal presence had subsided. Only when the mines closed and some mining families moved away did the State Police presence cease. I remember the anger this initiated in the town's children including me when we learned of how our relatives were treated and lived. We also thought of all the land that was wasted and now lie barren and desolate as the coal companies shut down the mines and left the area. Many houses became vacant and in disrepair from workers moving their families to places where work was available.

When my grandfather was fourteen, his time outside of his formal schooling was spent working with the mines in town. During his time with the mines, he was witness to

many accidents, injuries, and fatalities that lead to his questioning the accepted coal company practices and to even question why the workers' feared to challenge the coal company's practice and power and their cavalier neglect to correct, or even discuss, the compromised work environment. He told the story of how the foreman would come to the gate in the morning and randomly select workers from an assembled, hopeful group of men all anticipating a possible day's wages. They were "cold and mean" people who displayed little regard for workers (Vitori, circa 1970's). He supported this by describing times when a worker was injured or killed. The practice, in those days, was to move the victim aside, recruit a replacement worker, and continue production. This practice was the same as when he was in formal schooling as a child and re-enforced his initial reasons for getting involved in worker organizing. However, he also stated something further that was a complete surprise. He did not hold significant contempt for the foreman. My grandfather explained to me how they were "made to do it" because "they had no choice." They had to support a family also but their job was very much controlled by the mine's (and later, the steel mill's) owners and corporate executives (Vitori, circa 1970's). At the time (1970's), this was very confusing as I was limited in my understanding of such issues. He made the distinction that some people treat others bad due to what their job is. His belief was the worker treatment problem was much larger and extended well beyond just the foreman. In reflective hindsight and studying, I would now completely agree with him.

His choice to challenge the system resulted in him being "black-balled" from every coal company in the region. Their actions only fanned his flames to see working conditions change and win a voice for the workers in gaining health and safety benefits

for the workers and their families through formal organizing. Due to his need to maintain financial obligations, he obtained employment with United States Steel's Clairton Plant (which produces coke from coal). It was during this employment where he became actively involved in unions as this gave him the opportunity to address similar safety- and employment-related concerns in the steel industry similar to what he witnessed from his mining experiences. His established solid working and bargaining relations with the foreman but their decisions were still bound and limited by corporate officials and formal policy. He spoke of the foreman and he would "work together" for the worker's benefit but he would suspect that the foreman would have to offer some negotiation defense to the general manager.

He rose to become United Steelworkers of America Local 1557's Vice President and eventual President including during the time of the late 1950's steel strike. Due to his efforts and success in contract negotiations and organizing activity, he received appointment to District 10 Staff Representative in the McKeesport, PA, area where he finished his career and eventually retired in 1977. His life and beliefs accompanied by our town's and family's history were a solid example to me to stand firm and fight for your values and beliefs even when you may experience formal sanctions or consequences. Moreover, and very importantly, to look beyond the immediate situation as there may be deeper, macro issues influencing the current circumstances.

In 1964, my father was accepted for employment in United States Steel's Duquesne Works. In accordance with their practice at the time, the Industrial Relations Department determined he would be a Millwright through his aptitude test performance. The company provided training programs where a newer maintenance employee began as

a helper then, eventually, earned permission to enter the apprenticeship program through clearly demonstrated increased ability and skill. The apprenticeship programs focused towards allowing employees to learn a craft (Millwright, Motor Inspector, Carpenter, Boiler Maker, etc) by working with Journeymen and Master Craftsmen during job performance. He earned institutional certification as a Journeyman Millwright in four years and became a Master Millwright in twelve years. He built a proven record of accomplishment through formal recognition with the lowest downtime hours in resolving breakdowns and his ability to lead a crew to repair a production unit. He (Lord, J., 2008) told of when a specific General Turn Foreman (J. Kite in and around the late 1960's through the 1970's) issued him two, complete ratchet sets that led him to question why. The General Turn Foreman's statement was I know you [the union maintenance workers] take tools home. One set is for you to take home but you will keep the second set here [in the steel plant]. Through my dad and I talking about this, the General Turn Foreman was very capable in using such practices that built solid trust where my dad and his crew wanted to work their hardest for him. This appears as a supervisory strategy that was very effective and made this specific General Turn Foreman different from the others who were less trusted but equally hated. It could be this is some insight into supervisory learning but this is just a hypothesis at this point.

My dad stated that, at times, he "had more power than [the foreman]" since his shop-floor understanding permitted demonstrated higher skill and leadership ability. He became one whom other workers, and upper management, sought regarding maintenance issues based on his proven achievements that greatly benefited the company's bottom line. The General Turn Foreman (same as above) would pay him and his crew a couple

pay scales higher in such situations where they gave very hard and earnest work in crisis times in returning a down unit to production status. Again, was this a supervisory strategy in manipulating existing procedures and policy as a means better worker management practices? He stated that the he and his crew respected this specific General Turn Foreman, although purely hated him at times, was able to negotiate with the workers through establishing trust (Lord, J., 2008). The General Turn Foreman offered him a full foreman's position many times in recognition of his ability to negotiate shop-floor maintenance and resolve production-related problems and his maintenance crew was officially recognized in Duquesne Works' newsletter for developing tool and policy improvements several times leading to improved production and lowering cost.

One such instance is where the main rolling mill crane broke down causing production to stop (Lord, J., 2008). The maintenance crew had two millwrights and two motor inspectors assigned to get the crane returned to operation. Each maintenance worker was a master craftsman in their specific craft and all were veterans of many breakdowns including having one of the better average turn around times among all maintenance crews in the plant.

With this specific situation, the crane's main drive motor was not working. After three plus hours of troubleshooting the crane's electrical control systems, several additional maintenance personnel and a couple maintenance managers, the crane was still inoperable. A contradiction surfaced in that the maintenance crew tried all known troubleshooting techniques and something "should have worked" but everything was failing. The crew began discussing different ideas to approach the breakdown different from what they have done in the past leading the motor inspector gang leader to look

“beyond” the electrical switches and wiring. It was then he noticed a significant accumulation of bird feces within the contacts. From previous electrical troubleshooting experiences outside the workplace, he reasoned that bird feces impeded electrical current flow to a point where it became insufficient to power the crane. Once the maintenance crew addressed and resolved the feces problem, they restored the crane’s power. The total down time was over five hours (which was completely unacceptable) but the maintenance crew created new knowledge that cycled back into the system and became one of the possible issues that motor inspectors checked when troubleshooting electrical malfunctions. This practice was made formal through validation by their general turn foreman who had the power to make such a declaration. This was a good example of where worker knowledge became institutionally recognized.

Therefore, even with apprentice programs and the ascent to master craftsman status, it appeared that the maintenance workers also drew upon knowledge from their personal lives and social networks and brought that to bear upon and resolve a workplace contradiction. The result was their tool creation such that possible future similarities would not require the significant troubleshooting time.

After continued refusal to accept the foreman’s position offer, he was appointed to Gang Leader that is likened unto a working foreman without the administrative duties and the authority to issue formal discipline. His refusal was rooted in his not wanting to be a “yes man” to the company and not having the “headaches” of having to enforce company position in light of knowing what was and was not successful on the shop-floor. His stories describe several specific instances that all served to paint a picture of a very hostile work-environment where the focus was on production numbers in spite of

espoused policy regarding safety. In his words, he was directly told many times to [forget] safety and get the machine/equipment operating even though signs and symbols pushing safety as the most important consideration were liberally visible both on the shop-floor and in the locker room (Lord, J., circa 1990's). Interestingly enough, the very same company officials would be quick to issue formal discipline for the very same infractions in times of smooth-production turns. All through junior and senior high school, I had heard many stories similar to this when growing up resulting in wondering how people would negotiate their roles in such conditions as well as why safety was strictly enforced in one instance and not in others. This seeming dichotomy had never left me and was strikingly similar to the stories told by the coal miners as well as my grandfather's concept of looking beyond the immediate situation. This situation went well beyond the foreman and the general turn foreman as they experienced significant pressure from their supervisors regarding bottom-line focus and production's importance.

I felt great unrest inside since this was "how things are" and some inner anger began to build as there was no resolution for social justice on the part of the workers. It seemed to link back to the miners' stories with the common threads being company control and production first. He stated that it was clearly understood that production was paramount and the maintenance crews did what it took to restore production. He also spoke of very heated disagreements and arguments rising from day to day worker-worker and worker-management interactions and how the workers actually had more say than the engineers when troubleshooting and actual resistor or control bank that is very tactile oriented with less theory. At this point, I never considered steel mill employment since all

seemed so contentious and, in truth, senseless. The one phrase that stuck over the years is “there is what is said and there is what is done.”

In the early 1980's and during a very turbulent and insecure steel market, United States Steel's Chairman was David L. Roderick. During his tenure, the union gave many concessions in the attempt to keep the mills open and people working. The union workers and their families took a financial hit as well as relinquishing many benefits from previous contract negotiations, and strikes, from the 1950's onward. What did not make sense though Roderick received a \$200,000 bonus just after the concessions took effect. Again, my personal reflections were geared towards thinking why he and several United States Steel Board Members significantly profit at the expense of the many. The Duquesne Works, along with many other United States Steel facilities were shut down by the early to mid 1980's so the concessions went all for naught. After Duquesne Works closed, my father found work as a construction laborer in 1986.

The area experienced a bit of hope when Jesse Jackson visited with the steelworkers and local congressional representative in the attempt to save the current United States Steel steel-production plants. The union held rally in January 1986 just outside the Duquesne Works' main gate in four inches of snow but it went all for naught. In July 1988, my father's career as a steelworker was profoundly and permanently closed. His job in 1988 was working as a construction laborer rebuilding the north end of the Duquesne-McKeesport Bridge when, one day, he and the other workers experienced the ground shaking as in an earthquake. When he looked up from his task, it was just in time to witness Duquesne Works' No. 6 Blast Furnace, affectionately known as *Big Dorothy*, falling to the ground from implosion. This was United States Steel's bold exclamation

that loudly shouted your jobs in the steel industry are gone and they are not returning. This day brought a massive sense of sadness, and closure, to our family and some of my father's fellow workers with whom he had spoken immediately following this event. It felt like the final "Screw You!" from the company for all those years of hard labor and sacrifice in fulfillment of their job responsibilities that served to shape many workers' (and their families') identity as a steelworker. This is similar to the mining companies closing down and leaving the local residents to address and resolve all the abandoned, and dangerous, facilities. In addition and on a much larger scale, these realities extend well beyond even a community or region, let alone just one steel production plant, where the corporation's decision makers chose to relocate operations (Hoerr, 1988). All abandoned facilities remained as grim reminders of the source partly informing how people identified themselves as being a miner or a steelworker and, beyond that, their specific role within the workplace. To this day, my dad will still identify himself as a steel worker, or a mill hunk, and more specifically a millwright.

The plant closures brought extreme financial difficulty to my family. Many of my father's coworkers moved their families in search of jobs and I found it very ironic that United States Steel's leader at the time, Thomas Graham, was considered a hero to the company in that he was able to cut so many jobs in the name of eliminating "outdated plants" and drastic downsizing. He was even labeled the "smiling barracuda" since he would smile to people's face as he was eliminating their positions (Hoerr, 1990). I remember thinking that if he was so brilliant it would seem he would have minimized job loss while making United States Steel competitive.

At the time, I was not familiar with the chosen words of academia such as privileged, certified knowledge, informal learning, power, agenda, etc., but I had these questions of why and who and how. The “why” deals with why did people make these decisions and why did a few people benefit at the expense of the many. Why did many steelworkers lose their jobs while those responsible profited and earned six figures and better? The “who” are all those who made these decisions. Who were these people that were permitted to negatively affect so many others? The men and women I knew were either union workers or foremen many of whom lost their job along with my father. The “how” deals with how did they get to make these decisions. How did these specific people rise to such positions and augment the “why” in that why did they exact such exploitive practices upon the workers?

It seemed somewhat ironic then that I gained a management position with United States Steel. I started by working for the Employee Relations Department as a safety and industrial hygiene workplace educator then won a bid for a position titled “Process Leader” which was United States Steel’s current terminology for front-line supervisors or foremen. The term process leader was the company’s renaming the position in response to the recently developed and integrated employee involvement, or Continuous Improvement (CI), program. The term front-line supervisor will be used when discussing foreman, process leaders, etc. Having worked in the front-line supervisor position for a number of years; I both experienced and witnessed the open and hidden agendas of executive and corporate management in the course of normal business practices as well as seeing its manifestation on the shop-floor. With the advent of downsizing, employee involvement programs, global business practices, and the increasing gap between

executive pay versus worker pay, many issues rose on the shop-floor that did not have answers but which the front-line supervisor had not only address but effectively resolve (Allen, 1922; Bassi, 1995; Beckman, 1940; Billett, 1995; Bittel, 1959; Child & Partridge, 1982; Dawson, 1991; Del Brocco & Sprague, 2000; Ellinger, Watkins, & Barnas, 1999; Heyel & Nance, 1984; Kincaid, 2003; McCaully, 1948; Patten, 1968; Therkelsen & Fiebich, 2003; Yanouzas, 1958). Yet, the front-line supervisors “got the job done” but how they did it was never recognized, let alone understood and acknowledged. A whole hidden world of knowledge, learning and doing was virtually ignored.

In the late 1990’s, the corporation’s quarterly business meeting was held in the Irvin Plant’s Management Dining Room that required all management personnel attendance. At this point in time, United States Steel’s total worth had dropped nearly forty percent of what it once was just a few years prior. One management member had asked the question of the presenters, who were from corporate headquarters, why the current Chief Executive Officer (CEO), Thomas Usher, received significant compensation increase regarding salary, stock options, and bonuses when the company was in such dire straights with many union workers being laid-off. The answer was given that we would be in worse condition if we did not have Mr. Usher. As we left the meeting and for the following weeks, we simply could not believe the response proudly provided that day. Again, it made me remember the situations my father and grandfather would discuss regarding the steel industry and the existence of two types of work. One that is highly rewarded and the second one being just part of the many faceless people doing the grunt work. It brings back the early-1980’s Roderick issue where several United States

Steel production plants closed forcing many workers to unemployment but he received \$200,000 bonus.

The daily shop-floor operations include the front-line supervisor's role. The front-line supervisors are the only management member who works directly with the union workers. Front-line supervisors are the only *management* who deal directly with the shop-floor environment in its ever-negotiated complexity including knowledge of the production equipment and the incoming material, knowledge of people and relationships, knowledge of timing and sequencing of activity, and so on. However, their compensation was not reflecting their managing and decision-making efforts; their formal authority was highly limited, despite their role in reducing the cost per ton of steel to help keep the corporation viable. As long as "the job got done" and met the corporation's key drivers, it made little difference as to how it was achieved. The front-line supervisors' collective knowledge was not institutionally certifiable; in some ways (but not all), like the knowledge of the workers themselves – supervisory knowledge was ignored, denied and even occasionally denigrated by those exercised real control of the corporation. Linking back to discussions with my father, it appears that through creative tool manipulation and work-environment knowledge, foreman are able to run the business through established worker relationships and trust based on daily shop-floor community participation.

Also in the late 1990's and 2000, the CI Program decreased its popularity and role in the plant through consistent devalued emphasis and minimal to no employee celebrations. It was then the shop-floor buzz began to argue that the CI Program was just a means for the corporation to demonstrate its ownership of an employee involvement program as stipulated for International Standards Organization (ISO) 9000 Certification.

The once strong program established in the late 1980's/early 1990's was, indeed, just another means for the corporation to co-opt worker knowledge and not holding their end of the agreement (Hoerr, 1988; Rinehart, Huxley, & Robertson, 1997; Thompson, 2003). Worker cynicism issues rose once again in response to another corporation top-down implemented program used as a means of worker control (Andersson & Bateman, 1997; Howell, Carter, & Schied, 2001; Howell, Schied, & Carter, 2001; Jones, 1995). The front-line supervisors caught in the middle once more from having to enforce new and evolving policy against the backdrop of worker anger and rejection to failed and unfulfilled promises and took the beating on the company's behalf. In spite of the hostility, the front-line supervisors directed the shop-floor efforts such that production and its related costs remained competitive and viable as well as having increased quality and safety-related statistics.

In summary, the front-line supervisor's (formerly known as foreman's) role has a long history of using, adapting, and appropriating the formal workplace tools including union workers, interacting with union officials and executive management as they perform their role being caught in the middle. Front-line supervisors are the lowest management member in the management stratum but they also work daily side by side with the union personnel in the same work environment. They need to represent the corporation to the union in the form of managing the business and holding accountability in accordance with formal policy and agreements. They are required to translate and apply the policies to the union workers in light of face-paced global business practices. However, they also represent the union workers to the corporation by arguing for providing the workers with the best tools and opportunities for shop-floor safety and

success. They must justify and defend their decisions to executive management regarding union personnel and procedures in light of downsizing, restructuring, and cost minimization. They created, appropriated, and manipulated tools in establishing and building work-environment trust and social working relationships with the union workers while being bounded by formal corporate expectations. Hence, they literally manage shop-floor contradictions from the middle.

Chapter 2. INTRODUCTION AND OVERVIEW

Statement of Topic

Formally, a front-line supervisors' role is to manage the business (Beckman, 1940; Bittel, 1959; Heyel & Nance, 1984; McCaully, 1948). What this means, in the steel mills at least, is managing and directing union workers on rotating shifts. Front-line supervisors' responsibilities include addressing and resolving all production-related issues, shop-floor issues, scheduling, paying, and managing union workers, maintaining a safe work environment, among many others. The front line supervisor in the current steel production industry faces the ever-present threat of being dismissed through downsizing, increased job responsibilities, longer working hours, and fewer promotional opportunities and has little opportunity to establish relationships, other than with other front line supervisors, thereby limiting their upward mobility, yet not receive the social and economic benefits of union membership. It is important for front-line supervisors to learn not only their role, but the workplace socio-political realities as well. The most obvious is the corporate-sponsored formal training program. Beyond the formal, there exists a large hidden world of learned practical skills and knowledge. This study focuses on this large hidden-world.

Having experienced formal training programs while working as a front-line supervisor, I found many of them to be informative but not very helpful when managing shop-floor activities. In addition, the corporation's mission statement's assured every employee receive the proper and necessary training and tools allowing him or her the maximum success e. Post training conversations with fellow front-line supervisors would found us critiquing the training as being informational but not very useful. There was

some training sessions that colleagues would deem as “a complete waste of time.” A couple examples of such training sessions were “Making Meetings Work”, “Time Management,” and “Supervisor Training”. Although these programs provided good information some of which was usable as far as administrative-related tasks, they were minimally transferable to the shop-floor which had direct bottom-line implications and worker-safety concerns. The thirty-hour Occupational Safety and Health Administration Safety Training certification class was useful to the extent of navigating the OSHA handbook (*29 CFR 1910*) and conducting proper and thorough safety inspections. However, front-line supervisors, me included, did not have the agency to resolve all safety-related infractions. What we did do was neutralize the safety infractions’ implication and affect until they were resolved during a scheduled repair turn. Small infractions could be easily resolved with minimal cost during a normal production shift by using existing materials and a couple of laborers. Larger infractions required shutting down a production unit or requiring significant capital costs had a longer resolution time line or was just delayed until the yearly scheduled two-week outage. Many times upper management would direct the front-line supervisors to “just work with it” until it can be resolved during a scheduled repair turn. This contradicted, however, with the formal safety policy, and its related training, and the direct order to shut any safety-compromised or unsafe operation down and resolve the safety issue. What became problematic was interpreting the extent and meaning of “safety-compromised or unsafe condition” from the perspectives of the upper management, the front-line supervisors, and the union workers. These “gray” areas created vacuous and ambiguous meanings not only among the different roles on the shop-floor and extending to executive management but also

among the front-line supervisors as well. Albeit, the front-line supervisors as well as the union workers knew we were operating in spite of being in OSHA violation, but no one had ever contacted OSHA, at least as far as anyone in authority knew, to report the situation. Many times union workers would threaten to file an OSHA complaint, but none ever followed through although the threat used as leverage, especially when favors were needed.

In light of the above, how do front-line supervisors learn to address and resolve shop-floor situations and crises, grounded in the current business climate, when formal policy falls short? In other words, what aspects contribute the most and to what extent do conditions play a role when making decisions and formal policy does not address it? In fact, we could ask in what sense does it make separate out conditions from practice, and what can be gained from thinking about this situation in a different way such that these 'things' are unified in analysis? How do front-line supervisors learn to perform the operations needed, or the action to take, when a shop-floor issues and crises rise? Upon what aspects do they draw to address and possibly address and resolve them? How do they form and implement the necessary plans that will resolve the problem(s)? Then, to what extent will their solutions be considered as part of the long term, to permanent, normal shop-floor practices should the same, or similar, issues should surface?

Problem Statement

Historically, corporations provided formal training regarding the front-line supervisors' (known as foreman in this period) position but from the corporation's perspective. In addition, the early training programs developed mostly from a business

and university partnership meaning these trainings were developed from expertly not directly connected on the shop-floor (Allen, 1922; Mellen, 1928).

In the course of job performance, most front-line supervisors gain a solid understanding of the production equipment as well as the necessary ancillary equipment and tools including the equipment's capacities and limitations. Moreover, this knowledge also contributes to how specific front-line supervisors are able to address and successfully resolve non-normal and crises situations. This consideration is very important since it has significant implication regarding one's acceptance and membership within the front-line supervisor group as well as perceived as a leader that can resolve shop-floor situations by executive management, their peers, and the union workers. The enormous bulk of this knowledge is informal. A comprehensive listing of it could be virtually endless.

However, let us take a basic example from a production unit that cleans steel coils. The maximum steel strip width is eighty-four inches wide. The average width was consistently between forty-five to fifty inches wide with the maximum width approaching seventy inches. Even at seventy inches, the width yields sufficient distance from the production unit's support beams and columns such that the production crews were able to deal with poor incoming quality causing the strip to track to one side and crash into the support structure. However, a new customer required eighty-three inch wide product thus creating obvious problems. Crashes create issues on many levels. One is it creates safety problems from the need to have union workers in the machine removing scrap. The second is creates for production-related issues since scrap removal time is production time lost. The third is creates quality problems due to coils falling out of spec regarding the minimum acceptable weight. Just one of these issues results in front-line supervisors

experiencing significant formal sanctions. However, many times, two, or possibly all three, may surface leading to severe career implications.

The need to resolve the tracking problem became important for all the reasons cited above. After lengthy discussions within the front-line supervisors group, establishing and maintaining working trust and relations with the union personnel, knowledge of the production machinery, and trial and error attempts, the problem was resolved and allowed for the production crew to process the incoming product with minimal to no problems. This example serves to illustrate the informal networks, experience, shop-floor knowledge, and discussions combining to address and resolve what was a no-win situation.

In addition to understanding the complexities regarding the shop-floor environment and the formal policies and procedures, they also need to grasp the workers' abilities, strengths, weaknesses, and work ethic. For example, if delivery-end equipment problems should surface due to mechanical breakdown thus impeding the finished steel coil's discharge from the line, a union worker can operate a tractor to remove the coils such that production continues unhindered. But since the coil is a finished product and has become a value added output, the worker also needs to not only be certified to operate the tractor but needs to be one of the highly skilled operators such that no damage is done to the coil, the equipment or a fellow workers are not compromised through tractor-operator error. However, this knowledge, which remains essential to successful front-line supervisor role negotiation, appears on no spreadsheet, and is not quantified or measured.

Learning opportunities seems to be directly dependent on one's location and participation in the shop-floor environment. Additionally, it may also depend upon one's acceptance not only as a member but as one to whom others will share knowledge. The bottom line is what knowledge is privileged and institutionally certifiable and what is not. However, the problem is formal training rarely offered the knowledge needed for immediate success. Moreover, the absence of this knowledge may put workers health and safety at risk or cause the front-line supervisor to become a liability to the corporation instead of an asset.

Using this as a springboard, the problem becomes how these informal instances of learning situations be empirically described and examined to offer how front-line supervisors learn beyond what is learned, and why it is learned. For example, Safe Job Procedures (SJPs) guide workers' shop-floor practices related to safety. In drawing this out with an example, one specific SJP details how a worker should cut the metal band that serves to bind a steel coil's wraps when resolving quality-compromised coils such that they will be acceptable for the customer. However, like all SJPs, it focuses on the step-wise movements of the operations and gives minimal consideration, if any, to the underlying conditions in which the worker will be conducting their task other than slip/trip hazards such as oil/grease or excess bands in walking area.

The key aspect of this would seem to be not only the physical step-wise movement performed by the worker, the front-line supervisor in this case, but also what knowledge is verbally shared, by whom, and with whom. Workers need become proficient not only in the physical, step-wise movements but also to understand why the movements exist and are performed in a specific manner. However, what about the times

the step-wise movements differ when the same operation is performed? What is/are the possible reason(s) this would be?

Workplace norms, practices, and formal policies and rules seem to influence shop-floor environment, workers' roles, hierarchies, and groups (Billett, Barker, & Hernon-Tinning, 2002, p. 4). Investigating the daily worker interactions, customer concerns, incoming quality, seasonal effects, etc, will permit a deeper understanding across the full range of shop-floor culture and environment.

The ability to examine the workers' engagement and interaction to such a depth would seem to offer some significant plausible explanations of worker learning since it would seem these issues would dictate and guide who had opportunities and possibly speak to issues of power. However, it may be somewhat daunting to grasp and account for all conditions; gaining an understanding of several key ones informing the workers' roles can uncover important concepts. This may also help to shed light on how front-line supervisors address and resolve situations where no previous occurrence or model from upon which to draw exists.

Framing this research study in the current reality of rapidly increasing technological advances, a global business climate, increasing environmental concerns, power concerns, tight steel industry economic conditions, and the need for quick decision-making, corporations strive for an unrelenting quest for excellence (Nora, 1990; Pauls & Waterman, 1982; Senge, 1990) in production and quality through employee involvement programs and businesses practices. Working as a safety trainer and a front line supervisor for close to fifteen years, shop floor presence was vital in the course of the required normal job duties. Shop-floor presence entails not only understanding the

various and specific steel production and ancillary services equipment but also the customs, norms, traditions, politics, and culture. The only way to negotiate shop-floor roles successfully was to have as thorough as possible familiarity with the associated environment as well as the workers and their movements. While working on the shop floor, I believed there existed an unspoken truth stating that safety was third behind production and quality, respectively, even though all the company documentation, training, and espoused beliefs stated otherwise. At times, fellow front-line supervisors, union personnel, and I would discuss how safety only seemed important when the production unit was operating near capacity and with minimal problems. It continued to remind me of the struggles my father and grandfather experienced that there is what is said and there is what is done. This meant formally privileging certain visible topics all the while; the invisible environment informed the workers otherwise. Convoluting this situation was the employee involvement program's documenting each crew's performance through quantitative measurement displayed through charts and graphs. During equipment malfunction, the "proper" procedure was to follow all safety rules but many observable "shortcuts" happened attempting to minimize production delays. In spite of fracturing formal safety, intimate shop-floor environment knowledge present at the time of shop-floor observations, as well as knowing the physical capacity of the production-related artifacts, permitted such shortcuts with little to no safety-compromised situations. But beyond that, there were times when an executive manager "heavily suggested" (i.e. ordered) front-line supervisors to "ignore" safety rules especially in times of critical production runs. However, if an accident or incident occurred, the onus was on the front-line supervisor since "they knew better" from their extensive safety training and

contacts. In spite of the “shortcuts” and “heavy suggestions” from management, the number of accidents and incidents were low. So, if this training was important (and it was very important for some reasons) then how was it that the shortcuts were actually safe? Were there additional or different knowledge experienced by those whose duties required their daily shop-floor presence such that it differed from formal written policy?

How then do front-line supervisors resolve a situation when no previous occurrence or model is available upon which to draw? Many good research articles exist that discuss others ways of learning beyond formal training and workplace education programs. The problem now lies in being able to empirically describe these situations and possibly develop some system that would help facilitate a consistent method in resolving the problem.

Research Questions

Using the rationale as a springboard, this study focuses on front-line supervisors in a union-shop, steel-production plant and how they learn to successfully negotiate their role with in the corporation’s division of labor.

By negotiating their role as understood in this study, it means a continued practice in how the conditions of standpoint, agency, power, oppression, habits, knowledge, related business concerns, mediating instruments integrity, etc, intersect that helps to shape, inform, and guide how one engages, conducts, discusses, confers, consults, bargains, agrees, and settles the various issues bounded within the workplace environment. To be successful, a front-line supervisor needs to receive continued validation confirming how their superiors perceive their compliance in regards to formal jointly agreed performance parameters and proper expected response to shop-floor

stimuli. But, what additional aspects exist that front-line supervisors draw upon that are beneath the surface that need appropriate responses?

Moreover, what about the times the step-wise movements differ when the same operation is performed? What is/are the possible reason(s) this would be?

The following research questions guide this study.

1. What shapes and informs front-line supervisors learning?
2. What do front-line supervisors draw upon to develop and use supervisory skill?
3. How can informal instances of learning be empirically described in light of the full, complex range of artifacts, interactions, and shop-floor situations?

Chapter 3. LITERATURE REVIEW

Knowledge: Marginalized and Privileged

Considerable workplace learning research exists over the last century. The early research until quite recently shows the dominant voice coming from the ownership, executive management, perspective [see for instance (Baldwin, Danielson, & Wiggenshorn, 1997; Craig, 1976; Ellis, 2003; Enos, Kehrhahn, & Bell, 2003; Gilley & Eggland, 1989; Gordon, 2000; Heyel & Nance, 1984; Mathys, 1993; Mellen, 1928; Nora, 1990; Reittel, 1937; Roethlisberger, 1968b; A. Rose, Jeris, & Smith, 2004; Stein, 2000)]. Sawchuk (in press) has summarized this tendency in his review of workplace learning research by noting this same tendency, while also documenting the dominance of individualist perspectives in workplace learning research across the multiple disciplinary traditions that have traditionally produced insights on workplace learning including HRD, Adult Education, Organizational Development, Organizational Studies, Organizational Behavior/Industrial Psychology, Management Studies, and to some degree offerings from the fields of sociology of work, anthropology of work and so on. Although the dominant voice has not changed, another research perspective is present. This voice is from those investigating workplace learning either from the worker-side, considering power issues, or both.

Based on workplace research projects investigating informal learning, Marsick & Watkins state that “Informal and incidental learning take place wherever people have the need, motivation, and opportunity for learning” (2001, p. 28). They argue that workers can create their knowledge from each other and within the culture of the workplace community. At the heart of the issue was the ownership and control of employee

knowledge. As Fenwick (2006) stated, "...workplaces are well recognized as significant developmental sites for adult learning, change, and resistance." (p. 187). Marsick & Watkins observed "... we note that learning begins with some kind of trigger, that is, an internal or external stimulus that signals dissatisfaction with current ways of thinking or being." (2001, p. 29). Taken together, the idea is that workers doing the job may find some frustration with the corporate-driven practice and standards as it may not be completely applicable across all contexts such that the employees make conscious decisions regarding alternative actions. They gain the ability to resist and change the current and accepted practices through the knowledge they gained while doing the job. Their argument includes little on addressing structural issues that lead to their current reality but speak to address the smaller issues located within their control. They also make the assumption that a small collective group seems to be in control of their environment and no mention or implications are given regarding their rules, practices, and policies. In other words, it seems their argument does not include possible impacts from the socio-historical construction and development/evolution of their work environment, rules and policies, and mediating instruments present in their work environment.

A major assumption they make is that workers are able to construct and change their knowledge as they deem it with no consideration to external factors and control. However, they do acknowledge that workers can construct their knowledge rooted in social situations. As Sawchuk (2003) argued, "What were needed were tacit skills, practical connections, and access to the knowledge hidden in the cracks and crevices in people's lives in and beyond work" (p. 2) and he further states "What I saw was one's

knowing – even for the most experienced worker on the floor – depended upon ongoing integration with others” (p. 2).

Livingstone & Sawchuk (2004) and Sawchuk (2003) argue that knowledge and power are intimately related. They argue that there are two types of knowledge: privileged and marginalized. Privileged knowledge is institutionally certified and is the knowledge of top executives, managers, and professionals. As we shall see, an example of this that emerges in the research in this thesis is when the Safety Department issues a new or revised procedure in response to a change in OSHA’s policy. The new or revised procedure gains immediate acceptance as college-degreed professionals developed and issued it. It becomes problematic, however, in that corporate structure and control institutionally bind any “new” ideas or approaches. Thomas (1993) argues “We create meanings and choose courses of action within the confines of generally accepted existing choices, but these choices often reflect hidden meanings and unrecognized consequences” (p. 3). The implication here is the “business as usual” has precedence and all externally introduced elements get filtered through these people’s professional expertise and knowledge scope regarding the specific topic matter in question. The trouble is these people are mostly divorced from the shop-floor and most interpret external elements through a decontextualized lens. In other words, they overlooked conditions when integrating the external elements into the shop-floor environment.

For example, the plant’s safety professional may modify the formal safety procedures based on a revised OSHA ruling. This becomes problematic when it creates unforeseen safety compromises through hidden contradictions between the interpretation and reality. Hence, the plant’s official interpretation and subsequent implementation, the

certified knowledge, lies with the degreed professional's shop-floor understanding. Historically, this has been the practice and it has received little to no questioning. The issue lies now with those who must implement and enforce it on the shop-floor. The revision's implementation is imperative and requires compliance but, in practice, it gives rise to unforeseen compromised safety situations that front-line supervisors must resolve. Failure to implement the new rule could result in formal sanctions implicating the front-line supervisors' professional future. Implementing the rule may cause an accident and/or injury meaning the front-line supervisor and/or the union worker(s) was erroneous and careless thus resulting in the current situation or crisis.

This example illustrates the front-line supervisor must insure the union workers' revised operations in response to a revised formal rule that, realistically, causes increased compromised-safety prior to the rule's implementation. The problem occurs from the safety professional's lack of shop-floor knowledge and understanding (possibly from being divorced from the existing shop-floor conditions) but whose perspective merits institutional certification. This creates a contradiction that may or may not lead to the plant reconsidering the recently revised rule's interpretation through front-line supervisors openly questioning not only the safety professional's interpretation but also the current practice of theirs being the "official" interpretation. Even in times when a front-line supervisor's suggestions gains official review, its acceptance hinges on the professionals endorsement.

Marginalized is the other knowledge type. Marginalized knowledge and skills are co-created by the hourly, wage-earning people and the front-line supervisors firmly rooted in the environment but tend to have their knowledge institutionally ignored

(Livingstone & Sawchuk, 2004; Sawchuk, 2003). This study compliments Livingstone and Sawchuk's work through investigating front-line supervisors as their researched workers and the elites. They learn this knowledge in or out of the workplace but found uses in the workplace arising from co-constructing a response to resolve a situation or crisis. An example of the front-line supervisor's knowledge as uncovered in a previous study (Lord, 2005) that will serve to illustrate this point relates to knowing when to adjust the looper-pit-support-gate-rollers. The roller gates are located in the line that permits the steel strip unhindered movement through the looper pit that serves as an accumulator. An accumulator assures continuous line production by making welding time transparent to the shearman. Many times, incoming product was thin (0.072") and wide and had experienced production issues resulting in a wavy strip side. This resulted in a tracking problem due to its nature to crawl to one side and crash into the support superstructure. A crashed strip caused production, as well as safety and quality, issues. Being that the product was thin, increased line tension may have torn the strip.

The resolution was to adjust the roller gates in the overflow pit that would "push" the strip back to center. Moreover, gate adjustment demanded locking out all power sources to adjust the gates. The lock-out/try-out procedure takes time and they confirm the gate's position through strip movement to verify the correct gate offset angle. Therefore, there were two items here. One, knowing to what degree the gate needed offset from straight alignment. The other is the knowledge to perform such a task safely. Both actions were not complicit with formal policy and the safety-related item could bring formal sanctions. However, front-line supervisors', millwrights', and motor inspectors' collaborative production line knowledge permitted task completion. The

result was invaluable thus providing the production crew with the opportunity for maximum quality production in a safe environment. This knowledge would never be formally recognized nor certified but certain executive management personnel was glad it was done but did not “want to know about it.”

Front-line Supervisors

Front-line supervisor is one role located in the division of labor and evolved from the originally “foreman” title. As the industrial revolution gained strength, the owners grew their businesses and they began to expand to around the clock production six, and seven, days a week, the owners needed people to run the business in their absence. Business owners selected foremen from the workers’ ranks due to their demonstrated work-skill-knowledge and productivity (Cushman, 1938; Gardiner, 1945; Gilbreth & Cook, 1947; Leiter, 1968; McCaully, 1948; Mellen, 1928; Patten, 1968). However, contradiction and discrepancy encapsulated the position in both its understanding and perception. As Roethlisberger (1968) argued, “Nowhere in the industrial structure more than at the foreman level is there so great a discrepancy between what a position ought to be and what a position is” (p. 36).

Foremen were usually the better/best workers chosen for their skill and expertise relating to the job in hopes of transferring their work-style to fellow workers, anticipating being a good leader. Although the possibility exists of them being a ‘natural leader,’ the role of front-line supervisor (foreman) has much more imbued upon it and embedded within it (Grimm & Dunn, 1986; Hopper, 1967; Johnson, Kahler, & Paulson, 1967; Patten, 1966, 1968). Especially in the fast-paced global market, their formal obligation to the corporation and the necessity to guard its interests becomes increasingly complex

(Cooling, 1955; Gardiner, 1945; Gilbreth & Cook, 1947; Grimm & Dunn, 1986; Heyel & Nance, 1984; Ulrich, Booz, & Lawrence, 1950; Yanouzas, 1958). Among the many front-line supervisors' functions is to manage people, the product, machinery, hold accountability, and discipline (both formal and "in-house") when needed (Allen, 1922; Cushman, 1938; Heyel & Nance, 1984; Leiter, 1968; Mellen, 1928; Patten, 1968; Reitell, 1937; Roethlisberger, 1968; Seimer, 1959; Walker, Guest, & Turner, 1956; Walton, 1941).

As this position matured and evolved over time as normal business practice, several contradictions soon arose. One is rooted in the idea that being the best worker does not necessarily translate to one being a good manager. Their identity grew partly from the worker (working class) and perceived as skillful (benefiting the business). It seemed that the owners made the initial assumption that superior workers will be good quality managers with the proper training and perspective (Allen, 1922; Cushman, 1938; Mellen, 1928). Another contradiction rested in the fact that the front-line supervisor as caught in the middle between the owners (now the corporation) and the workers (Allen, 1922; Bittel, 1959; Elangovan & Xie, 1999; Leiter, 1968; McCaully, 1948; Patten, 1968; Reitell, 1937; Roche, 1951; Therkelsen & Fiebich, 2003; Walker, Guest, & Turner, 1956; Walton, 1941). The front-line supervisors' identity formed socially-historically as a worker but they now had to put themselves in the position to manage the same people with whom they identified and were once a member.

Those front-line supervisors who enter the industry through having a college degree finds the job not much easier and may, at times, be harder (Hopper, 1967; Johnson et al., 1967; Patten, 1966). Although they have little to no social ties with the union

worker, their major obstacle takes the form of not knowing 'how things work' on the shop floor and must be quick to learn the process in addition to their role and responsibilities. Having come from outside the business seems to not afford an easier time of negotiating the role of front-line supervisor over those who were promoted from the rank and file. In addition to not having 'experienced' the process of the specific department and unit and a lived-experience of socialization and networking, other issues may come on the form of gender, class, race, etc.

Although the position was borne out of necessity, many in the literature question its usefulness and value (Grimm & Dunn, 1986; Metzgar, 2006; Patten, 1968; Yanouzas, 1958). Some consider the position an unnecessary evil and its actual usefulness has waned especially in light of the numerous employee empowerment programs and advanced technology. They argue that front line supervisors are considered a necessary evil (viewed more of a liability than an asset), excess baggage, and not really management (Collins & Holton, 2004; Dawson, 1991; Del Brocco & Sprague, 2000; Gilley & Boughton, 1996; Gordon, 2000; Hayden, 1999; Henderson, 1993; Johnson, 1994; Jones, 1995; Kay & Christophel, 1995; Kincaid, 2003; Lindner, 1998; Longenecker & Neubert, 2003; Nora, 1990; Senge, 1990; Therkelsen & Fiebich, 2003; Yang, K., & Marsick, 2004). The bottom line is they believe that front line supervisors have outlived their usefulness and have become "dinosaurs." Child and Partridge [1982, as cited in Dawson, 1991)] states that supervision problems are created by management through: "an imbalance between authority and responsibility; a misunderstanding of what the job entails; poor remuneration; and an unwillingness to accept line supervisors as part of the management team" (p. 36).

A second consideration is the idea of the position's metamorphosis from authoritative dictator to one of a coach or facilitator (Collins & Holton, 2004; Craig, 1976; Ellinger, Ellinger, & Keller, 2003; A. D. Ellinger, Watkins, & Barnas, 1999; Ellinger, Watkins, & Bostrom, 1999; Johnson, 1994; Nora, 1990; Senge, 1990). The former is located in the steel production plant's historicity in the manner of worker management. Workers were told to "leave their brain at the gate" and were told what to do, how to do it, and where it is to be done by management including the front-line supervisor (or at that point in time, foreman). However, as the global market began to expand and more efficient methods were being sought, this dictatorial style began to be phased out and evolve into alternative management styles embracing being more lean and would espouse more worker inclusion in decision making and training (Cheser, 1998; Clark, 1998; United States Steel Corporation, 1990; Field, 1997; Marsick & Watkins, 1992; Mathys, 1993; Nora, 1990; Senge, 1990) thus minimizing the need to the authoritative figure. The latter supports the idea that the role of the front line supervisor is mentor and a mediator of employees' personal growth and development especially in light of a changing workforce composition (Deal & Kennedy, 1999; Doloff, 1998; Losoncy, 1995; Lynch, Leo, & Downing, 2006; Macneil, 2001; Wayne, Liden, Kraimer, & Graf, 1999; Wilsey, 1995). With the advent of the many employee involvement programs and personal development philosophy, limited power has been given to workers (at least perceivably) through work teams and continuous improvement development (Bacon & Blyton, 1999; Coupland, Blyton, & Bacon, 2005; Hodson, 2002; Kasl, Marsick, & Dechant, 1997; Marsick, 1990). Somewhere along this continuum is reality.

From the position's inception and to present day, businesses did try to address these issues and conducted many training programs and workshops for the foremen. These programs were designed and delivered by the owners and executive management and were, in many instances, done in collaboration with a university or college or an engineering staff (Allen, 1922; Cushman, 1938; Heyel & Nance, 1984; Mellen, 1928; Reitell, 1937; Roche, 1951; Ulrich, Booz, & Lawrence, 1950; Zaleznik, 1951). When considering the history of "foreman/supervisor training" programs, a common theme is they deliver instruction regarding rules, policies, procedures, programs, safety, etc "...to develop, on the part of the foreman, a correct perspective of his relations to the men under his control and to the management" (Mellen, 1928, p. 5) enabling the foreman/front-line supervisor "...getting work done ... tells the working force what to do, how to do it and when it is to be done" (p. 5). The phrase "a correct perspective" becomes problematic, though, in the fact that what is "correct perspective" seems to ignore or devalue the underlying conditions in which the front-line supervisor's perspective is practiced and constructed. Without these additional considerations, it would seem that "correct perspective" is only informed by formal policy that offers what *is* to be performed in all situations. However, the front-line supervisor does not manage in a vacuum meaning that other considerations need to be counted in the forms of mediating artifacts capacities and limitations, worker attitudes, seasonal and environmental effects, incoming product quality and composition, accidents, and issues of power, to name a few. What this all boils to front-line supervisors in the course of negotiating their role have gained knowledge permitting them to make the necessary decisions to resolve shop-

floor issues when against the backdrop of what they know and the available information at the time.

However, workplace learning exists and is experienced in a “contested terrain of social, political and economic struggle (Bratton, Mills, Pynch, & Sawchuk, 2004, p. 103). Schied (1995) adds that management developed ways to shape and control workers as well as the work including front line supervisors. A difference exists between privileged knowledge and “really useful knowledge” in which official and formal training classes and its content are rooted. Most often, training content is rooted in formal policy most of which is either written by people not working on the shop floor and no understanding of the daily operations and issues associated with it or has become outdated due to technological and customer demands and changes. Nora (1990) states management has the responsibility to train their employees and provide them with every opportunity to succeed. The problem is what criteria are used to measure or evaluate “opportunity to succeed” and who determines it.

A significant amount of literature discusses front line supervisors as perceived by upper management and associated front-line supervisor training, their performance improvement, as well as a plethora of training programs designed to strengthen the front line supervisors’ ability to hold accountability and manage the shop-floor grounded in corporate policy and procedures (Allen, 1922; Bratton, Mills, Pynch, & Sawchuk, 2004; Cooling, 1955; Cushman, 1938; Dawson, 1991; Deal & Kennedy, 1999; Del Brocco & Sprague, 2000; Gardiner, 1945; Gilbreth & Cook, 1947; Hayden, 1999; Heyel & Nance, 1984; Leiter, 1968; Lord, 2001; McCaully, 1948; Mellen, 1928; Nora, 1990; Patten, 1968; Reitell, 1937; Roche, 1951; Seimer, 1959; Therkelsen & Fiebich, 2003; Walker et

al., 1956; Walton, 1941). The problem arises when trying to transfer the instruction to the shop floor. A thorough understanding of formal policy is very important and definitely has its uses and some formal policy parts may even have direct shop-floor applicability. But how do front-line supervisors learn the knowledge beyond what the formal part has to offer? Many argue that the really useful knowledge is social constructed, sometimes termed “the people’s knowledge,” and gives consideration to the argument that the person is part of and deeply immersed in a society including the full range of emotions, politics, mediating instruments, resources, agency and not divorced from it in the form of a Cartesian individual. Bratton, Mills, Pynch, & Sawchuk (2004) argue, “we consider learner-centredness . . . does not come close to approximating the political and ethical dilemmas, the contradictions, and the possibilities of collective action” which seems to support a more accurate description of describing the impacts associated with training design and delivery. Learning is constructed through meanings ascribed to the physical environment, the underlying conditions, the mediating instruments, operations and actions, language, signs and symbols, the rules, the division of labor considerations, and the “good and knowledge of the whole” and does not happen in a vacuum. The major critique of formal learning is it decontextualizes the concepts and practically supports learning in a vacuum and compromises how well formal learning translate to “the real world” with real people and group dynamics and interactions (Moxnes & Eilertsen, 1991)?

In reviewing these programs, the content seems to have been comprised from either privileged or declarative knowledge. This would continue to plague training programs even to the present. One surfacing problem is the seeming mindset that all

problems can be solved through the application of training. Training application has its usefulness and purpose however there are also times when training is not warranted, or needed, and may exacerbate an issue. As Brattan et al, argued, “learning is part of a management strategy to achieve sustainable competitive advantage” (2004, p. 11) but how does management determine what needs to be learned and *how* is learning experienced. Drawing upon the previous sentence, trainers need to conduct deeper workplace investigations by considering the shop-floor culture that includes its traditions, tools, rules, signs, symbols, and underlying conditions. Although research literature exists that begins the discussion, further research needs to advance the discussion. A significant amount of training programs rise from the Industrial Engineering Department’s work observing employees while performing their normal tasks. What they do not consider are the underlying conditions present at the time of the study. Many times, shop-floor issues are the result of contradictions that are structural in nature as discussed earlier. And merely throwing training at some issue may completely be out of context.

For, and returning to the earlier example of the thin and wide incoming product, the front-line supervisors had performed the task of managing the crew as they process the wide and thin product. Further training on Standard Operating Procedures, Safe Job Procedures, Standard Quality Policy, Conflict Resolution, Making Meeting Work, etc. will not provide them with the knowledge they need to provide the best resolution to process the wide and thin product. Either they run the production line slower than normal and fail to meet expected production parameters or they increase line speed thus subjecting the steel strip to crash and create quality- and safety-compromised situations. With either decision, the front-line supervisor will experience formal sanctions – a no-

win situation with the strong possibility that such a sanction will be in their permanent file. This is an example of where a contradiction rises between activity systems' objects rooted in formal policy and incoming product quality. Contradictions are an aggravated structural tension and a dichotomy existing within or between activity systems and may shed light on learning outcomes experienced by front-line supervisors as they strive to resolve contradictions. In addition, as negative as it may sound, significant learning seems to arise from no-win situations. In other words, no matter what decision the front-line supervisor makes will be the wrong one for which they will experience some level of sanctions.

Caught in the Middle

The front-line supervisor seems to have a duality of purpose. The first purpose is they represent management to the union and the second purpose is they represent the union workers to management. The front-line supervisors are charged with holding union workers accountable to the company's formal policies and procedures—whether its safety, production, quality, etc—and are expected to level formal sanctions and appropriate discipline. Many front-line supervisors received promoted from the union ranks (Cushman, 1938; Heyel & Nance, 1984; Leiter, 1968; Mellen, 1928; Patten, 1968; Reitell, 1937; Walton, 1941) creating intra- and inter-personal conflicts as well since they must now exercise their power in the best interests of the corporations and not in the view of the collective bargaining unit. Such procedures are rooted in and governed by both internal and external entities most of whom are divorced from the shop-floor. Front-line supervisors are charged with “running the business” and are expected to meet and exceed production and quality objectives while enforcing safety, environmental, and cost-

reduction practices. The problem is the raw statistical figures on production, quality, and safety summaries that executive and staff management review do not offer sufficient consideration regarding the equipment limitations and depreciation, product mix, socio-historic issues, and cultural impact.

Existing in contrast to their corporate responsibilities and obligations, front-line supervisors work day-to-day and side-by-side with unionized steelworkers and have often developed strong working relationships and personal friendships with them. This close relationship means that frontline supervisors and the unionized workers often have very similar concerns (Kay & Christophel, 1995; Longenecker & Neubert, 2003; Moxnes & Eilertsen, 1991; Nora, 1990; Therkelsen & Fiebich, 2003; Zemke, 2000). In actual practice, front-line supervisors face competing agendas and interests that force them to negotiate among these competing agendas and are often caught between rival and sometimes contradictory union and corporate perspectives on safety, production, quality, among other concepts and issues. Moreover, front-line supervisors face pressure to reconcile safety concerns with competing organizational pressures stemming from actual dichotomies between production schedules, quality concerns, and issues of employee involvement as well as holding accountability regarding formal corporate policy and procedure (Brattan et al., 2004; Darrah, 1996; Dawson, 1991; Drago-Severson, 2004; Enos, Kehrhahn, & Bell, 2003; Gee, Hull, & Lankshear, 1996; Grossman, 1996; Hayden, 1999; Hoerr, 1988; Kincaid, 2003; Longenecker & Neubert, 2003; Rinehart et al., 1997; Sawchuk, 2003).

For example taking the safety issue, why is a comprehensive safety program (that in which all proper and required safety mechanisms are in place) practiced only during

specific times. Granted, the formal policy dictates continuous formal safety program compliance (OSHA, 1997). Nevertheless, why are mandatory sanctions issued for no or missing motor guards but ordered to keep the line running when the guards are missing during critical production runs? Shop-floor safety's history embeds hostile and contentious management / worker relations from the steel production's infancy through present day (AFL-CIO, 2001; Bacon & Blyton, 1999; Brody, 1969; Kincaid, 2003; Metzgar, 1999, 2006; Roche, 1951; Somerville & Lloyd, 2006; USWA, 1974).

This is, seemingly, where the bottom line trumps safety at least from the front-line supervisors' perspective. Upper management orders front-line supervisors to deny anyone being near the missing guard area(s). Therefore, this becomes a multiple-level compromised situation. One, is it ethical to allow production unit operation if all safety mechanisms are not complete? Moreover, what options exist if a situation rises such that a worker's normal job duties require their presence in the safety-compromised area? One option is to shut the line down during the specific time needed for task completion, how would the front-line supervisor explain the delay? If they tell the truth, they are technically insubordinate since upper management directed them to keep running while assuring no one will enter the questionable area. Although they have a solid argument to justify their decision supported by formal and federal policy, it will not be without implications (such as pay raises and promotions). Alternatively, do they create and document a fictitious delay (since something always happens) for turn-report recording if production is paused for safety corrections? The second option is unimpeded continued production while the worker performs the required task and their individual safety becomes compromised and, at the worst, an injury or fatality occurs. However, the

worker can refuse completing the task and begin arguing with the front-line supervisor with the possibility of additional union workers joining their fellow union member. Again, this is not without consequences as this will endear upon the union workers the front-line supervisor's character, values, and morals. Union mistrust does not bode well regarding front-line supervisors' career and success when managing work in danger-laden environments.

Beyond this and leading to the broader structure, front-line supervisors are experiencing contradictory expectations by being told to shut down operations for safety concerns (per formal safety policy) in one circumstance and being told to keep running and achieve the necessary production-numbers (as per formal business policy) in another. During the latter, upper management directs them to assure no one enters the safety-compromised area. This adds the extra burden of "baby-sitting" safety-compromised areas in addition to the other duties. Beyond that, these types of situations have implications for future courses of action and developing in the front-line supervisors' decision-making the always second guessing aspect to a point where they make hasty decisions or, even worse, no decision at all. Such a learning outcome holds potential disaster since hasty, or no, decisions can lead to wrong or bad decisions resulting in accidents, incidents, and/or injuries all of which result in either human suffering or pain and/or money loss. Making no decisions thereby may lead to either the union workers making them for the front-line supervisor and losing respect for them. On the other hand, the front-line supervisor will contact upper managers for advice regarding most/every major decision thereby causing their superiors to lose trust and confidence in them as well as implicating their upward mobility.

On a third level, the Basic Labor Agreement and the Occupational Safety and Health Administration both stipulate the ability of any worker to shut down a job they deem unsafe. Although this is seemingly innocuous since this is the legal and ethical course of action, it is not without consequences. Such a consequence is upper management's mental perception and note that this job shut-down happened on this specific front-line supervisor's watch. Translated, this will hold implications for their next job performance evaluation and raise/promotion considerations since they "permitted" this to happen. The preceding example serves to illustrate a very real situation illustrating being caught in the middle and, conversely, the no-win situation.

Isolation

Wenger stated that to be a full participant in a community, "it is just as important to know and understand the latest gossip as it is to know and understand the latest memo" (Wenger, 1998, p. 74). By this notion, frontline supervisors are full participants in neither. The front-line supervisor is considered corporation management but is located at the lowest corporate hierarchical position.

Beyond that, the front-line supervisor position's very nature requires working a non-daylight-specific schedule meaning they work rotating shifts, weekends, and holidays side-by-side with the union workers and participate fully in the shop floor culture. Livingstone & Sawchuk (2004) argue "co-workers, predominantly through various informal networks, collaborate and construct a skills and knowledge 'scaffold' for greater individual and collective knowledgeability." Hence, this lack of total immersion in the daylight culture in which executive (upper) management and staff operate excludes the front-line supervisor to very important social networking and

knowledge acquisition/scaffolding opportunities in the workplace and denies them complete access regarding the collective knowledgeability. Outside the workplace, front-line supervisors' membership in the management ranks provides them the opportunity for attending the various social functions such as the yearly management club picnic, the Christmas Party, etc., but their schedule becomes a barrier to full participation. These social functions allow for informal discussions regarding work, family, hobbies, sports, etc with those members who have the power to advance their careers. However, Sawchuk (2003) states "What were needed were tacit skills, practical connections, and access to the knowledge hidden in the cracks and crevices in people's lives in and beyond work" (p. 3). Since these functions are planned with respect to those management members who experience the daylight culture to which front-line supervisors do not consistently participate resulting in limited social and networking opportunities with those who evaluate and promote them and authorize salary increases. The other drawback rising from this limitation is minimal exposure and experience to the language, knowledge, and culture embedded in the daylight work schedule. A concept readily revealed in the front-line supervisors' yearly evaluations that have direct implications regarding promotion and salary increases.

Working back turns (afternoon and midnights) and holidays would seem suggest that front-line supervisors have more networking opportunities and collaboration with and participation in the shop-floor culture with the union workers. Beyond this, many front-line supervisors were promoted from the union ranks further cementing the notion of being more similar with the union workers. However, front-line supervisors are not rank-and-file members meaning they have no real inclusion in the union-workers'

community and union workers do not evaluate and promote them nor do they authorize pay increases. However, front-line supervisors are daily exposed to and experience the shop-floor language, knowledge, and culture but rarely are worker knowledge institutionally recognized and certified (Billett, 1995, 2004; Clegg & Ross-Smith, 2003; Darrah, 1996; Garrick & Rhodes, 2000; R. Johnson, 1979; Livingstone, 1997, 2001; Livingstone & Sawchuk, 2004; Sawchuk, 2003; Schied, 1995; Schied, Carter, Preston, & Howell, 1997).

A Critical Perspective

Only recently have researchers begun to examine privileged knowledge and the people's knowledge [see for instance (Adams et al., 1997; Billett, 2002, 2004; Boud & Middleton, 2003; Boud & Solomon, 2003; Brattan, Mills, Pynch, & Sawchuk, 2004; Clegg & Ross-Smith, 2003; Darrah, 1996; Fenwick, 2001; Gee, Hull, & Lankshear, 1996; Hodson, 2001; Livingstone, 1997, 2001; Marsick, 1990; Newman, 1993; Sawchuk, 1997, 2001). What are significantly limited are the discussions regarding power and agenda embedded within the training curriculums and little to no mention regarding the need to challenge the current design and delivery of them. Front-line supervisors have real power given to them by their position and possibly some earned respect but no authentic inclusion within the union members' community. They also have the power to challenge authority but not without ramifications. Power is an issue very hotly contested in a union shop, heavy industry workplace (Bent, 2003; Cervero & Wilson, 1994; Clegg, 1987, 1998; Elangovan & Xie, 1999; Freire, 1985; Gaventa & Cornwall, 2001; Kothari, 2002; LeCompte, 1995; Mishler, 1986; Myers & Young, 1997; Opie, 1992; Weiler, 1988) as evidenced in the daily battles over safety, production, and quality issues that is informed

by formal corporate policy and procedures against the back drop of the Basic Labor Agreement (BLA) between the Corporation and the Union. As Gaventa & Cornwall state, “In some situations, the asymmetrical control of knowledge productions of others can severely limit the possibilities which can either be imagined or acted upon...” (2001, p. 72). Having to daily negotiate between the two ends of privileged knowledge and shop-floor knowledge supplemented by the formal policies and the BLA, front-line supervisors seem to perform their role along the continuum.

The other concept missing from training is the inclusion of the inherent shop floor artifacts and environment that both, directly and in-directly, affect the transfer of training to practical application. Cole (1999) states that

“...an artifact, a material object that has been modified by human beings as a means of regulating their interactions with the world and each other. Artifacts carry within them successful adaptations of an earlier time ... combine the ideal and the material, such that in coming to adopt the artifacts provided by their culture, human beings simultaneously adopt the symbolic resources they embody” (p. 90).

Training that does not include the shop-floor artifacts and environment is divorcing itself from reality and thus seemingly provided in a vacuum and decontextualized to an extent. Starting with Vygotsky (Vygotsky, 1978), furthered by Leont'ev (Leont'ev, 1978), and continued by Engeström (Engeström, 1999b, 2001; Engeström, Miettinen, & Punamäki, 1999a), tools (signs, symbols, and artifacts) mediate humans' interaction between them and the object (whatever the object may be) as was

discussed earlier. Not considering this would seemingly result in incomplete and haphazard training. Very little research, if any, even when employing a critical lens that argues the need to question why and for whose purpose, still makes little to no argument for the mere inclusion of tools and their impact and interpretation on the shop-floor in assisting in the training's transference. Brattan et. al. (2004) state "The Taylorism and Fordism movement in work design should be interpreted as a shift in the locus of production knowledge from shop-floor workers to management" (p. 13). However, this decontextualization of the shop-floor knowledge and a rejection of the embedded symbolisms potentially would be the very culprit for the erosion of training programs and their success in transferring to the shop-floor. The argument would be when the shop-floor knowledge shifted to management control; the historicity of the knowledge becomes lost over time thus rendering the knowledge as just information with no foundation of its origin.

Chapter 4. CULTURAL HISTORICAL ACTIVITY THEORY

Perspectives and Theoretical Framework

Background

The theoretical framework for this study was Cultural Historical Activity Theory (CHAT). This chapter will introduce and illustrate CHAT's fullness as a theoretical framework capable of identifying and describing informal instances of learning. Lord & Sawchuk (2006) stated,

“CHAT is a specific tradition of analyzing learning and human development that accounts for informal as well as formalized learning; consciously directed as well as tacit learning; individual as well as collective practice; material, organizational and cultural barriers and supports. This offers a systematic social analysis of learning throughout its full range of variation, but never loses sight of the deeply human face of human development” (p. 1).

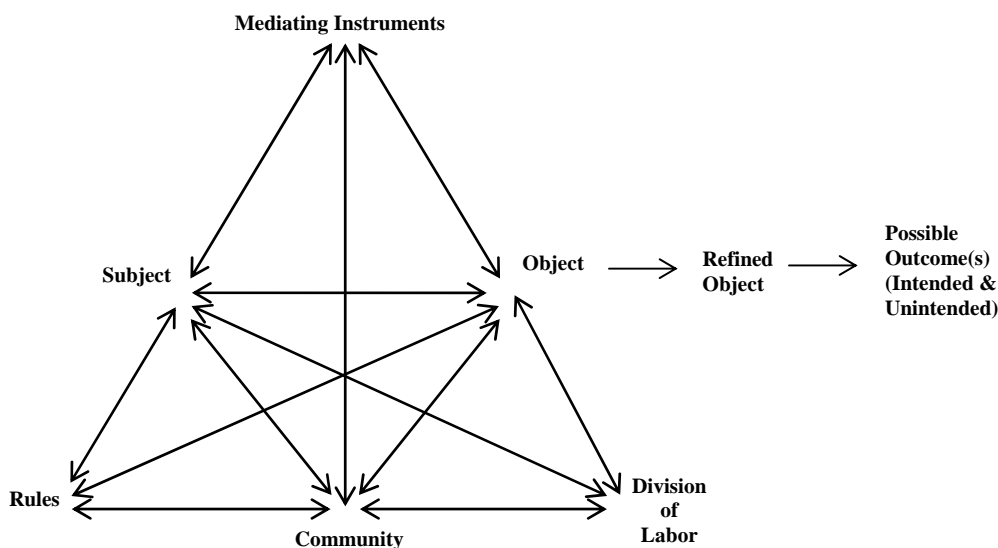
In fact, as I will try to show, one of the important strengths of CHAT is its ability to investigate human learning and change located within their specific reality and not divorced from their socio-historical context.

CHAT's approach maintains that understanding the fullness of human actions and operations inclusive of individual and group learning are better when located within the larger *system of activity*. This larger activity system is considered against a longer time span of its development, and is said to be object oriented which establishes the importance of both broader, presumed purposes of people's practices and the immediate, practical needs of them as well. All elements of an activity system carry embedded within

it a history, the development and evolution of labor, interactions, mediating instruments, rules, operations, actions, objects, etc.

Based on the works of the founders of what is known as the Cultural Historical approach Vygotsky and in particular Leont'ev, Engeström developed a diagram (see Figure 4.1) that illustrates the different elements of an activity system (Engeström, 1997, 1999a, 2001; Engeström, Mietinen, & Punamäki, 1999). The elements of CHAT (see Figure 4.1) are the subject, object, mediating instruments, rules, community, and division of labor. With its roots in Marx, Vygotsky, Leont'ev, and, more recently, Engeström and Sawchuk, CHAT provides a descriptive tool that has the ability to explain how learning something is accomplished which maintains a strong, inherent and comprehensive linkage to social, historical as well as political and economic contexts in which this learning occurs.

Figure 4.1: Engeström's CHAT diagram



More specifically, Leont'ev (1978) argued, "Activity is the minimal meaningful context for understanding individual actions...The activity of individual people thus depends on their social position, the conditions that fall to their lot, and an accumulation of idiosyncratic, individual factors." (p. 10). It considers the subject (i.e. the individual or the group) as part of a functioning society (as a whole) and not isolated from it (Engeström, 1999b) and uses the subject's perspective to investigate an activity. CHAT accomplishes this through examining the subject's standpoint, agency, role, actions, and reactions in fulfillment of some desire, fully immersed in their surroundings and context such as rules, division of labor, mediating instruments, etc as illustrated in Figure 4.1. Of important note are the double-ended arrows located between each CHAT diagram element. They represent the two-way elemental interaction meaning one element can inform, shape, and guide another.

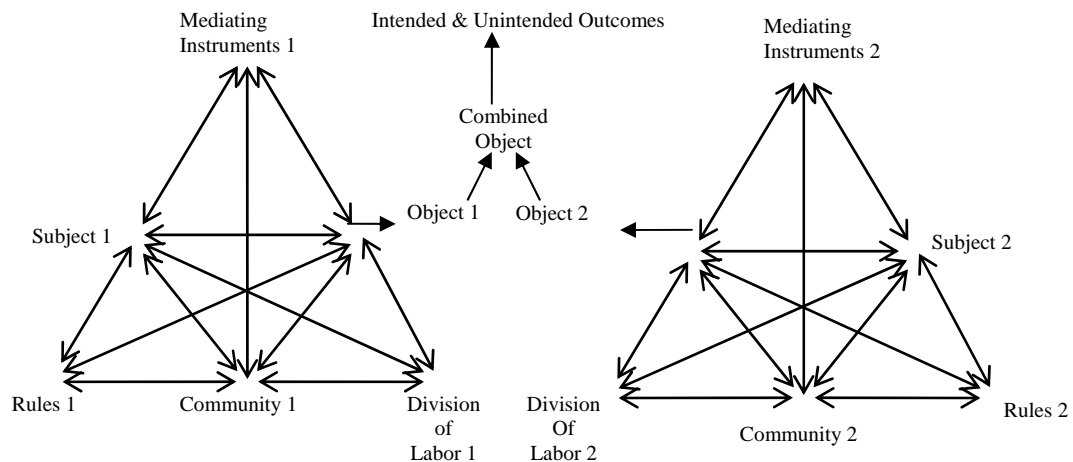
As Leont'ev (1978) stated, "It is evident that the activity of every individual man depends on his place in society, on the conditions that are his lot, and on how this lot is worked out in unique, individual circumstances" (p. 10). This means a specific subject participates in activities located within their operational scope. Their access and opportunity (i.e. "their lot") encumbers immediate and accepted activity participation accessible to other community subgroups enabling increased probable upward mobility. However, this will not permanently relegate them to locked positionality as opportunities may rise depending on one's conditions and motives (desires). Beyond this, a CHAT approach also urges consideration regarding the existing conditions (see discussion below) as well as the individual's unique socio-cultural formation and history.

Individuals within the collective subject all participate in transforming the activity system's object in response to some motive, or desire (Engeström, 1999, 2000; Engeström, Miettinen, & Punamäki, 1999; Sawchuk, 2003). Although many individuals may be in a group participating in an activity, each subject may/will have their specific motive. An individual's formation and history will shape and guide their interpretations, standpoint, and agency within the collective as no assumption can be made that the individuals within the group are the same or even similar. It can be said that what holds these diverse orientations, motives, outlooks or desires together is the object of activity. These similarities or differences are not static but may depend on the existing conditions as well as be guided by a previous activity's outcome(s). This also has implications regarding a unified subject, a divided subject, and the many instances in which both unity and division of perspectives co-exist and inter-mingle.

In essence, an object refers to the problem space towards which an activity is oriented. Objects are not solid and static entities ones demonstrating evolving and dynamic characteristics (Engeström, 1997, 1999a; Foot, 2001, 2002) and are a general designation that orients an activity system. Moreover, the object has an evolving horizon that permits in-depth investigations by following changes, no matter how slight, in the activity's orientation and direction. The change in orientation arises, in part, from either changing conditions or expanded-contacted knowledge. Beyond these, it also permits consideration over an established time range. What this means is the activity system changes through the individual activity-system-element evolution (expansion-contraction) iteration of which continually provides a different foundation or "starting point" for practice.

Contemporary CHAT research takes into account multiple activity systems investigation as an activity network (illustrated in Figure 4.2). CHAT's ability to permit such an investigation permits a fuller investigation regarding human interaction firmly grounded in their social reality.

Figure 4.2: Multiple Activity Systems making an Activity Network



Combined objects appear with the advent of activity networks (multiple activity systems). The activity systems' subjects (see Subject 1 and Subject 2 as illustrated in Figure 4.2) may either similarly or differently located within the activity network. The resulting intended and unintended outcomes arise from a combined object. A combined object provides conscious consideration regarding two or more specific objects. In other words, the synergistic influence and implications of one activity system's elements direct and inform, maybe even transform other activity systems' elements. For example, what implications may arise from activity system A's division of labor on activity system B's outcome(s). The implications may be short-lived or be cycled back and augmented. This

is not to say that all outcomes only arise from the combined refined object but as we will see this is an important dynamic that is a key focus of my data description. By way of summary to this point, a very rigorous approach would entail the researcher being open to identifying intended and unintended outcomes from either a single activity system or a smaller activity network within the larger network.

These outcomes may not be static either in that some outcomes could cycle back into an activity system as a (new or modified) rule or a mediating instrument thus allowing for an expansion of the activity system. Sometimes, of course, new outcomes (whether they are new ways of doing things, new or modified tools, products, etc.) do not end up integrated into activity and their effect is lost. More generally, in this sense, it is important to remember that an outcome (that is not lost) is also an object that transforms the subject. What this means is the subject does not remain static and unchanging either. For instance, the subject may experience an unforeseen contentious situation when making a decision that may give them pause to repeat their approach thus forcing them to change, or adapt, a different method and criteria when facing the same, or similar, situation.

The subject's role is included as one specific role in the overall division of labor. The division of labor is the CHAT element that details the breakdown of who does what and who performs what actions and operations within the activity. The division of labor is generally, but not always, organized as some type of hierarchical structure where a break down of roles is contained, each person or group having formal (and informal) responsibilities in transforming the object. Although a vertical hierarchical illustration is common in corporations, such as the steel industry (as well as other entities such as non-

governmental organizations, volunteer organizations, or even the local book club), the division of labor can have a horizontal orientation, also. The horizontal orientation can be both located within one specific role or it can be divided according to responsibilities such that some roles are not in the direct succession of some vertical structure but provide support and ancillary services to the main hierarchy. For example, in a steel-production plant, the roles located in the main vertical hierarchical structure are the union worker, front-line supervisor, department manager, plant manager, etc (see Table 4.1). However, the safety and industrial hygiene professionals, production planning, marketing and sales, quality assurance, among others, support the production and maintenance roles and are less hierarchical in nature. That is, although they are not in the direct line management structure, their impact and implications remain important for overall success and, at times, introduce complexity and convolution of hierarchical power struggles. In addition to the internal labor division, external entities also exist that shape and implicate how the internal roles negotiate on the shop-floor.

Table 4.1: Division of Labor Example

Line Management	Staff Management	External Entities
Corporate Executives	Safety Professionals	Customer
General Manager	Industrial Hygiene	Outside Contractors
Plant Manager	Quality Assurance	Sales People
Department Manager	Production Planning	
Front-line Supervisor		
Union Worker		

The division of labor (both vertical and horizontal) permits conscious consideration of the interaction between each role-driven perspective within the activity

system, and allows a solid understanding of the interrelations between each other, and in turn the outcomes of activity. Numerous existing research articles examine specific roles within a workplace, but many fail to consider the direct implications rising from how the interactions and negotiations play a role in the specific person's learning within the labor division and the person's specific standpoint/perspective while performing their assigned role. This includes the formation and evolution of both the role and the person or group. An appreciation for the division of labor provides an important basis from which to examine learning in relation to the effects of simultaneous, multiple responsibilities and their synergistic results, consequences, and complications. That is, the underlying assumption here is that the learning of roles does not occur in a vacuum. The external complications arising from either competing or amicable interests are inherently woven together such that the moment-by-moment operations affect and influence each other and implicate the specific role under investigation. All of which defines important dimensions of the overall learning process.

The previous discussion sheds light on a CHAT principle called *multivoicedness* that forces the researcher to think about not only the fact that different perspectives exist but also about their combined or synergistic effects. However, multivoicedness goes far beyond just the division of labor. Multivoicedness has implications on several levels. First, it allows the researcher to consider different perspectives (including those traditionally viewed as in the margins). In other words, two people performing the same job may interpret the job's duties and responsibilities differently due to their cultural and historical formation. For example, the job description stated "a level of expertise is needed" gives rise to multiple interpretations regarding the word "expertise." One's

history and experience will serve to inform their understanding thus creating different perspectives each potentially implicating the people' learning experiences. This allows the consideration of the full spectrum of agency in and between the different people within, and possibly outside, an activity. Second, multivoicedness is an issue observable within the collective subject, meaning that specific individuals may have different understandings or interpretations regarding the rules, mediating instruments, and their usage, development, and evolution that may shed light on different perspectives or create intra-subject contradictions.

The subject transforms the object through the use of some mediating instrument(s) governed, informed, and bounded by some set of rules (written/unwritten, spoken/unspoken) that have been developed and have evolved over time. Instruments and rules guide and shape behaviors, expectations, responses, considerations, sanctions, and direction and must be considered in light of the context in which they were developed. Considerations of the past and current context of these instruments and rules reveal the potential reasons and situations leading to their development as well as their relevance. In other words, this approach encourages us to ask: Do some rules and mediating instruments exist such that the reasons for which they were developed are no longer valid or out-of-date? A very powerful use of CHAT, but noticeably lacking in the literature, is its inherent ability to make meaning and to grapple with a rule's or mediating instrument's creation and development in its own, specific context, and/or situational response, for which it was developed.

For example, a conversation with a colleague yielded the following anecdote. A child watched his mother prepare a ham for baking and always noticed his mother

removed both ends just to placing it in the pan. After several years observing this, the child questioned why. The mother stated this is how I learned from my mother. Her mother (the child's grandmother), when asked the same question, offered the same response meaning that is what she learned from her mother (the child's great-grandmother). The great-grandmother, in response to the same question, giggled and stated that she removed the ham's two ends because the pan was too small. From that time forward, the ham's two ends remained attached. What this illustrates is the condition-driven procedure developed in response to a specific issue (the ham was too large for the pan). Over time, the family never questioned or investigated the procedure even though the pans (the mediating instrument) experienced a change (became larger since the early 1920's). CHAT's cultural-historical focus has the strength to bring this to light. This is not to say that other methods may have come across this story. However, CHAT's historicity forces the research to investigate and describe some element against its own history.

Although the preceding example seems finite when thinking of social and political realities, it serves as a concrete example illustrating the importance of identifying the specific context grounding a procedure's, a rule's, a mediating instrument's, etc creation and development. Among such considerations meriting investigation are identifying the state-of-the-art technology, the political reality and landscape, the economy's status, geographical location, class-ethnicity-gender factors, resource access and allocation issues, etc. Additionally and workplace specific, what was the management-worker relations status? Then, what has been the rule's or mediating instrument's iteration and evolution, if any, up to its current form? CHAT provides the

opportunity to investigate learning in light of why and how these elements' creation, development, revisions and upgrades evolved. From the CHAT perspective, these and other matters – regularly set to one side in attempts to analyze workplace learning – are crucial when trying to grasp learning as inherently linked with context and history as it sheds light on how the current reality came to be as well as the implications of the division of labor on an individual's, a group's and even a community's collective knowledge.

Contradictions in CHAT

Contradiction's role in CHAT is central to investigating learning. From a CHAT perspective, contradictions are not simply conflicts or disagreements. They exist structurally; they are not happen-stance, idiosyncratic or accidents. In other words, their roots are in the very elements in and between the activity systems. Contradictions are dialectical in nature in the sense that two elements that may be rooted in the "truth" are nevertheless diametrically opposed, sometimes causing a potentially no-win situation, but always creating an activity system disturbance, and thus the potential for change and development. They are aggravated structural tensions constantly requiring some form of either temporary or permanent resolution. The meaning and use of this concept of contradiction for education and training purposes is that learning emerges as a result (one result out of many possible results) of the resolution of the contradiction.

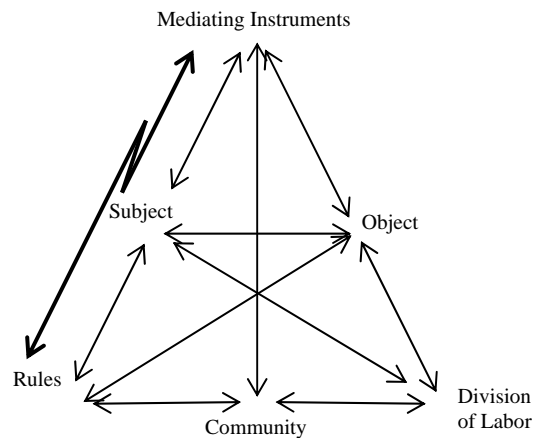
Diametric opposition may appear in many ways in an activity system / activity network. One source of contradiction is multivoicedness. Multivoicedness lends itself as a valuable principle when investigating contradictions. One avenue relates to individual and collective cultural historical molding that informs and guides rules and mediating

instruments interpretation and perception. When investigating the shop floor, for example, existing rules and mediating instruments are open to interpretation not only through one's cultural historical grounding (i.e. one's biography), though this should be considered in relation to the conditions underpinning the processes and the actions embedded within an activity system. The second is less related to biography and more so the division of labor and the associated jockeying for recognition, position, and power – both vertical and horizontal. For example, let's say three people view a document and each have a different interpretation. If these difference emerge out of structural conditions of the activity system (its roles, divisions of labor, tools, etc.), it is an expression of contradiction.

A second contradiction type (see Figure 4.3) is when a structural tension rises between two elements within one activity system. An example of this is when a mediating instrument in an activity system contradicts with a rule in the same activity system. A concrete illustration would be when production machinery (a mediating instrument) needs to have a limited line speed (running slower than x feet per minute) but the production rule mandates that the line speed for "Product A" needs to be x feet per minute or greater. If following the rule, the line will function in optimum performance parameters informed by past practice but the material may track to one side and crash into the production machine's structural support. By not following the rule, the production machine will run the product without problems but will not meet the production parameters. This also implicates when the elements are located in different activity systems. In other words, a Quality Program rule says the line speed needs to be so many feet per second. But, the Production Schedule mediating instruments does not

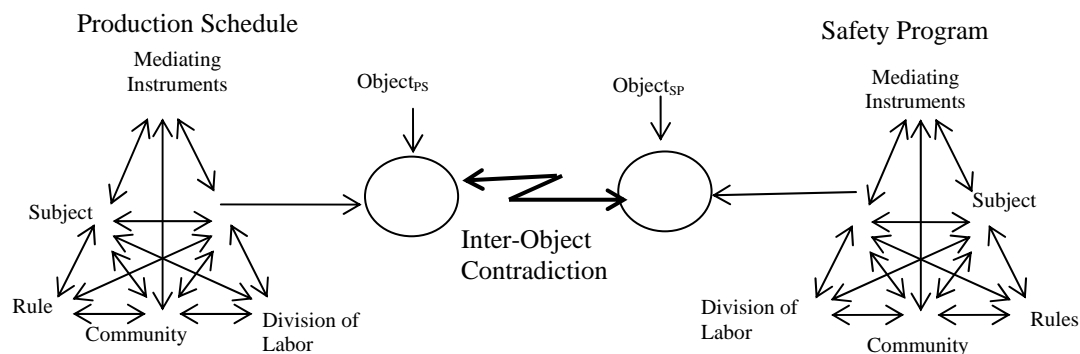
have the ability to accomplish it. Either way, the front-line supervisor will be defending their decision, a range of people will be making forms of adjustment, responding to the situation, even not responding and justifying this non-response, talking with each other, and so on – in a word, engaging in learning as a response to a contradiction.

Figure 4.3: Contradiction between a mediating instrument and a rule in one activity system



Another contradiction exists when a dichotomy rises between some advanced technological understanding/knowledge and the current or older technological understanding/knowledge. Technology in the sense is not limited to just computers, electronics, and other tools, but it may also include ideas, such as product chemistry. For example, the steel's chemistry, maximum expected width, and expected maximum-minimum thickness informed the production machinery's design. However, as technology advanced, the chemistry or new, innovative customer products exceed production machine capacity.

Figure 4.4: Contradiction between two objects

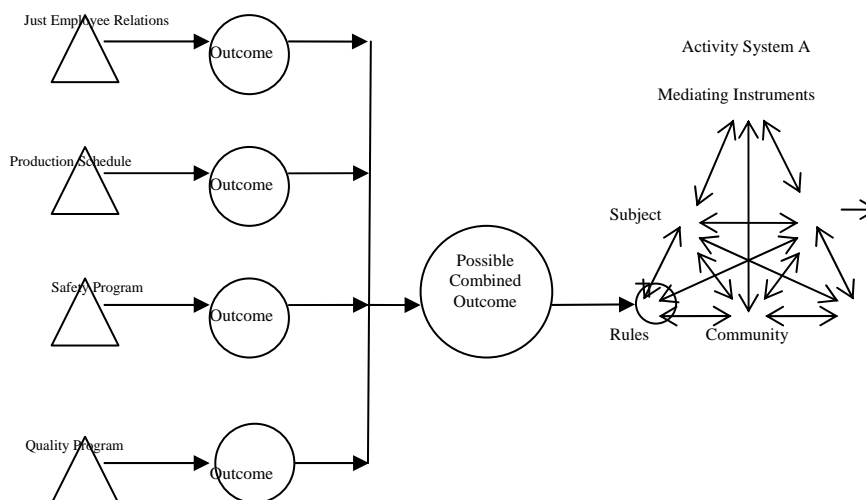


The analysis of the contradictions become important when wanting to observe, describe and explain how front-line supervisors work to resolve them, which in turn sheds light on new ways of learning. These new ways of learning will be the means that will allow this investigation the ability in offering an alternative to the current workplace-learning mode of analysis and understanding. CHAT has the ability to investigate the source of the contradictions in terms of various forms of tool mediation that becomes observable. Once knowing the source, then one may be in the position to identify the intended and unintended outcomes as well as possibly trace its potential recycling back into, and possibly expanding, the activity system.

CHAT has the ability to shed light on the expansive cycles of transformative learning over a given time period. Through the resolution of contradictions, the activity system integrates and augments the new knowledge and ways of learning created leading to expansive learning. Subsequent activity system investigation starts with the expanded activity system. The collective-subject's means to question current policy and procedures through surfacing contradictions within practice may lead to structural change and can be

traced over a given time span. Each component (such as the rules, mediating instruments) located with their activity system has sub-activity systems (see Figure 4.5) [see (Engeström, 2004)] that inform and guide their evolution as well. It is the changes in these activity systems that are of interest in exploring new ways of learning in resolving primary and peripheral contradictions embedded in the activity system.

Figure 4.5: Sub-Activity Systems' Outcomes integrated back to an existing activity system leading to its expansion



Levels of Activeness

When trying to grapple with “what was really happening” on the shop-floor, a thorough familiarity with the workers goals and motives as they complete their job duties is very important as it gives meaning regarding movement (Leont'ev, 1978). Leont'ev (1978) argues “There is frequently no difference between the terms *action* and *operation* [italics in original]. In the context of psychological analysis of activity, however, distinguishing between them is absolutely necessary” (p. 65). A group or an individual carries out goal-driven actions when participating in object-oriented activity systems

involving many simultaneous and sequential goal-driven actions. Observation, listening and questioning, and interviewing, may shed light on participants' goals that gives meaning to why the action is performed. The goal-driven actions require the human to exercise conscious meaning to be initiated in completing some conscious goal.

Operations, on the other hand, are less conscious and possibly categorized as robotic-like or second-hand. Human and machine movement could appear similar, or the same, or may appear to be somewhat "random." Without some depth of understanding why a group or individual is performing some set of movements in a specific manner, it will be difficult to make meaning regarding their movements and may lead to incorrect interpretations of the movements that will lead to either skewed or false explanations.

Without some depth of understanding or being unaware of the goals, the actions may not make sense or be the clearest. In other words, actions become more identifiable and understandable with a known goal lest the worker's appearance be that of random, disconnected sets of movement. For example, a front-line supervisor has developed the goal to deliver the weekly safety packet as they participate in the Safety Program activity system. He or she makes a conscious decision to accomplish this goal and plan the actions needed to realize it. Knowing this, the researcher is able to conduct more informed observations regarding the subsequent action-filled operations, the front-line supervisor's step-wise movement, required for goal resolution. At times, knowing the identified action may be the only way to make sense of observed operations.

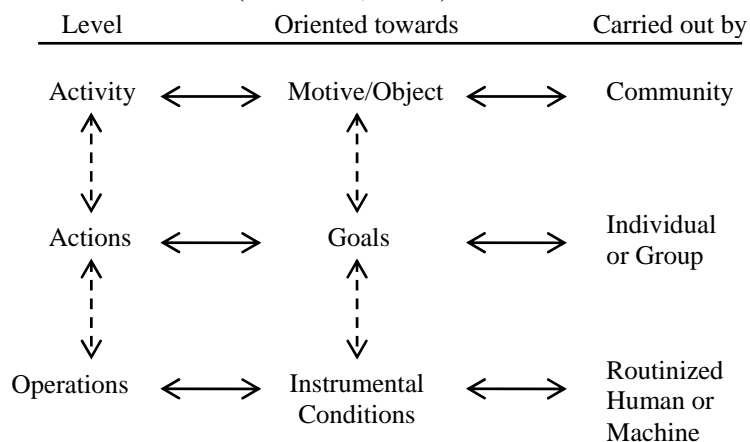
The operations relate to conditions and are those small, step-wise, movements performed in less conscious ways, often automatically, by humans or machines.

Operations are necessary to realize an action. Furthering the above example, the front-

line supervisor may remove the formal packet from their mailbox, remove the staple, copy it, and distribute it to each union worker on the crew without thought and possibly concentrating on other issues. Additionally, a CHAT approach also suggests it is important to become as familiar with the underlying conditions as possible, since the conditions underscore the operations.

Figure 4.6 diagrams the above discussion and illustrates how the notions of actions embed successive and simultaneous operations for their completion. In addition, how successive and simultaneous actions are done while engaged in an activity. The dashed arrows indicated a fluid movement as one level morphs into a different level. Routinized as used here is a regular or habitual course of procedure or mechanical performance of an established procedure established by the workers and somewhat driven by the Standard Operating Procedures (SOP's).

Figure 4.6: Levels of Activeness (Leont'ev, 1978)



A CHAT strength offers the researcher the ability to identify times where the subject needs to make a conscious effort to establish and meet a goal as opposed to

performing an operation which is done as second nature. Not to be overlooked and included in this is the movement between actions and operations. As the front-line supervisor repeatedly performs the action, they develop the ability to perform the step-wise movements without conscious thought thus meaning it becomes identified as an operation. The importance in knowing this is when some issue rises, it may force the front-line supervisor to bring the conditions back to being conscious thought. Drawing upon a very mundane example such as the safety packet, let's say the copier mis-fed a paper and became jammed. The front-line supervisor, still bounded to the Safety Program's object, must now establish a goal to remove the jam forcing him to give conscious thought to what must be done – i.e. actions. Once the front-line supervisor clears the paper jam, he can return to copying the safety packet. After successfully meeting this goal, he may now return to accomplishing the original goal of safety packet distribution.

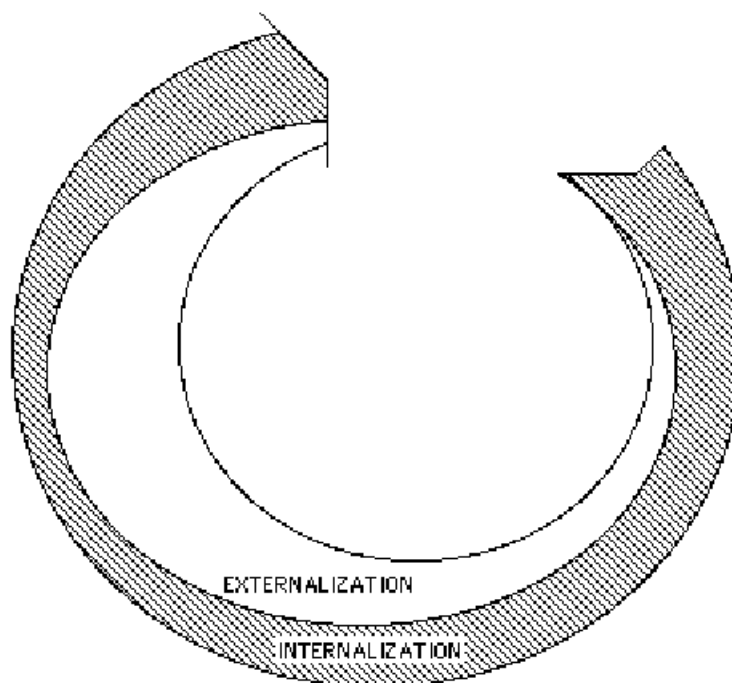
This ability offers the researcher the opportunity to examine episodes when some set of conditions or external factor actively forces a person to think through situations when the normal operations will not complete or serve the action and object-relatedness of the activity system. The person must now consciously rethink the steps to accomplish the current action that may be resolved through establishing a different goal-driven action in the immediate term then return to the original goal-oriented and object-related practices thereafter. Potentially, this part of CHAT can shed light on learning. It does so by bringing a systematic framework for including the virtually endless range of practices, both those that are routine and some which can highly contentious and dramatic, which make up the fullness of the learning process.

The fullness of the learning process also includes the concept of human externalizing and internalizing knowledge. The front-line supervisor's initial experience as they first begin to negotiate their role requires an almost total emphasis on internalizing the workplace environment, the formal policies and procedures, their initial training, the division of labor (and its implications being in a unionized work shop), among others (see Figure 4.7). The idea here is the front-line supervisor is absorbing the majority of the knowledge flow (the shaded part of the arrow beginning in Figure 4.7). They begin to grasp the intended, manifest shop-floor aspects performing their role on the surface meaning they gain an appreciation for and are able to apply the formal policies and procedures as well as employ the proper mediating instruments through using them as designed. Goal-directed actions govern and inform their shop-floor movements especially when experiencing surfacing contradictions and situations. As they acclimate to the workplace environment and accompanying shop-floor activities, the action converts into operations meaning many actions will become second nature.

At this point, the front-line supervisor potentially begins to appropriate mediating instruments, and processes, and be creative as they address and resolve shop-floor contradictions and situations. They possess the necessary shop-floor comportment such that they can negotiate their role through creating opportunities. They understand and have a command of the shop-floor language, codes, symbols, signs, and are able to command the latent, unintended aspects. Through their shop-floor presence and awareness, they begin to externalize knowledge (the widest part of the non-shaded part of the arrow in Figure 4.7) to the workplace environment such that new models, processes, or mediating instruments emerge and implemented. Thus, the activity expands with the

new knowledge consequently changing it. As the new models and processes begin to stabilize, the inherent contradictions and implications are once again the dominant learning form (the shaded part of the arrow at the tip in Figure 4.7). This possibly leads to changing the underlying conditions that may permanently alter the operations performed by the front-line supervisor thus forcing them to develop conscious goal-directed actions thus repeating the cycle.

Figure 4.7: Diagrammatic representation of the internalization/externalization discussion. [taken from Engeström, Y. (1999a, p.34). “Activity Theory and Individual and Social Transformation”].



Drawing upon the above discussion, the operations could hold one key to identifying and describing learning outcomes. Identifying the changes in operations and the associated reason regarding why, and possibly how, will help to describe learning

outcomes in that contradiction resolution possibly forced some adjustment or alteration. In addition, this could also be beneficial to investigate where in the internalization/externalization cycle the action is occurring. This is a good place to ask the “why and how did the operations change” question. Was there some recent implementation of new models or processes? If so, the front-line supervisors may be internalizing the subsequent implications, and possible contradictions, rising as the new models or processes stabilize.

If possible, goal identification supplemented by recognizing the underlying conditions could offer insight regarding the changes in operations. The resolution of the contradiction may create a change in the operations since some different step-wise movement (human or machine) is (are) needed. One possible source of the changes are possibly evidenced when conducting a thorough examination of the conditions in attempting to identify and shed light on the possible and existing structural disturbances that are compelling attempts at resolution. However, if some small change should occur in the operations through either the step-wise movement of task completion, or a specific operation(s) is/are removed, or if additional operations are needed and implemented, then this presents means to describe specific sources or moments of learning in a way inherently linked to the broader context. The routine can be (and is) altered by some internal or external disturbance. Again, what changed, why did it change, and how did it change?

CHAT's Strengths and Weaknesses

It is a valid criticism that the kind of triangular diagrams I have drawn upon have become overused, and over-emphasized. Regularly, such diagrams become the focus of

presentations in this tradition and they have appeared in numerous articles. Just as regularly, it seems that these diagrams are inadequately explained. Sometimes they are a short-hand and sometimes it is possible they stand-in for proper explanation. I argue that despite this, the diagram's greatest strength lies in guiding the researcher through data analysis and examining the dynamic interaction between the different elements within and between activity systems. Though not without its problems, the diagram can be an effective way to illustrate the elements of CHAT. Nevertheless, to insert the diagram with no explicit discussion, no foundation can be distracting or superficial.

Many articles claiming to employ CHAT as their theoretical framework seem to be noticeably lacking in grounding the analysis in the cultural-historical (at least according to Leont'ev, 1978) or in the sociohistorical (if located in Vygotsky) or in the underlying conditions present at the time of the investigation [see for instance (Bedny & Karwowski, ; Cortez & Kazlauskas, 2000; Hung & Wong, 2000; Issroff & Scanlon, 2002; Jonassen & Rohrer-Murphy, 1999)]. Some research articles grapple with the subject's motives and goals but, many times, fall short and do not go far enough to investigate [see for instance Alterman, 2000; Bannon & Bodker, 1991; Hill, Capper, Wilson, Whatman, & Wong, 2007; Torraco, 2005)]. It would seem, however, that to investigate the fullness of human activity, learning and development, it would be prudent to better explore the cultural-historical roots of the activity and to identify the existing conditions as they may assist in identifying differences between espoused and in-use operations as well as step-wise variations in operations completing a visually similar task. Deeper investigations permit a fuller understanding through identifying key mediating instruments and associated key moments of mediation. Taking this further, CHAT has the

ability to describe when the key moments of mediation are intended (manifest) and unintended (latent) providing the opportunity to identify primary and peripheral contradictions and examining the possible learning outcomes. In addition, this depth will also permit overcoming the separation between the learning and the doing. In other words, it firmly places the subject deeply enmeshed in their context including consciously considering surfacing contradictions, mediating instruments, their position in relation to other divisions of labor, environmental issues, power flow, and the current business climate. CHAT offers a far more powerful opportunity over other frameworks since it considers dialectical issues as well as maintaining the fullness of being deeply human across a full spectrum of human activity.

What has even been more troublesome is that CHAT may have become the current “flavor of the month,” and many have either overlooked the cultural/historical concepts or their investigations did not go deep enough to shed-light on the existing conditions – both of which are problematic [see for instance (Edwards, 2002; Nocon, 2004; Prektert, 2006; Redmiles, Ellman, Zisman, 2005; Sellman, Bedward, Cole, & Daniels, 2002)]. CHAT is not some template blindly overlaid with no forethought. CHAT’s strengths and abilities become grossly misused opening the possibilities for erroneous propagation regarding its fullness and power as a theoretical framework. In a simple template form, some may see little need in using CHAT when another theory may seem more direct. Although such theories may have specific uses, they fail when attempting to describe the fullness and contingencies of informal learning in a systematic way.

Chapter 5. DATA COLLECTION METHODS

Introduction

Cultural Historical Activity Theory offered the ability to empirically describe the many learning possibilities front-line supervisors have. The specific CHAT elements and principles forced conscious consideration of not only the shop-floor situation and its many interwoven factors but also the history and the multiple perspectives located within the situation. What I needed was the ability to observe and record the traditional and cultural manifest and latent aspects regarding front-line supervisors and their shop-floor roles. Their interviews supplemented their shop-floor actions and operations. The collected data spoke to observing numerous mediating instruments, their associated moments of mediation, and used to resolve what contradiction. Beyond these, the underlying conditions also needed recording. The method had to be fully encompassing but also to question what was unspoken.

Critical Ethnography

Thomas argued, “Conventional ethnographers study culture for the purpose of describing it; critical ethnographers do so to change it” (1993, p. 4). Critical ethnography does this through questioning the unquestioned assumptions that lies just below the surface of the formal policies, laws, and daily rituals, etc in the attempt to challenge taken-for-granted rules, mediating instrument use, policies, and procedures that informs, shapes, and guides their daily activities. Critical ethnography is a method that broadens ones vision when investigating culture and “sharpens ethical commitments by forcing us to develop and act upon value commitments in the context of political agendas” (Thomas, 1993, p. 2). Especially against the backdrop of the current global business climate, many

argue commodification issues regarding people, their societal and organizational role, and their decisions do not support human growth or decency (Cunningham, 1993, 1996; Cunningham, Curry, & Hawkins, 2002; Gee, Hull, & Lankshear, 1996; Howell, Carter, & Schied, 2001; Howell, Schied, & Carter, 2001; Rinehart, Huxley, & Robertson, 1997; Schied, Carter, Preston, & Howell, 1997, 1998; Seccombe & Livingstone, 2000; Sennett, 1998).

Nevertheless, how are value and ethical commitments treated or from what vantage point are they understood? Value commitments, whether overtly stated or covertly achieved, are not clear-cut and dry since value needs more explanation. What were the consequences for the front-line supervisors for breaking formal procedure? One's belief in either the business side or the worker (human) side forms the criteria assessing ethical and value commitments. This is why this study employed critical ethnography as it offers the opportunity to explore such issues. If this study did not probe well below the surface, it would have just merely described the shop-floor actions without really understanding the deep-seated goals and power issues that lie underneath the surface.

The example given in Chapter 3 serves to illustrate the missing voice of the front-line supervisor since formal policy, upper management, and the union all had a voice in the previous example leaving the front-line supervisor to deal with the fallout and consequences. Conventional ethnography sheds light and describes the situation but critical ethnography investigates the power issues and their resulting implications. This is not to say the front-line supervisor was completely without voice and agency since it is obviously more complicated than that. Such extenuating circumstances involve the

history of the specific front-line supervisor, his achievements, his perception, and time with the corporation, among others. Nevertheless, these situations still create contradictions and situations where the stakes are human life. Critical ethnographers speak on behalf the marginalized and recognize that voiceless groups can challenge and change the current power structure.

CHAT and Critical Ethnography

This section discusses CHAT and critical ethnography. Critical ethnography, as a method, provided the best data collection means allowing a solid CHAT analysis and plausible explanation.

Critical ethnographical data collection included observing and recording customs, traditions, actions, and activities including all associated artifacts. In this sense, the CHAT perspective served as the understanding of actions and activities. This provided the ability to investigate and break down observations through an informed sense of understanding the conditions and goals underpinning and driving the operations and actions. Having investigated the shop-floor traditions and cultures as well identifying goals, the reason why front-line supervisors performed specific movements, informed observations were noted and recorded. The why (grasping the goals) provided a very important backdrop against which the actions and operations were performed thus allowing a more informed data analysis.

Using Figure 4.6 (p. 67) as a reference, the present underlying conditions informed the operations. Critical ethnography allowed me the opportunity to identify and examine the shop-floor community's culture, traditions, "ways of doing," "ways of knowing," rules, political ideologies, etc, by which people conduct their daily lives. The

conditions were the ideals, philosophies, seasonal effects, etc, in which the step-wise movements, the operations, were conducted. Striving to understand the conditions was imperative as it shed light on why specific movements were done in specific situations. Grasping the conditions gave a more plausible and informed explanation of the data.

CHAT provided the structure to lay out all, or at least a significant amount, of the mitigating factors within some activity. In addition, this structure provided the opportunity to review and consider the data, its role, and relevance holistically. Included in this was the conscious effort of examining the historical implications as well as one's socio-cultural formation. What this means is CHAT provides a rubric, of sorts, showing where specific datum's role, impact, influence, and relevance was. Ethnography, as a method, seems best positioned for gathering the data.

Interview Guide

In trying to examine the complex shop-floor social structure, a key data collection tool was the interview guide. The intent was to elicit thick, rich descriptions such that it would be possible to shed light on the participants' motivations, goals, and to examine their social network. Therefore, formulating the specific questions was a painstaking task. The original version consisted of twenty-five prompts. Through field testing, many of the prompts were found to be limiting. Among the limiting questions were: 1) How do you feel about your subordinates, 2) How do you feel about the shop-floor, 3) How do you feel about your supervisors, and 4) How do you feel about crisis situations. Field-testing brought to light a couple issues. First, the prompts did not illicit the thick descriptions sought as well as not providing the participant the opportunity to talk. The second was these prompts were telling the participant what to discuss instead of allowing them to tell

me their stories and what they bring as important. Thirdly, the word “feel” was a poor choice. By asking the participants how they felt, the prompts did not elicit the needed stories to answer the questions and it was not feelings I was after. Hence, the final version evolved in light of field-testing. I collapsed many questions into broader focus and the word feel was revised. The prompts provided the participants to talk about their experiences and attempted not to narrow their discussion.

The interview guide’s prompts attempted to get at not only front-line supervisor shop-floor roles but to describe both successes and failures. With the understanding of expansive and contracted learning, it seemed too narrow just to focus on their successes. The underlying in probing times of failure is the assumption that front-line supervisors can also experience learning through negative situations and failure. The interview guide employed many open-ended prompts that permitted the front-line supervisors the opportunity to take the conversation where they needed it to go. The notes from their first interview helped to structure the second interview but only a few structured prompts were developed for each front-line supervisor. The reason was to illicit deeper discussions regarding some conversations that thicker descriptions.

The final initial interview guide consisted of fifteen prompts broken down as six explanation, six descriptive-experience, two opinion, and one advice (Carspecken, 1996; Madison, 2005; Patton, 2002; Spradley, 1979). Appendix A details the interview guide.

Field observations and the Research Site

Pittsburgh, Pennsylvania, and southwestern Pennsylvania area has been a notable steel-production city since the middle 1800’s. Supporting the steel industry’s boom was the area was also a considerable source of coal availability in southwestern Pennsylvania

providing the steel industry the opportunity for massive growth and as one industry grew so did the other. In this area, workers were mostly steelworkers or coal miners. Among the steel-production corporations were United States Steel (the world leader at one point), Wheeling-Pitt, Bethlehem Steel, Armco Steel, and LTV Steel. The Pittsburgh area is still to this day known as “The Steel City” due to its history regarding steel production. However, only a few steel-production plants remain and the area is but a shell of its former self. It seemed ironic that history was repeating itself in the sense of major industries leaving the area causing many workers to be jobless and fighting to survive just like when the coal companies left. The only remembrance of the once booming industry is the abandoned and run down facilities that once employed thousands. The area has three types of steel-production mills that are coking plants, steel casting plants, and steel finishing plants.

The specific research site was a steel finishing plant located in West Mifflin, PA, a suburb of Pittsburgh along the Monongahela River. The Picklers and Raw Coil Storage Department was chosen allowing for a deeper investigation in a smaller area due to the wide array of mediating instruments available in just one department, let alone multiple departments since resources was limited. The Picklers and Raw Coil Storage consist of two processing lines and a storage area. The workplace observations were conducted in the areas where the front-line supervisor interview participants negotiate their roles and where they experience the majority of their job responsibility and obligations. The field observations spanned just over two hundred hours in length over forty-five days allowing ample observing time attempting to witness many shop-floor situations and possibly yield several iterations of both routinized operations as well as yield potential contradictions.

Field notes focused on human movement and interactions, human/tool interactions, and human/machine interactions. The interactions and conversations between front-line supervisors, front-line supervisor and worker(s), and front-line supervisor and upper management were central to the observations.

The two processing lines are the 84” Pickle Line (oriented north-south) and the 64” Pickle Line (oriented east-west). The 84” and the 64” denote the maximum strip width the line can process. Each line processes coils through an elevated temperature, hydrochloric acid bath treatment that removes the primary and tertiary scale from the coil’s surface preparing it for further processing and treatment. The 84” Pickle Line charges coils in the north end and discharges them in the south end. It has a Burner’s Station, two distinct Coil Feeder stations, the Welder station, the Roller, the Shearman, and the Bander/Marker station where the coil is discharged and placed onto coil cars for transfer to down stream processing. The 84 was built in the early 1970’s and has had several technological and structural upgrades over the three plus decades. The 84 is serviced by two Electrical Overhead Transport (EOT) cranes with the north-most crane primarily only being used on maintenance turns. One Utilityman operates the EOT in addition to monitoring the acid concentration in both the 84’s and the 64’s acid tanks. The 84 also has the Tractor Operator and is the one operating the tractor pulling the coil cars from the 84” Pickle Line to the Cold Reduction Storage bays. The Utilityman and the Tractor Operator also have additional duties as needed. The 64” Pickle Line charges coils in the west end and discharges them in the east end. It has a Burner’s Station, one Feeder Station but two charging lines, a Welder’s Station, a Shearman, and the

Bander/Marker. The Cold Reduction Department's EOT Crane removes processed coils and places them in Cold Reduction Storage bays.

Raw Coil Storage is a storage bay oriented north-south used to hold raw coils which are those that have been rolled into coils from a slab and have not been processed. Raw Coil Storage is the unit from which the 84" and the 64" Pickle Lines draw their stock. Raw Coil Storage unit employs a Stocker, a Conveyorman, a Loader, and four EOT Crane Operators. The crane operators remove freshly rolled coils from the transfer chains running the length of Raw Coil Storage and places them in marked holding bays and relays their exact location to the Conveyorman. The south-most crane operator assists with stocking the 64" Pickle Line and the middle two crane operators assist in stocking the 84" Pickle Line. The north-most crane operator is dedicated to removing Hot Mill product and working with the Loader. Additional duties for all crane operators assist with scrap removal, locating and placing coils on line stocking chains, and assisting with Hot Mill product.

In addition to the operating units, Picklers and Raw Coil Storage also have maintenance personnel consisting of Millwrights, Motor Inspectors (Electricians), and Systems Repairmen (computer-related). In times of normal production turns, one of each is assigned to the afternoon and midnight turns. The Millwright's responsibilities encompass the monitoring and maintenance regarding the mediating instruments' (i.e. the production line, pneumatic systems, hydraulic systems, drive shafts, etc) mechanical aspects. The Motor Inspector monitors and maintains all electrical aspects related to the mediating instruments except for the ones being computer-related. The Systems Repairman monitors and maintains computer and programmable logic control systems

related to the mediating instruments. This includes both hardware and software applications.

At any one time, many activities are present giving rise to considerably more actions comprised of several operations. Substantial preparation time was spent in the field by just “living” in the community. During this period, I spent time establishing trust and building social networks aiming to grasp what is really happening through the workers’ own words. Although this can be problematic since this depends on the person’s standpoint and perspective and whose voice is being heard, it was done to help shed light on the existing conditions during the observation times. In addition, it was also done attempting to grasp the subjects’ goals and motives as they negotiated their roles in the activity network.

The human interactions were recorded as front-line supervisors performed their daily role along with their interactions as shaped and guided by not only by their division of labor position but also by their standpoint and agency. These were collected in an attempt to examine how the division of labor manifested on the shop-floor and what mediating instruments were used during these interactions. It showed how multivoicedness played a role at least from the aspect of how the front-line supervisors’ role shaped and informed shop-floor negotiation and their voice. Among the observations were of the people working the positions either as part of the division of labor or in close proximity to the front-line supervisors with whom they had conversations and why the conversation took place. Such considerations were was the conversation work-related or personal, contentious or amicable, and who seemed to control the conversation.

Observations also included human / mediating instrument interaction. This seems to be key from the fact of how the workers employ, and modify/develop, mediating instruments assisting in transforming the object. Among the interest is examining if the mediating instrument was being used as originally intended? The importance of this is noting the means by which the subject is transforming the object and what the intended and unintended outcomes have shown and what has been absorbed by the activity network.

It was evident that the shop-floor housed many conditions, some the same or similar and some changing, in which the worker had to negotiate and re-negotiate their role. Imbued upon the conditions was the principle of historicity and associated state-of-the-art technologies, procedures, and knowledge that can be found within both the community and localized to the specific environment. The steel industry community has standard tools and procedures used to transform the object but most are similar to a template and revised as necessary in the specific environment. One issue to note, however, is that many of the production machines (production lines or production units) in use were developed a number of years prior to the present meaning that the production unit was designed and operated in a specific time with knowledge and technology available during that time.

Shop-floor actions and conversations were recorded and, supplemented by front-line supervisor interviews, hidden agenda and reasons lying underneath the surface that gives impetus to the official policies and procedures informing and guiding the front-line supervisors' shop-floor role negotiation. One intended outcome from this is exposing the hidden agenda and opening up to the front-line supervisors is it initiates collective

questioning and possible social justice and change is minimizing, maybe eliminating, the no-win situation (Cole, Harris, & Bernerth, 2006; Cole, Schaninger, & Harris, 2002; Cunningham, 1998; Moch, 1993; Newman, 1994, 1999; Schied et al., 1997; Thompson, 2003). Critical ethnography shed light on what the front-line supervisors did to be successful in spite of possible contradicting formal policies. And although formal policy was not changed, front-line supervisors developed and implemented procedures and mediating instruments allowing for successful role performance. And in this instance, successful was used to mean they did not cost the company money, injure or kill union workers, and did not get fired (field notes and a common interview thread). The study showed that front-line supervisors were not as interested in challenging many formal policies to change them but to exhibit formal compliance but doing what is needed, within reason, to “get the job done.”

These shop-floor interactions can be examined through understanding the role, impact, and implications regarding division of labor and the multivoicedness. By drawing upon the division of labor and multivoicedness, it may be possible to shed light on what power structures and power flow exist that bear direct and indirect implications regarding the front-line supervisor position both upon the position by others and within the position as individuals within the collective subject. What language is being used and how are the ideas being exchanged? In other words, is there an open, two-way dialogue or is the conversation's tone contentious in nature? Furthermore, is the language that of the mill or normal, everyday conversational English? Another consideration may be is there a position, or person, to which others segue or acquiesce when addressing shop-floor issues? The hope is through examining these concepts and the possible challenging the

dominant practice the front-line supervisors may gain a voice in their role negotiation. By gaining insight into shop-floor negotiations among the division of labor and the role of multivoicedness, it may be possible to challenge the status quo. Furthermore, how does it connect to the broader structure regarding such issues as who actually develops and implement such constructs as safety rules, quality parameters, instrument choice and integrity, among many others and for whose purpose and benefit are they developed?

Field Observation Guide Development

Field observations were crucial to understanding front-line supervisor learning. What I needed was a guide that would assist in maintaining lucid and comprehensive note beyond the readily visible. The initial field observation guide provided the ability to systematically record human movement, the reasons for the movement, the specific division of labor involved, and the associated mediating instruments. Upon field testing though, this became problematic from the analytical perspective. This means that when beginning to analyze the data, the conditions were not considered and did not permit comprehensive data analysis. In other words, part of the picture was missing. The movements were not considered against the backdrop and in the environment in which they were occurring. The importance was the same goals were established on two different occasions but the actions to achieve them were different. This required deeper investigation to shed light on and explain the difference hence the focus on identifying and recording the underlying conditions.

The field observation guide revisions thus provided the space allowing for recording, as complete as possible, the existing conditions against which the actions were performed. This forced consideration regarding the existing conditions through conscious

investigation and identification. Recording data to this level permitted the understanding and the ability to explain different observed actions to achieve the same goal. The final field observation guide version is shown in Appendix B.

Participants

The research participants were all steel industry front-line supervisors whose role was managing the three operating units and the assigned maintenance personnel on each turn located in the Picklers and Raw Coil Storage Department. By managing, I mean that they are the ones who made decisions attempting to address contradictions and crises situations. They assured that all personnel had the proper mediating instruments in working order as well as managing union personnel through holding accountability and provided the proper training and issued subsequent necessary sanctions. Front-line supervisors were responsible to complete all required paperwork that addressed all aspects that transpired over the course of their shift. Among the paperwork included the daily production and quality reports in addition to completing formal documentation explaining all unexpected or anticipated events. They must also ensure that any workers reporting off for the next shift are covered by institutionally qualified personnel and that all necessary resources were in sufficient supply and readily accessible.

Through my familiarity with the front-line supervisors, I approached them and verbally asked for their participation in this study. The participants were all located within the same department allowing for consistency of mediating instruments and formal department-specific rules as well as the socio-cultural construction of the workplace environment. By focusing on only one department, this study was able to

probe deeper due to not having to consider wider arrays of mediating instruments and rules. Six front-line supervisors were interviewed and observed.

Paul has been a front-line supervisor for eleven years and rose from the union ranks after earning his Bachelors degree. He has since earned his MBA as well as perceived as the department's unofficial coordinator. He grew up in an urban neighborhood and raised by his grandmother as both his parents were either incarcerated or engaged in illegal activity.

Vincent transferred to operations from a staff-management position and has just over eighteen months front-line supervisory experience. He grew up in a solid middle class house where his father and mother were business owners. Vincent entered the steel mill with a Bachelors degree and had no prior experience working in the business. His first ten years entailed performing industrial hygiene and safety based in the General Office Building.

Nick was a coalmine supervisor with twenty plus years experience and transferred to the steel industry due to downsizing and closure and did not choose the retire option. Nick drives over an hour each way as he chose not to relocate closer to the plant. Nick rose from the union ranks, whose father was a miner, and his mother was a stay-at-home mother.

Rodney entered the steel mill with a Bachelors degree and was on his thirtieth year. His father had worked in the mill and his mother did part-time work. Rodney worked his way through college but it was not in the steel industry. He experienced childhood in a strong working class neighborhood.

Scott was promoted from the union ranks. He has no formal schooling beyond high school save for the formal certifications required by the plant. His father worked in a steel mill and his mother mostly stayed home but engaged in some part time work. Scott's steel mill career began in the union where he worked close to twenty-five years as a line operator. Scott was promoted to front-line supervisor for personal reasons among them being his union retirement package would all transfer to management's retirement package. Scott had many social networks in many departments although his specific work focus had all been in the pickling department.

Benjamin came into the steel mill as a manager with a Bachelors Degree. He was raised in a working class family. His father worked in a factory and his mother worked part-time as a cashier.

Participant Interviews

The six front-line supervisors were interviewed using the semi-structured, open-ended interview guide previously detailed. The significance of semi-structured interviews was that it allowed me to ask specific questions about the workplace. It also allowed me to ask follow-up prompts from each participant's responses. In light of attempting to elicit thick, rich stories, a considerable amount of time was built-in to the interview guide as well as the actual interview. As Fontana and Frey argue, "Most structured interviews leave little for the interviewer to improvise or exercise independent judgment" (2000, p. 650). The interviews had solid discussion, though spirited at times, and permitted flexibility to probe deeper on many conversational threads. In spite of some tangential conversations, remembering the research questions helped to reestablish focus and continue.

Each participant was interviewed twice; the second interview was used as a follow up to the initial interview to illicit deeper discussion and further clarification. Each interview was between sixty to ninety minutes in length and allowed the participant to expand their discussion in response to the interview guide's formal prompts as well as engaged in conversation allowing for thick descriptive responses. The interview guide and techniques drew upon previous work by critical ethnographers concerned with issues of power, control, and agenda in the practice of conducting interviews (Errante, 2000; Hollway & Jefferson, 1997; LeCompte, 1995; McIntosh, 1992). In light of their arguments, class, gender, and race issues received consideration as well as the power negotiation embedded with the actual interview between the interviewer and the interviewee. Maintaining a professional level of conduct and working to avoid acknowledging references to racially and gender-suggestive stereotypes as well as overly graphic illustrations was very effective in maintaining dignity with respect to these issues. When such a remark did surface, although minimal in number, the participant was asked to rephrase their statement. Beyond that, I kept reminding myself that the interviews were not about my experiences but mine were used as a point of reference attempting to establish a conversational rapport. Consideration was given to the dynamics of interviewing. Each interview was a constant negotiation with the interview participant and was not neutral. As Madison (2005) argued, "The interviewee is not an object, but a subject with agency, history, and his or her own idiosyncratic command of a story" (p. 25). With this in mind, the interview was not approached as sitting the interviewee down, issuing a prompt, and recording a response. In fact, it was a continuously constructed, negotiated, and re-negotiated dialogical exchange.

The front-line supervisors had many stories to tell. Some were far more ready to talk than others but those who were hesitant eventually became comfortable as the interview progressed. However, this study needed specific information regarding some key elements. Errante (2000) article on oral history and remembering titled one of her sections “*Negotiating Ways of Remembering and Telling or How I Got Narrators to Tell Me What I Wanted to Know*” [ital in original]. This spoke to the what, why, and how the questions, as well as follow up questions, were asked. The need for specific information drove why and how many prompts were asked. The specific information needed to explore and shed light on participants’ motives (reasons for activity engagement) and their lived experiences in shop-floor role negotiation. A deep understanding of their intra- and inter-group relations was desirable as well as understanding their background. The very analysis demanded each front-line supervisor’s socio-cultural background. In addition to that, this study also demanded thick descriptions regarding failures and times when they faced possible sanctions regardless of their decision.

Another section is titled “*Negotiating the Context of Remembering or How Narrators Got Me to Ask Them What They Wanted Me to Know and How They Wanted Me to Know It*” [ital in original]. This examined the participants’ idea of what should be made available in an interview in spite of and beyond the existing interview prompts as well as when they may think they have not understood what they had just said. Many times through the interviews, the front-line supervisors made available their successful shop-floor ventures. Moreover, in many interview instances, front-line supervisors were hesitant to offer times when they either broke the rules or took short cuts. They seemed to want it known that they do comply with formal policy. However, some initial

observations did not completely support that. Being cognizant of their opportunities to make available what they wanted me to know, some spirited conversation was experienced and, at times, a couple front-line supervisors seemed to completely shut down on some prompts.

The interviews were digitally recorded as a sound file and were assigned the labels of FLS1, FLS2, FLS3, FLS4, FLS5, and FLS6. Each recording was transcribed into a word document including the front-line supervisor's age, time on the job, gender, race, college grad or promoted from the ranks, department, and parents' jobs. This type of demographic data proved useful during the analysis. It permitted class biography inclusion and consideration well as contextualizing each front-line supervisor's transcript in regards to their cultural-historical background.

Formal Documents

In addition to the observations and interactions, formal documents were collected. One type was the formal policies and procedures and procedures that informs and guides the business practices. Among these were Standard Operating Procedures (SOP's), Safe Job Procedures (SJPs), Standard Quality Practices (SQPs), The Mon Valley Tomorrow program (the Continuous Improvement (CI) program, and the formal plant and department safety rules. These helped to shed light on what was expected from the personnel as they performed their role within the activity network. During shop floor observation, a couple key safety procedures were checked from what was written to what was done. Many times, the exact procedure was rarely followed but the actual step-wise movements were very close to the formal procedures.

Training documents were also collected. The documents mostly consisted of formal training program content as given both in-house as well as externally. Among the ones collected were Supervisor Training, Thirty-hour OSHA (Occupational Safety and Health Administration) course, developing and delivering better meetings, time management, conflict resolution, and diversity training. The training material was reviewed for what front-line supervisor role negotiation was expected focusing on how they were expected to transform objects by use of mediating instruments informed and shaped by the rules. The shop-floor observations took into consideration the programs' content and times of compliance as well as non-compliance was documented in the field notes including an attempt to note the conditions. Also, it was attempted to identify the activities goals driving the actions such that a more informed explanation could be grasped. It would not be possible to make sense of the front-line supervisors' step-wise movements and decisions without a moderately clear understanding of the goals driving the actions.

Mediating Instruments

Additionally, what mediating artifacts are being employed as the front-line supervisor interacts with others as well as shop-floor role and participation and how is the artifact being used? Further data collection included formal documents, memorandums, notes, training materials (including manuals, videos, instructors' handbooks and training planning documents), and other associated artifacts used in the activity systems. The consideration of mediating artifacts becomes significant when trying to understand the shop-floor environment, possible goals and motives, and how such instruments are used to transform the object through moments of mediation. For example, when transforming

the Production Schedule object using the specific customer's production tally sheet, is it the front-line supervisor or the sheerman that is controlling the conversation and what are the conditions underpinning the conversation's context. Or another example, as the front-line supervisor communicates with a subordinate, for what specific purpose is the communication intended, where is the conversation taking place, what mediating artifact is in use, and how is it being used? Through observing actual conversations, mediating instruments, and their key moments of mediation, it may be possible to gain an understanding regarding what really happens on the shop-floor. Additionally, it permits an investigation regarding how new learning may be initiated and possibly even contradictory to formal policy and procedure.

Personal Journal

Throughout the fieldwork and interviews, I maintained a personal journal. Shop-floor observations and participant interviews stirred some sense of nostalgia mixed with confusion in me. The personal journal was a place to reflect on the fact that I was no longer a front-line supervisor, although many times I had to force myself to remember this. The field observations became awkward in the sense of having once been an active and recognized member of the community but I was now considered an outsider. As the observations unfolded, the shop-floor actions and operations triggered memories and gave rise to feelings of restlessness in me.

Although this was unexpected, it did give rise to internal reflection that forced significant considerations regarding what determines an insider and an outsider. This carries significant discussion in the literature [see for example (Clandinin & Connelly, 2000; Errante, 2000; Fontana & Frey, 2000; Hollway & Jefferson, 1997; LeCompte, 1995;

Maguire, 2001)] and many authors go to great lengths attempting to grasp this impact on the research. Many situations rose in the field where it became important to maintain focus on the researcher role and deny temptation to “interfere.” This meant that as having been one of the insiders whose role was addressing and resolving shop-floor contradictions, I struggled to resist temptation to offer shop-floor related suggestions to current front-line supervisors.

Beyond that, the community had moved on and it was not even close to the one previously experienced. I had established in my mind that I would be immediately accepted but this was not the case, causing a somewhat uncomfortable feeling in the outset. Almost like getting the same look that, we gave outsiders when I was there. I know and communicate in the community’s language fluently as well as know the symbols and nuances that occur on the shop-floor. I was expecting to establish a quick trust and acceptance back in the community. But the trust was not immediate nor was it unconditional. It all pointed to that I was an outsider and not an accepted, or recognized, shop-floor member.

Data Analysis

Notes from the observations and participant interviews were coded using NVivo data analysis software. To ensure trustworthiness, triangulation of findings, participant interviews were checked through shop-floor observations, questioning, talking with union personnel, and examining formal documents. The transcripts were thematized and coded. Common threads among the interviews, as well as shop-floor observations were grouped.

The study’s CHAT-use permitted the opportunity to make sense of the themes rising from data analysis. CHAT was able to consider the many data pieces (artifacts,

human movement and interactions, communication, documents, etc) such that each CHAT element with each activity system received as accurate and thorough representation as possible.

Chapter 6. FINDINGS – DATA ANALYSIS

Introduction

This chapter details this study's findings. The two major sections are 1) Context and Contradictions: Working and Learning in the Middle, and 2) Mediation Types: Understanding Supervisory Skill/Style and Learning. The first speaks to the findings regarding the front-line supervisor learning firmly rooted in their context and illustrates the associated shop-floor activity systems. Beyond this, it further illustrates the significance regarding front-line supervisors' shop-floor interactions deeply entrenched with their social relations and the environment. The latter discusses front-line supervisors' mediating shop-floor situations including contradictions.

This study found three general mediational types including empirical contextual examples within each. This chapter concludes by drawing some conclusions regarding the findings.

Context and Contradictions: Working and Learning in the Middle

Borrowing from Mike Rose's (2004, p. 6) assessment of a restaurant's layout, the shop-floor is a very structured environment whose organization focuses movement and behavior towards production – getting product out the door. The shop-floor is tailored to be a streamlined, high yield, steel production unit with timely ancillary services. The very locations of the current pulpits that house associated production personnel reside in key places along the production line. The overhead electrical transport (EOT) cranes, the acid tester's booth, the scrap bin, side scrap conveyor and bins, and the coil feeding chains have all been placed such that production is not affected when they need serviced. The

strategic placement is not by accident. The specific production line stations' locations permit more easily access, supervision and control regarding the production processes.

Although there are maintenance personnel existing outside the department, the majority of their responsibilities occur outside the production unit. If their work would be required on the production unit, the production unit would be in need of some major repair meaning that its operation either experiences compromising or is not able to produce at all.

Shop-floor culture evolved from a very long history of contentious worker-management struggle and, at times, very explosive with many voices. There has been a long tradition of production-driven practices with an equally long history of "bottom-line" mentality. Quite recently, safety and quality have gained formal recognition as well as employee involvement programs and the associated programs of human resource development. The latter two have significantly influenced, at least as far as general awareness is concerned, the formal policy regarding production-first philosophy. The result has been re-designed and updated tools that are required to comply with federal and state authorities with the power to levy formal sanctions. Consequently, the shop-floor culture and practice has evolved beyond production-only activities to one that has integrated additional ones that seem to reflect the current, espoused beliefs of international, federal, and state agencies.

Front-line supervisors participating in this study were able to, and did, espouse the formal safety rules in both general and department specific documents. They held the union workers accountable through enforcing personal protective equipment (hardhat, safety glasses, hearing protection, etc) use as well as monitoring their compliance with

the formal Safe Job Procedures (SJPs). Front-line supervisors accomplished accountability through verbal and/or written corrective feedback.

Conversely, there were times where the front-line supervisors permitted fracturing SJPs or were deeply involved through direct participation. The conditions underpinning this often presented some contradiction producing a “tight spot” for the front-line supervisor. Observation and participant questioning uncovered situations where front-line supervisors experienced compromised mediating instruments, diametrically opposed production-quality expectations, or shop-floor dissent. Compromised mediating instruments meant either a one specific production line component, or some combination of several production line components, demonstrated some level of structural disturbance thereby forcing a change in “normal” step-wide operations. Often, such conditions led to front-line supervisors either supported or directed “by-passing” formal steps as given in the SJPs or performing steps that lied outside the scope of the SJP. Nonetheless, the task in question was not compliant with formal safety policy and was open to formal sanctions levied by a higher line management position or the plant’s safety professionals. All such details, while perhaps seeming to represent production details, are in fact also the nuts and bolts of the learning process as well. If informal learning forms the bulk of the learning that supervisors do even when formal training supplements and guides practice, then it is in the heart of these types of production process details where we will begin to uncover it.

The data uncovered three distinct but overlapping capacities helping to analyze and describe. One is Self. The Self includes such things as the front-line supervisors’ formal education experiences, their socio-cultural formation, attitude, demeanor,

emption, their self-efficacy, among other aspects related to their growth, their education, their habits, perceptions, engagement, etc. Self seems to shape, inform, and guide their supervisory skill/style, interpretation, understanding, and learning. Two interview prompts regarding telling about their job and the shop-floor yielded some insightful responses. Rodney stated that his collegiate experience did not “prepare me for that.” Rodney and Vincent expressed lack of preparedness to work directly with the union steelworkers as their parents did not work in a steel mill. One overwhelming experience was the continuous antagonistic behavior from the union workers against management as well as the subtle and obvious humor, demeanor, and comportment. Paul, on the other hand, stated his history with the union workers. He stated, “I grew up with many of these people as well as worked with them for a couple years. I just give the shit right back to them plus I have the hat [the white hard hat]. You just have to show them who the boss is and put it back on them. They may hate you but they’ll respect you.”

Front-line supervisors bring a wealth of history, culture, and traditions with them to the workplace as well as their knowledge, skills, and talents. Moreover, these aspects guide and shape the front-line supervisor’s interpretation, interactions, engagement, their doing, and ultimately, their learning. Historically, front-line supervisors encountered and engaged many different roles performed by many different people having shop-floor involvement (directly and indirectly).

A second one is Social Relations that embeds all the divisions of labor and the extent to which the individual in the division of labor performs the role. Originally, the data pointed to identifying this capacity as “people” but when grappling with this further, it spoke to more about relations on the shop-floor. So, the label was determined to be

Social Relations from the interviews as the participants spoke to relating with roles more so than specific people. A point worth mentioning rising from the front-line supervisors' interviews hinted at reifying some roles such as production planning, safety, and OSHA. Social Relations embeds such aspects as power issues, agency, and standpoint, among others. In addition, the specific people performing the roles, shaped and informed by their socio-historical growth, define the social relations. Benjamin stated, "One of the biggest problems I have is when Production Planning puts stuff on the tallies that want to run. I know they have a job to do and I know the customers need their orders but hot material can not be run. Period. It creates problem with the entry end workers [union production crew] as well as create quality problems." Paul stated, "You just give the people what they want. Safety wants contacts, I give them contacts. Quality wants write up, they'll get their write ups. If I need to tell the welder no bad welds, I mean no bad welds. There are so many things that needs done but it is my job to get it done." By observation, Scott was interacting with contractors for several days. The contractors were repairing part of the building's floor during normal production turns. Scott said, "Between the work permits, the burn permits, fire coverage, and coordinating them [the contractors] with the tractors, I am ready for a beer at the end of the day." Rodney was concerned with the future International Standards Organization (ISO) visit. He said, "ISO always creates a panic around here. When they visit, we have to be on our best behavior. And the bigger problem is making the union people say what ISO wants to hear." In this case, Rodney was expressing a relation with an entity but it certainly was real to him.

From the observations and interviews, the social relational roles include those in both the corporation and outside entities. Those having direct presence are the union

workers, upper management members, and all supporting staff. The indirect presence surfaces through externally driven agency mandates, sales people, or customer driven concerns. In addition, people's roles in the division of labor contribute to and implicate front-line supervisors' learning while transforming the object. The roles imbedded with this category cover the broad spectrum of responsibilities ranging from the shop-floor union worker to the plant manager and corporate executives to outside contractors and sales people to state and federal agencies. Their impact felt within the mediating instruments, the rules, the community, as well as the object.

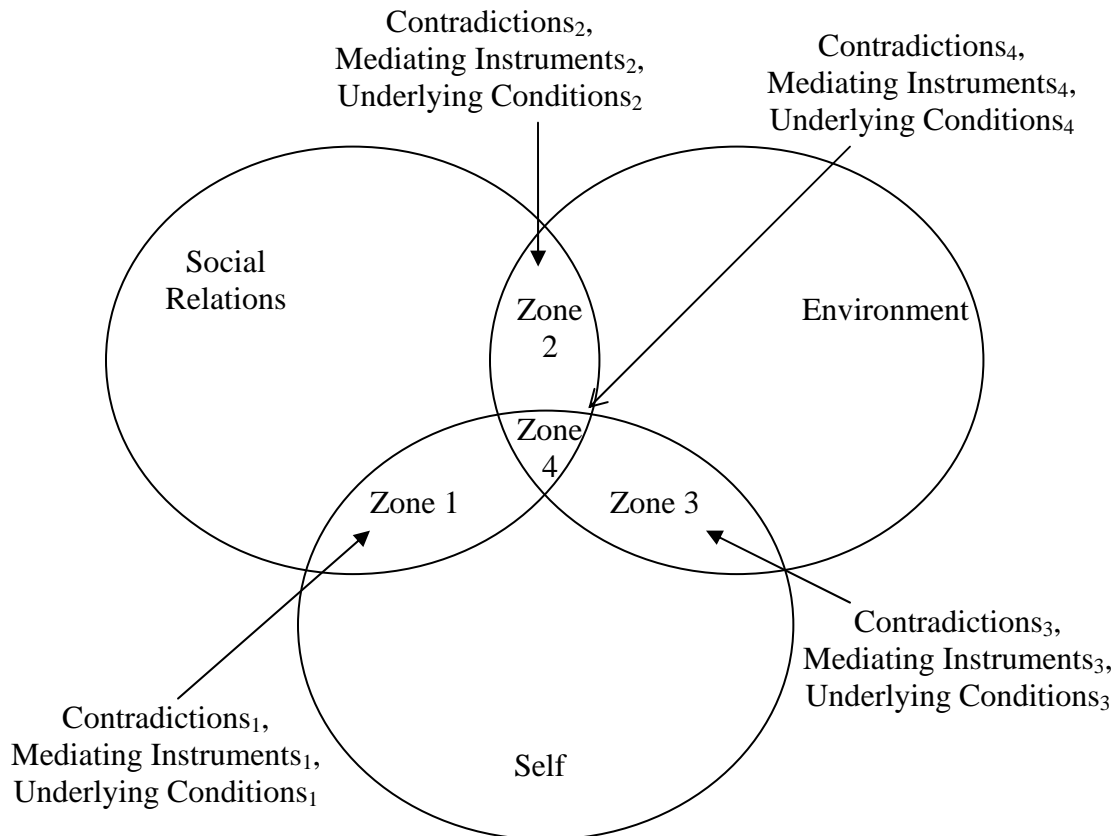
The Environment includes all the physical manifestations of the workplace (production units, pulpits, offices, lockers, mobile equipment, etc) in addition to all the intangible aspects such as sounds, smells, seasonal effects, heat (or lack of), sights, among others. Table 6.1 summarizes these three capacities and their associated dimensions from the field notes.

Table 6.1: Three key aspects with associated dimensions

Self	Social Relations	Environment
Formal Education Experiences Socio-Cultural Formation "Rules of Engagement" Self-Efficacy Attitude Demeanor Personality Interpretation Emotion	Shop-floor Specific "Rules of Engagement" Professionals Managers Executives Officials Contractors Sales People Consultants Agency Representatives	Production lines Cranes Pulpits Formal Training Classes People Presence Formal Policy Formal Procedures Formal Meetings Global Business Reality External Agency Directives Atmosphere "smells" "sounds" "sights"

The three distinct aspects exist co-dependently with each other and they share interactive overlap. As Billet (2002) stated, "...learning is shaped through moment-by-moment interactions and engagement in activities that are shaped by the micro-social processes of the workplace" (p. 4). Through the identified activities, the task now becomes laying-out some structure, some guide, in helping to describe the workplace micro-social processes, interactions, and engagement. This study has argued throughout that this will shed light on empirically describing informal instances of learning. Using this as a springboard, the interactions, conditions, potential contradictions, and mediating instruments observed in the overlaps can help to concretize moments of engagement. By focusing in on the zone, it permits the space as well as maintaining the presence of all relevant factors when investigating and analyzing informal instances of learning. The above discussion illustrated the distinctions located with each capacity. This next section will illustrate the role these capacities will have when examining the interactive overlaps. It will help to keep in front of the researcher are the mediating instruments, possible contradictions, and the underlying conditions at the time of observation. With this in mind, it may be possible to offer a plausible explanation regarding learning outcomes. Figure 6.1 illustrates the conceptual diagram rising from the data regarding front-line supervisors' learning aspects.

Figure 6.1: Conceptual map illustrating the three overlapping categories.



Zone 1 is the interaction between the self and the social relations. The interaction includes the front-line supervisor, the specific role(s) involved in the relation; all associated mediating instruments, and the specific set of conditions underpinning the interaction. In this zone, it is possible to investigate the moment-by-moment interactions between the front-line supervisor and others. These are situations where the environment does not have a role. As Vincent noted, “Dealings with union officials always gets into a pissing contest.” This spoke to him interacting with the union grievance person where the meeting involves power issues. Vincent saw this as the union grievance person trying to set up some situation where union workers will receive some favorable decision in the future through exerting some “push” now. The issue was regarding Vincent’s directing a

laborer to clean up concrete rubble in the looper pit. In the strict sense, worker presence in some areas of the looper pit during running turns is prohibited. But Vincent assigned the laborer to an area near the prohibited area. The grievance person expressed concern that Vincent subjected the laborer to unsafe conditions if something should happen. As Vincent stated during my questioning him, "How many times do people go through the area and now all of a sudden it becomes a problem," The grievance person used the language found in the Basic Labor Agreement to make his argument. During the interview, Vincent expressed his disapproval in contentious engagement and preferred if people "just did their jobs." Nevertheless, the union grievance person engaged Vincent arguing a specific decision Vincent made that, in the union grievance person's perspective, negatively affected the laborer in trying to influence the next similarly focused decision Vincent would make. At this point, Paul entered the conversation and expressed to the union grievance person that Vincent was perfectly within his rights to assign such a task. Paul also explained that if they wanted to file a grievance, that will be fine and to expect a fight. At that point, the shop-floor meeting dispersed. Paul, who grew up working class, knew that union grievance person's agenda since a union worker was recently formerly sanctioned. Paul understood the underlying conditions and what the union grievance person was trying to accomplish. As Paul noted, "I know his game. He wanted to piss and moan now so maybe next time, we will not assign the laborer to do such work in that area. He is thinking we are double talking. But, nothing says we can't put a person there so he was just trying to intimidate Vincent." Vincent did not comment on the discussion.

Zone 2 is the interaction between social relations and environment. Located in this interaction is how the micro-social processes play out that helps to shape the environment as well as the environment shaping the micro-social processes. The inherent, personal, and role-related shop-floor structure(s), embodiments, and mediating instrument(s) arrangement shapes, reshapes, and implicates the environment's atmosphere and physical manifestations, as well as shape and inform social relations. Among the inherent shop-floor structures are the actual building material, shape, columns, beams, siding, and resource access points (i.e. oxygen, acetylene, water). The personal description includes workers' personal belongings, personal arrangement preference, portable mediating instrument placement, and shop-floor engagement. The role-related designation includes the different stations and pulpits along the production unit, maintenance stations, and ancillary services and stations. Embodiments speak to the location and goal-driven actions of the specific person-filled divisions of labor directly and indirectly implicating shop-floor considerations. One major implication for the front-line supervisor is it informs and creates the underlying conditions at the moment the self engages in, interacts with, and negotiates Zone 1, 3, or 4.

Zone 3 is the interaction between the self and the environment. This permits the space to focus on the front-line supervisor and the actual workplace environment. This is their negotiation through the physical arrangement, experiencing the sounds, smells, formal meetings, etc. Nick stated, "I listen for specific noises to confirm whether some things are happening or not. Such as the welder, the RCS [Raw Coil Storage] cranes or the side choppers. By listening for these noises, I know if the line is running, if there is a problem, or what RCS is up to no matter where I am." While observing Nick on the shop-

floor, he did not hear the side choppers at one point. He used his portable radio to contact the shearman to determine if a problem existed. It turned out to be the shearman visited the locker room at which time production resumed.

The area denoted as “Zone 4” is the Self interacting with (imposing upon) the Social Relations interacting (“conquering”) with Environment. Alternatively, is it also fair to say that Environment interacts with Social Relations and interacts (“shapes”) with Self? The outcomes illustrated that the social relations and the environment did shape the self. Located here, front-line supervisors experienced expansive and contracted learning. Paul stated, “I remember one time the roller told me he needed to change the temper mill rolls during a really good production turn. I refused to listen because the end of shift numbers would make me look good in the bosses. We ended up shouting at each other but I told him I have the hat [white hard hat]. But a half hour later, the temper mill rolls almost exploded and damaged the controls near by. It ended up costing the turn and made me look bad. I learned to take seriously when a union worker has a huge concern. I’ll never do that again.” What Paul was stating was he will listen to the union workers as an equal but will still make the final decision. He learned that he needed to include the environmental factors (such as the roller’s concern with the temper mill when it was making a different noise) in addition to focusing in production-only concerns.

The above discussion reveals a couple important aspects. One is Paul was being influenced by wanting to “look good” in upper management’s eyes. These are the factors that speak to a front-line supervisor receiving salary raises and promotions. The second was to give consideration to what the union workers were saying. The roller, having many years on the job, was able to detect instrument-related issues (such as compromised

temper mill rolls) by the sound he heard. Then, to a bigger extent, was causing production to cease for a couple hours and required Paul to complete a major delay report to which his name was attached. Thinking through the analysis, Paul's goal was for his crew to post a solid production turn. But it appeared that he became complacent and ignored the underlying conditions when focusing on his goal that surfaced and caused problems. The underlying conditions are present throughout and serve to shape and inform front-line supervisor learning. This also serves to illustrate the environment and social relations shaping the self. Paul admitted, "Yeah, I was somewhat driven to look good. I thought I new the machines." This situation also speaks to the possibility of front-line supervisors externalizing to a larger degree than what they realistically could. One of the unintended outcomes was Paul listens to others and gives the environment and the underlying conditions just as much merit when making a decision even though he does worry about how he looks to upper management. Nevertheless, Paul also alluded to he would probably see himself being egotistical again.

Identifying the Five Activity Systems

Five common themes surfaced from the interviews speaking to the front-line supervisors' activity participation. A common theme running through the interviews was the practice of safety. One of the five key activity systems to emerge was the Safety Program that was formally informed and guided by the department's and the plant's safety program. On a more subsurface level, it was also informed by front-line supervisors not wanting their name to be associated with an incident or injury on their turn. Nick stated, "It sucks when something happens on your shift. Although I did not cause it, I get blamed for it and my name is on the accident report [a required formal

document for incident and injury investigations]. Although there is nothing official like production numbers, the bosses have it in their mind.” Paul echoed something similar, “I can have the best production turn ever. But let something happen and I am fucked.” Paul’s statement seemed to be representative of the front-line supervisors’ attitude regarding incidents.

Safety is a two-fold venture for front-line supervisors. The first is their own safety while on the shop-floor in terms of their well-being in terms of not being injured, poisoned, or being subjected to long term effects. The second lies in their modeling the accepted safety practice for the union workers as well as holding them accountable against the formal safety policy. Rodney offered, “We [front-line supervisors] are expected to model the safety program and wear all required PPE [personal protective equipment]. Which is only right especially if we are to hold the union people to wearing it. It wouldn’t be right for me to write up someone for not wearing the safety goggles if I don’t.” Nick added, “I know safety is important but sometimes its more dangerous to follow what is written. But I won’t put the guys in a harmful situation.” Formally through visual observation, front-line supervisors were required to distribute the weekly safety packet and subsequently enter each contact given to the union workers in the computer. In addition to the weekly safety packet, front-line supervisors are also required to conduct a minimum of two safety observations per worker per week and enter the observation into the database. The front-line supervisors had many mediating instruments surfacing in the Safety Program as illustrated above. Just to recap, they have the formal safety program, the weekly safety packet, their language, safety observations and the formal document given to the worker, the computer safety system, and their own practice of it.

Although the front-line supervisors expressed the concern for not getting anyone hurt, they also expressed concern for the performance if these two expectations were not met. As Paul said, “Yeah I want everyone to be safe. But, I also know I am being judged on what I enter into the safety system every week by my boss. It just a simple thing to do so I do it.” Scott said, “As I said I don’t want to see anyone get hurt. But my evaluation is based on my getting the safety stuff done.” Based on the interviews and observations, it appeared front-line supervisors’ goals were informed by these two expectations, at least on the surface. Their actions were copying and delivering the safety packet as well as planning their safety observations. But as Paul admitted, “I just make mental and written notes on what I saw when I sit down to enter the observations then I fill out the actual document for the safety people.” Although a bit unclear with the current data, front-line supervisors motives were beginning to emerge but the danger may have been reading more into it.

The second activity system that emerged was the Production Schedule (PS). On the surface, corporate policy stated safety is the first and most important consideration. However, through visual observation, production-related issues seemed to garner the most importance. One example was continued production through forcing the union workers to dealing with a missing safety device. The specific device was a motor gear guard directly adjacent to where union workers performed their role. Formal policy demanded the line to shut down, locked out, and the guard replaced. The guard protects workers from moving gears that could injure or kill them. However, since repair turn was “only two days away,” upper management ordered the front-line supervisors were to work with it. The time for repair was approximately two to three hours if the repairs did

not experience unforeseen problems. But the production line was operating well and exceeding the business plan. Paul stated, “I know its all about producing tons. That’s the name of the game. That’s why we have jobs. But it is tricky when running with an important safety guard broke.” When trying to probe Paul further, he alluded to “workers being used to these things.” Scott said, “Its all part of the game. Its all about the tons.” Vincent stated, “The biggest problem is listening to the union bitch about it. Like it’s the first time that happened. Just shut up and do your jobs.”

A document analysis illustrated production’s significance. Among the mediating instruments employed beyond the production line and its associated parts were numerous tables, charts, and graphs all detailing each crew’s performance, the daily totals, totals for the week, totals for the month, and all in relation to the business plan. Each pulpit is given the proper tools it needs for maximizing production. As technology and robots improved, the lines have been recently updated with computer-driven robotic arms and transfer cars allowing for decreased cycle time for charging coils. These coupled with each union worker’s skill in using them is a mediating instrument employed by front-line supervisors in the Production Schedule. They also are guided by the formal policy of Standard Operating Procedures (SOPs) and by the Production Tallies that detail each customer’s orders and acceptable tolerance ranges. Through proper and timely applications of knowing when to use or appropriate the mediating instruments and rules, front-line supervisors manage the union workers to produce steel coils. Scott stated, “That’s what is all boils down to. Getting the tons out the door.” Through portable, hand-held radios, the front-line supervisors communicate, as needed, with the crew throughout the shift providing support and direction.

The third activity system that surfaced was the Quality Program (QP). Paul stated, “Gone are the days when we just ran and shipped the product. Now so many companies are fighting for a piece of the market. We need to do it better. Plus, just like safety, never get your name attached to running junk. Very bad!” The Quality Program is informed by the Standard Quality Practices and the department’s specific quality procedures. Nick stated, “We have the power to shut the line down for quality problems but you better make damn well sure you can defend it. But if you don’t fix quality problems you get your ass chewed out. If you do fix it and lose time, you get your ass chewed out. Either way you’re fucked. So, its still better to get yelled out for production than to have a coil returned by the customer. That’s your ass!” What this speaks to is possible contradictions between QP and PS. More to the point, it demonstrates that quality receives similar importance as production and safety. Paul stated, “Quality reports are part of every meeting. Investigating a defective product and completing a report on it requires the same energy and importance as an incident report. Quality is very important.” Paul’s statement was supported by the formal report that is required for each defective product. Beyond this discussion, many signs were posted throughout the department keeping quality a conscious thought as the front-line supervisors’ performed their role. One such sign stated “The Customer is the Next Inspector” and many quality charts and graphs were posted on the department’s bulletin boards.

Not so dominant as the previous three but still prominent on the shop-floor is the Employee Involvement Program. One major indicator was each crew’s performance statistics posted on the bulletin boards and in each morning’s summary sheet of the previous twenty-four hours. Moreover, each crew is required to hold one formal

continuous improvement meeting each month as well as develop and work on improvement projects that will help them achieve their production, quality and safety goals. Scott stated, “The involvement program was much bigger than now but it still continues. Of course, we don’t have the celebrations like we used to.” Many still believe that the employee involvement program was developed and implemented as the means to satisfy International Standards Organization’s (ISOs) requirements to becoming ISO 9000 certified. Scott’s statement seemed to capture the general flavor, “We knew it was just another bullshit program by the company but they needed it. In the beginning, CI [the employee involvement program] was very successful. Crews established goals, met them, then celebrated. But now, its just a way to track what everyone is doing.” In spite of the shop-floor perception, front-line supervisors know their participation in the involvement program is important for their evaluations and possible promotions. As Paul stated, “They [department and plant managers] evaluate us on how active we are with CI. They gauge us by looking at the charts and diagrams.” The Employee Involvement Program still maintains shop-floor importance as well as career related importance.

The fifth and final key activity system ascertained was Just Employee Relations. Through interview transcript analysis, one thread weaving through them is the front-line supervisors’ concern for the union workers safety and well-being. By use of the Basic Labor Agreement and their manner of interacting with other people, the front-line supervisors exhibited conscious thought when addressing union worker related issues. Rodney stated, “I would hate to see any of them get hurt in here so I try to be fair when assigning work tasks. Sometimes a union worker does not like what I decide but I do try to be equal and fair in all matters. Sometimes it is rough.” Shop-floor observations

showed times when front-line supervisors helped the union workers in their roles. In one example, a bad scrap jam occurred in the entry end of the line. Paul put on work gloves and was right there helping the union workers to free it. Paul, Scott, and Rodney each confronted the department manager for decisions affecting the union workers that were not the best for them. In one sense, the department manager wanted to limit the number of gloves given for the union workers to use on the job. Paul confronted the department manager and pointed out to him how ridiculous that was in putting the union workers in a compromised situation compromising the safety by forcing them to use worn-out gloves. Paul “won” his argument. Scott needed the laborer to remove concrete pieces and dirt from a construction project. Scott permitted the laborer time in an air-conditioned environment upon job completion and gave him some easy sweeping to finish his shift.

Table 6.2 illustrates the five key shop-floor activity systems.

Table 6.2: Five key activity systems

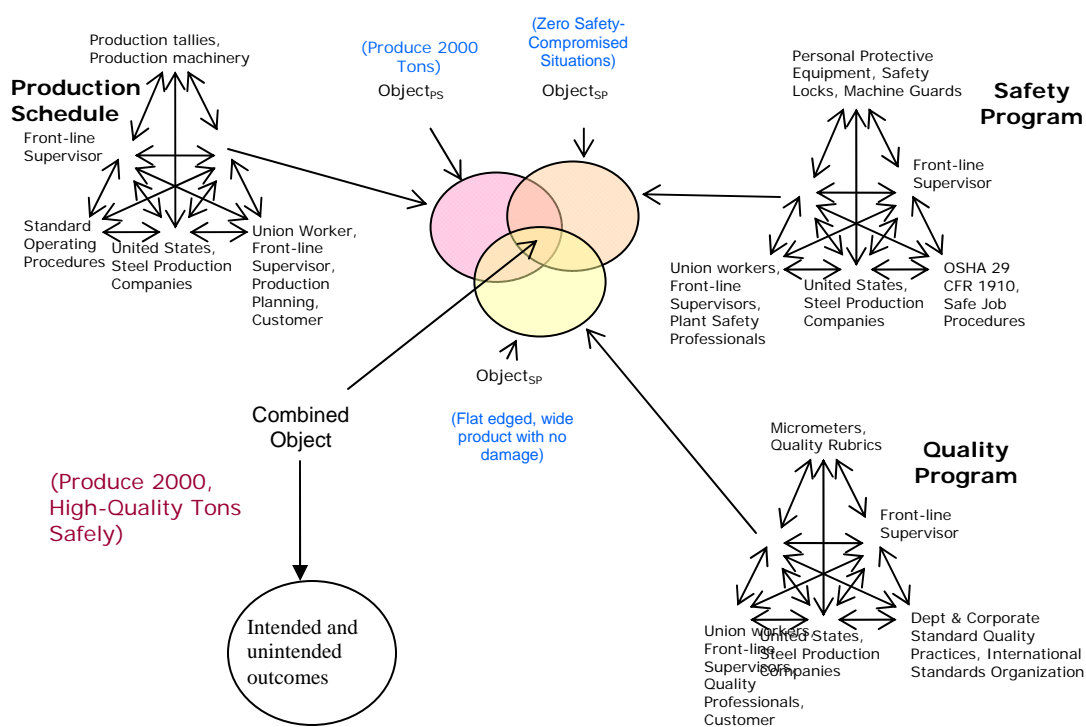
Five Key Activity System
Safety Program (SP)
Production Schedule (PS)
Quality Program (QP)
Employee Involvement Program (EIP)
Just Employee Relations (JER)

The five key activity systems combined to make an activity network. Although there were five identified, many times not all activity systems were manifest. In other words, at times, say three out of the five activity systems were dominant although the other two were present but latent. The three dominant ones were the Production

Schedule, the Quality Program, and the Safety Program. Field observations yielded front-line supervisors goals were in response to those three the majority of the time. This became obvious through visually observing: the weekly safety packet distribution; the hourly production statistics recording; the mandatory strip-surface quality inspections; the formal documentation regarding product defect, production delays, or safety incidents. These are but a few of observed actions in which each front-line supervisor performed. Paul allowed in his interview, “We are constantly watching safety, quality, and production. All at the same time. They are all important so we just need to do it.” Nick supported Paul’s sentiment by saying about his job, “I really do enjoy what I do. Its just that you need to be mindful of everything all the time.” When I probed what “everything” was. Nick responded, “It is how many tons we get [production], making sure they look alright [quality], and that no one gets hurt [safety]. If I can do that, the bosses are happy.” Employee Involvement Program and Just Employee Relations were more latent and under the surface. Although, by the front-line supervisor’s interactions with the union workers and the shop-floor, they demonstrated fairness and concern however this was implicated by mounting pressures resulting from compromised or poor-production shifts. Scott allowed, “I don’t trust any of these bastards out here. I know they would fuck me in a heartbeat but I don’t want to see them get hurt. And I try to give them a bone [this means to provide maximum opportunity for production incentives] every now and then.” Paul stated, “I try to give the crew the opportunity for good numbers for their charts. That’s important for them. Although CI [the Employee Involvement Program] is not as important as it once was, it is still here.” Figure 6.2 illustrates the complexity of analyzing the data concerned with the three dominant activity systems in

the activity network namely Production Schedule, Safety Program, and Quality Program. But by being dominant does not mean that the other two are less important. These three represent the majority of the intended actions. These three bring sponsor the most immediacy of attention from front-line supervisors due to their ability to implicate the bottom line.

Figure 6.2: Diagram showing an activity network with three activity systems.



To reiterate, the three activity systems are the most visible concerning capital cost, bottom-line focus, and the manifest perspective. Scott stated, “Between safety, production, and quality, any of them can fuck you if you don’t stay on top of them.” In addition, the majority of the contradictions rose rooted in these three activity systems. And by identifying the physical signs and symbols in the work environment, they all support these being the dominant with the other two lying just below the surface but with

enough impact that they gain credibility when conducting a complete analysis. Again, CHAT provides the ability to investigate and analyze shop-floor complexity regarding front-line supervisor learning.

Figure 6.2 also illustrates representative example located in each activity systems various elements such as rules, division of labor, and mediating instruments and serves to illustrate laying out the data for a CHAT analysis. Being mindful of the conditions performed firmly rooted in the underlying conditions and the goal-driven actions as well as identifying surfacing contradictions permits plausible explanations regarding the deeply human face of human learning.

Introduction to Working Class Biography

Working class biography speaks to the culture in which one is raised. In other words, people experience specific speech patterns, different symbols, and references depending on their parents' and community's influences. For example, Paul mentioned that he had grown up with many of the union workers and understood their humor and knew when they were trying to "get a rise" from him. Scott experienced similar home life in that his father was a working class person who frequently spoke about his industrial experiences as a union worker.

In spite of formal policies, procedures, and rules, the front-line supervisors actively create their own society and culture through use of mediating instruments (tools, signs, and symbols) in which they give meaning to and make meaning of the everyday activities, actions, and operations. In addition, they also bring their life history to the workplace in how they deal with employees, interpret the formal documents, and ascertain present conditions and resources and bring them to bear in resolving a

contradiction or some shop-floor situation. The latter includes a solid grasp of the current knowledge within the activity system/network as it has built, expanded, and evolved over the history of the activity. Front-line supervisors base their goals on what they value as important that subsequently informs their actions. Each front-line supervisor places a value on situations, relations, and formal policy in accordance with their interpretation of it. If a front-line supervisor never experienced foul language as a means of acceptance then they will take offense, either inward or outward, when performing their shop-floor role. For example, Paul and Scott had both traded very derogatory remarks with the union workers. Scott said, "If they don't say fuck you but address me formally or are quiet then I know something is wrong. That is when I begin to worry that something is up." These types of codes speak to Scott knowing and understanding the shop-floor culture as he experienced that while growing up. And as he stated, "something is up." Being aware of this condition, Scott established and performed the goals and actions during his shift from an informed perspective. If what he suspected was true, he does not want to exacerbate it beyond the current issue that will definitely lead to relational issues and possible production implications.

The underlying conditions reflect the crew's attitude and demeanor and directly impacted their operations. Vincent, on the other hand, did not experience this growing up. As he stated, "From my former position in safety, I thought I was ready for the move [to front-line supervisor]. But no matter what I do someone is bitching at me and wanting to see me fail. They are cold bastards who just don't care." When probed further, Vincent allowed, "We did not treat each other this way. My dad never said fuck, at all. We never treated each other like this," Vincent did not understand the conditions. Vincent was

observed several times engaged in conflicts not only with his subordinates but with front-line supervisors from Central Maintenance. He could not understand when they were just trying to get a rise from him. Paul stated, “He [Vincent] needs to either let it roll off his back or give it right back to them. He lets it bother him too much.” Although I could not get the information from Vincent so the data does not show this, I have belief that the crew would not “give their all” on some shifts for Vincent. The belief is fueled by listening to what was being said and the crew’s demeanor in performing their roles. However, empirical data does not show this. This belief needs further research as it may yield fruitful knowledge regarding supervisory skill.

The above discussion attempts to illustrate the importance of class biography’s shop-floor implications. This does not mean to say that only those with working class backgrounds know it. But it does say that one’s personal biography shapes and informs their interpretation and having an understanding of the shop-floor culture helps a front-line supervisor when developing goals throughout the shift. It follows then that, by front-line supervisors having access to the latent rules, artifacts, and codes of the shop-floor, they have the ability to employ them to mediate their role negotiation in the social relations and the environment. Moreover, good front-line supervisors are able to employ these latent shop-floor aspects in resolving contradictions. It is their ability to “see” what the conditions are “saying” and use it as a means to establish the proper goal-driven actions.

Mediational Types: Understanding Supervisory Skill/Style and Learning

The preceding section illustrated the shop-floor context and the associated environment and people-social relations. This illustrated the context where front-line

supervisors perform their role that is the five key activity systems. Identifying the activity systems and the activity network helps to firmly ground the front-line supervisors in their social reality.

Front-line supervisors employed a variety of mediating instruments through role performance. The specific shop-floor underlying conditions determined mediating instrument selection and usage manner. Beyond this however, the specific instrument choice and usage employment also depended upon the specific front-line supervisor's ability as well as their agency, shop-floor presence, and prior shop-floor learning experiences (including both expansive and contracted).

Accompanying the key identified mediating instruments, interviews and observations identified key moments of mediation. The "key" declaration parameters arose from the number of time a specific mediating instrument was mentioned in the interviews supported by visually observing the times a front-line supervisor employed specific mediating instruments on the shop-floor. Between the interviews and observations, several mediating instruments rose as receiving the most use throughout their daily role negotiations hence they became key. In addition to listening for and observing which mediating instruments were used, it was also noted why it was used, and how it was used. The other factor was grasping the underlying conditions during the moment of use. The investigation identified mediating instruments used in three different manners. The three were: used it as designed, appropriated existing mediating instruments, and those created in the context.

Mediations/Learning rooted in artifacts as designed

Mediating instruments identified as “Mediations/Learning rooted in artifacts as designed” was developed through observing front-line supervisors using mediating instruments as they were designed to be used. This means the front-line supervisors did not alter or appropriate the existing artifact at any time.

End of turn report. The end of turn report is what executive management requires front-line supervisors to complete when closing out their production turn. It includes such production related information as steel coil quantity (the number of coils, total tons, total linear feet), quality related information, accident-injury explanations, and any major delays that would disrupt production for more than thirty minutes. They fill in the blanks with the proper information and fax it to the plant manager. The Production Schedule, Quality Program, Safety Program, and the Employee Involvement Program activity systems employ this mediating instrument. The end of turn report (in its current form) was developed in 1990 and remains intact. The end of turn reports have historically been required of front-line supervisors since the role's development (Allen, 1922; Mellen, 1928; Reittel, 1938, Walton, 1941). Paul, Nick, Rodney, and Benjamin allowed that they believe this report provides executive management the foundation they need for formal training programs. In their experience, the training department has provided specific programs in response to prolonged periods of substandard performance. Executive management uses the information provided by this instrument as part of their bottom-line understanding regarding the department's performance in meeting the corporation's key drivers.

However, as the front-line supervisors stated, the end of turn report does not provide the space to explain the underlying conditions to substantiate missed production, quality, and safety expectations. This is one instance where they just need to “fall on the sword” but, from an analytical perspective, it does provide impetus for their learning. It seems here that the end of turn report indirectly sheds light on primary and peripheral contradictions thus implicating production, quality, and safety expectations. As Paul stated, “I need to fax the end of turn report every time but I can do things during the turn that will show better numbers than if I just did nothing.” Nick had mentioned where he would shut the line down for a minor repair (maybe ten to fifteen minutes) but will provide the union workers to maximize remaining production time. By this, Nick will need to explain the delay but will have far better turn-related statistics for the end of turn report. As he stated, “I am willing to sacrifice fifteen minutes but know I will meet performance expectations.”

Pulpit. Pulpits are those air-conditioned enclosures located at each production position along the production line. They serve the purpose to act as a noise reducing enclosure allowing the union worker a safe space through limiting noise and airborne hazards, including heat, to work. The exit end pulpit housed two union positions those being the bander and the recorder. The bander is the production line position located at the exit end of the line. Bander’s duties include direct production line interaction to thread the steel strip into the take-up reel allowing it to build a steel coil. The bander is also responsible for removing the completed product from the take up reel, quality assurance and inspection, securing coil through applying a metal circumference band, exit end house keeping duties, and duties as assigned. The recorder’s position performed

duties that included steel coil data entry, writing proper coil identification information on the coil, confirming incoming product related to the given customer, operating crane to load coil for transport, stocking and maintaining sufficient required job-related materials, among others.

Recently, the department eliminated the recorder position and split the associated duties between the computer and the bander. Those front-line supervisors who began their responsibilities with both positions in the same pulpit had to change how they understood the delivery end. They experienced learning the front-line supervisor's role, regarding the responsibilities of these two positions, as separating out each position's responsibilities as distinct as well as what they do combined.

Combining the bander and the recorder into one position has implications on many levels affecting the front-line supervisor's role. This dissertation helps make explicit several key aspects beyond formal training while examining front-line supervisors' learning lives. The first is the underlying conditions changed in the form of position elimination, remodeled delivery end pulpit, and the change in social relations and expectations in the delivery end. During the front-line supervisors' learning curve, front-line supervisors established goal-driven actions when addressing surfacing contradictions regarding this area. Paul stated, Change is part of the business. You just accept it and deal with it. The first time something major hits the delivery end, I'll just work with what I have and go from there." Other aspects would include worker and machine interaction and the front-line supervisors' ability to interpret, manipulate, and create instruments for goal-driven action completion including their demeanor, attitude, and efficacy in managing the shop-floor. Nick said, "Its not like the recorder did a lot

most of the time. Other than figuring out times when the computer screwed up, the bander could have done the job. So one station is eliminated. You'll have that. The workers will settle down and everything will get back to normal. The only major change I see is the bander may not give as much attention to the coil on the mandrel [take up reel]. Scott added, "The only big change will not having an extra body in crisis times. Other than that, the bander will have to do a little more than what he is used to."

The position elimination had the most significant affect on the underlying conditions. The first, and possibly the most obvious general condition set, one is there is only one worker in the same pulpit combined with a restructuring of the booth's interior. This alone drastically alters the conditions in the specific pulpit when situations rise needing resolution. Vincent stated, "It won't seem too bad as long as things don't get too bad. But, I was used to having two people to help me. And it was a place that I could talk through problems." The Front-Line Supervisor needs to consider one union worker in the immediate area as well as tool upgrade and evolution and revised SOP's, SJPs, and SQPs. This alone creates a significant situation. Nick expressed concern stating, "The biggest thing I see is enforcing what the correct procedure will be come time to do observations. That, and what if there is an accident there. That will certainly get safety's attention. But, I guess it will help to get the best way to do the jobs."

Specifically, problems (both intended and unintended) emerge based on this change such that prior front-line supervisor's operations which could have been carried out in a routine way, have to be considered consciously. Benjamin's presence was required to address a peripheral contradiction rising while the bander discharged a coil. He was needed to make a decision regarding to specific coil discharge procedures for a

specific customer. While observing Benjamin as he listened to the bander, he gave a long pause and seemed to stare ahead and drift away. After approximately thirty plus seconds, he looked to his right (where the former recorder's position was located) then was able to give a decision. It was just over a minute where there was silence and no movement within the pulpit. Once the production line returned to normal operations, Benjamin was asked what was happening. He stated,

“When I learned the delivery end of the line, it was when two people worked there. When he [the bander] asked me that question, I drew a blank. And I remember of always glancing at the recorder while coming with a response. But the entire pulpit was changed and I just lost my focus. For the likes of me I could not remember. I had to play out the old pulpit in my head to remember the required sequence and what needed to happen before applying it to the new system.”

From a CHAT perspective this describes a key instance in which an operation shifts to a goal-directed action. One outcome is role re-negotiation and re-remembering. Re-remembering is the front-line supervisors must rebuild how they remember a specific situation. The conditions and environment changed that underpinned their memory [Benjamin's in this case]. In other words, operations rose to actions since the underlying conditions changed that the front-line supervisors had to give pause and actively plan what needed done and how. Paul mentioned, “I had to get comfortable with there only being one person on the delivery end. If there is a crisis, one person will have to handle it meaning I will have to help the bander.” Vincent expressed a huge concern. He said, “Its

not my job to do their [union workers] job. But now I guess I will try and learn coil ID's and such to help which just adds more stuff.”

The left column of Table 6.6 illustrates the former conditions that were present when the front-line supervisor was learning the position and how to negotiate their role. However, as the right column of Table 6.6 illustrates, the conditions have changed so much so that the two, distinct positions (recorder and bander) have been combined meaning the two distinct, specific duties are performed by just one union worker mediated by use of new high-tech tools. These tools evolved in accordance with the state-of-the-art technology where one union position was eliminated (the recorder). The corporation in response to mounting global business competition drew upon the combined knowledge located in the Community and demands leading to cost-cutting practices wherever seemingly feasible – at least as far as the bottom line are concerned.

However, there is another general set of conditions, though seemingly obscure, that probably has a greater impact. This is rooted in the repercussions and consequences associated with eliminating a union position causing both local (in the pulpit) and extra-local (the entire production line and department) attitude ramifications. These directed attitude changes focus on the company but which inevitably falls on the front-line supervisor. This was included in the “stuff” that Vincent had mentioned. Scott and Paul, on the other hand, both alluded to the fact that the banders just need to do their job and the department's union workers know this is the steel industry. Some specific conditions located within this general set are power issues, empowerment issues, cynicism, defeatist and fatalist attitudes, as well as increasing the chasm between the corporation and the union, among others. “Being caught in the middle” takes on a different persona in that the

shop-floor union workers not only hold the corporation and the managers in contempt but also their own union leadership.

Table 6.2 details the above discussion.

Table 6.2: Comparison of underlying conditions in the delivery end pulpit

Prior Delivery End Pulpit Environment	Revised (modified) Delivery End Pulpit Environment
<ul style="list-style-type: none"> ➤ The pulpit's physical interior layout including tools and materials ➤ Company tools (i.e. PPE, line monitors, control panel, computer, etc) ➤ Company materials (i.e. memos, chairs, trash cans, etc) ➤ Personal tools (i.e. season-specific clothing, etc) ➤ Personal materials (i.e. clothes, newspaper, thermos, lunch bag, etc), ➤ two distinct positions (divisions of labor), ➤ the history of the positions, ➤ the history of the two workers, ➤ the "voice" of each worker, ➤ the worker knowledge expansion/contraction over its history, ➤ the governing Basic Labor Agreement (union/corporation bargaining agreement), ➤ the Standard Operating Procedures, ➤ the Safe Job Procedures, ➤ the Standard Quality Practices, ➤ specific customer practices and expectations, 	<ul style="list-style-type: none"> ➤ Change in pulpit's physical interior layout ➤ One line monitor, revamped control panel ➤ Company material (rearranged due to position elimination) ➤ Personal tools (for only one union worker). ➤ Personal materials (for only one worker) ➤ One position performing former two-job responsibilities ➤ Making new history with one worker (where two had been) ➤ The "voice" of one worker ➤ Union worker reaction to position elimination ➤ Learning curve for the worker (relearn position and placement of the modified instruments) ➤ Revised Safe Job Procedures ➤ Revised Standard Operating Practices ➤ Revised Basic Labor Agreement (one position eliminated) ➤ Revised Standard Quality Practices ➤ Specific customer practices and expectations

Zone 3, Figure 6.1, can describe this change and the subsequent learning namely the self and the environment. The delivery end conditions changed from the time Benjamin first began negotiating the front-line supervisor role as well as modified mediating instruments. Table 6.6 illustrates the delivery end pulp conditions comparison and change. Beyond that, Benjamin also drew upon the presence of two specific people in two specific positions although he did not engage with the people. The social relations were not present in this one. The physical environment changed for Benjamin that had triggered his memory regarding delivery end sequences.

Mediations/Learning rooted in the appropriation of existing artifacts for use in different ways

The ability to appropriate mediating instruments speak to the efficacy front-line supervisors demonstrate on the shop-floor. Thinking back to the discussion of internalization and externalization, front-line supervisors who gain shop-floor proficiency and practice externalization have the ability to appropriate mediating instruments. They synthesize their times of experiencing internalization with the self such that their shop-floor presence strengthens allowing them to manipulate mediating instruments needed to meet an established goal. The conditions change in such a way that renders internalized operations ineffective where they must consciously establish goal-directed actions.

Customer product. One specific situation yielded creative uses. Paul was managing a shift where the significant amounts of incoming steel required being cut as scrap thus resulting in lesser incoming product to complete a customer's order. The specific interaction zone is Zone 4 meaning an examination of the self, social relations and the environment and the associated mediating instruments and underlying conditions.

The shearman [the union workers whose role is to side trim the strip to proper width and shear the strip to proper linear feet] summoned Paul to the shearman's pulpit due to his rising concern of successfully meeting a customer's order. The contradiction was if the shearman cut the remaining six ordered coils as instructed from the production tally, the seventh, and last one, would be significantly acceptable weight. But if the crew was not able to complete the order, significant consequences would surface for Paul. Through Paul's discussions with the Production line's entry end, his discussions with the shearman, and his knowledge of prior experiences with the customer, Paul superseded the production tally listing the ordered weight. Instead, Paul reviewed the customer's range of accepted ordered weight and he directed the shearman to produce each coil to within 10 to 50 pounds of the minimal accepted weight. The next seven coils were produced in this manner and the order was made. The analysis illustrated that Paul had sufficient grasp of the underlying conditions meaning he knew of the customer and what they would accept, production line capacity and ability, specifically the scale performance, and his agency was such that the shearman trusted him and followed his direction. Using this information, his goal was to direct the shearman to shear each of the next seven coils to a specific steel strip length.

Customer-related contradiction. In the course of job performance, most front-line supervisors gain a solid understanding of the production equipment as well as the necessary ancillary equipment and tools including the equipment's capacities and limitations. Moreover, this knowledge also contributes to how specific front-line supervisors are able to address and successfully resolve non-normal and crises situations. This consideration is very important since it has significant implication regarding one's

acceptance and membership within the front-line supervisor group as well as perceived as a leader that can resolve shop-floor situations by executive management, their peers, and the union workers. The enormous bulk of this knowledge is informal. A comprehensive listing of it could be virtually endless.

However, for the sake of concretizing this discussion, let us take a basic example from a production unit that cleans steel coils. The delivery end of the production line is where a worker threads a linear steel strip into a take-up reel and winds (actually wraps) it into a steel coil. A similar image would be to think of how one would roll a carpet from a linear plane and rolling it onto itself. The normal work practice is to apply a very thin oil coating to the strip just prior to the coiling process. The oil coating held the wrapping process such that, as each successive wrap builds, the oil permits the wraps to slide thus maintaining a straight sidewall. In other words, each wrap lays directly upon the one below and one does not extend further than any others do and is not staggered or erratic. Staggered, erratic, and protruding sidewalls create an unsafe object due to lacerations and punctures. Beyond the safety aspect, staggered, erratic, and protruding sidewalls also lend themselves to product damage thus compromising the coil's ability to demand top price.

One specific customer requires dry product meaning no application of oil. Their reason is their reheat furnace is insufficient to burn the oil from the strip prior to their coating process. Hence, any oil will impede their coating process thus rendering their finished product as useless to their customers. Therefore, from our company's perspective, it was imperative that no oil was present to avoid coils claimed as secondary and returned. This results in reimbursing our customer and incurring the shipping costs both to the customer as well as returning those rejected coils. The problem is dry product

does not lend itself to building straight sidewalls. Moreover, as previously mentioned suspect sidewalls create problems and not permitted.

Nick and Paul offered how they, as a group, resolved this contradiction. The contradiction was that the product was required to be dry but the mediating instrument was unsuccessful in making the product as required by quality and safety standards not to mention bottom-line implications. In a sense, the contradictions were peripheral in nature but had some primary contradiction implications. What were condition-rooted operations now became a conscious thought, goal driven action. Drawing upon Figure 6.6, Zone 4 is appropriate for laying out the situation for investigation. The underlying conditions was somewhat dependent on which union worker performed the bander's duties, the customer's urgency of the product, non-normal operational procedures (no oil), the front-line supervisor's agency and shop-floor presence, among some others. The mediating instruments was the delivery end take up reel and the associated coil car, the associated hydraulic and pneumatic controls that move the take up reel and coil car, and language. The social relations surface through discussions with union personnel having familiarity with the delivery end, fellow front-line supervisors, millwrights, and, at times, the vendor associated with the delivery end equipment. The self give consideration of specific front-line supervisor's mediating instrument knowledge, ability to lead while addressing contradictions, their agency to lead by example, their supervisory skill to mobilize the different social relations, their knowledge of the union workers' language and symbols while working through the problem, and their self efficacy in perceiving them selves as able to take the lead.

Mediations/Learning rooted in created artifacts

Created artifacts become reality when designed artifacts and their manipulation fail to prove sufficient when engaged in the activities. Created artifacts rise from the need since the current environment does not house specific ones needed to resolve surfacing contradictions. Material artifact: Looper pit gates. The looper pit acts as an accumulator pit allowing the production line's entry end the ability to provide sufficient material for the center section to maintain movement. Through observation notes, the entry end was cyclical meaning it needs to stop when welding the next coil. Therefore, sufficient material must be available allowing continuous operation at the line's center and exit end when the line's entry pauses to process the next coil. Once properly processed, the coil is charged into the line meaning it enters the looper pit. The gates support the steel strip from rubbing against it over the length expanse of the looper pit – approximately two hundred feet. The gates' design has two opposing gates that close and become inline with each other accounting for the production line's width that is eighty-four inches. Twelve sets of gate exist on each of three levels.

Each gate-dyad's intent is the two should align flush as they close. However, incoming quality compromised material (such as wavy or jagged edges) tends to create problems observed through the steel strip wanting to track to one side and subsequently crash into the production line's support beams. A crashed strip gives rise to several problems. One is it reduces the turn's production numbers since clearing a crash means shutting down the line and removing the scrap and repositioning the steel strip. The second is removing the scrap and repositioning the strip places union workers in safety-compromised situations. Rodney stated, "Anyone not directly needed on the line was put

in the area to pull scrap as fast as possible. The hot mill is never blamed but we catch hell for running their junk. They should have to come here and remove it.” Safety-compromised situations sometime result in worker injury and possible fatality so these situations are avoided whenever possible. The third issue relates to quality. Scrap removed from a crash renders the affected section as useless for the customer due to altered steel strip’s width. The narrow width results in that specific section labeled and deposited as scrap and causes coils to be under weight. Underweight coils not meeting customer tolerances result in a second hand coil. The last issue affects the specific work crew’s employee involvement program’s standards thus implicating successfully meeting their projects’ target numbers. Vincent stated, “It seems once a strip crashes, I lose no matter what I do.”

Through a couple front-line supervisors’ experience with the line and the looper pits, they tried different positions with the looper pit gates. As Paul said, “I remember having to straighten out the gates when they became cocked which would throw a good quality strip. So I wondered if purposely offsetting the gates would help if the strip was bad.” By writing notes in the front-line supervisors’ log book, Paul, Nick, and Scott began to experiment and found that this did work. Nick added, “Taking a couple minutes to adjust the gates beats the hell out of losing production time and making junk. And the bosses don’t know it since a couple minutes either way is never noticeable. Besides, I can always give a charted delay to stringers or flash trimmers. They don’t know any better. As long as they get the tons.” Paul then sketched the offset and on which gates and levels. They copied and passed the sketch among the front-line supervisors to consult in such situations.

Through their production line experience and knowledge as well as reasoning out previous issues, the front-line supervisors created a tool that permitted them to resolve the primary and peripheral contradictions associated with poor quality product. They also drew upon their relationship with the veteran union workers with whom some working trust had been established. More specifically, through analyzing the self, the environment, and social relations and considering the mediating instruments and the conditions, this permitted a description of how the front-line supervisors learned how to resolve the problem. What seemed of significant importance is the self, namely Paul, Nick, and Scott and their willingness to discuss this through their experiences and line knowledge. It also speaks to their mechanical understanding through experiencing opposite situations as well as their initiative of doing something different and, actually, not formally permitted.

Symbolic artifact – the favor-artifact (and its family). Another consideration gives rise to the union workers having a sense of power over the front-line supervisor from their standpoint of using their knowledge and skills as leverage for some “favor” in whatever form it appears. The critical approach helped to uncover a portion of these issues that lie just under the surface but have significant impact regarding front-line supervisor learning. This becomes problematic since it interferes, or impedes, the front-line supervisors’ expected role negotiation at least from the formal side.

Of course, one of the key roles of front-line supervisors is to manage the effort/reward bargain that is inherent in all workplaces among them being “favors.” How hard are workers’ made to work is a central component of the wage structure, production outcomes and in turn the competitiveness or viability of the enterprise as a whole. It is

also a central component of workers' lives, their learning and opportunities. Front-line supervisor's work in this way is in the middle of this complex overlap. Front-line supervisors used favors as a means to future practices.

Through observation, Rodney talked with a union worker. The contradiction was there was not enough work for the Utilityman to remain on the clock the entire shift but latent outcomes surface in the form of cynicism and negative attitudes should the front-line supervisor direct the worker to clock out. Rodney and the worker "reached an agreement." Although Rodney did not "directly" condone it, the worker wished to "milk the job" meaning the worker made his task last all shift. Rodney said, "The worker was directed to perform housekeeping duties in the entry end of the production line. I told him he is to stay busy and I do not want to see you talking to other workers in their pulpits or in the break room. So, as far as I know, he is doing housekeeping work." Housekeeping duties means to make the area clean and to remove all scrap, equipment, and garbage and is an action bounded in the Safety Program activity system. In other words, the safety rules state that work areas are to be clean and free from falling, tripping, and struck by hazards.

Milking a job is completely against corporate expectations supporting that workers complete tasks in a timely and efficient manner and, in part, breaks from "bottom-line focus" and running the business in the corporation's best interests. Rodney seemed to be aware of this from his words to the worker to stay busy. But this favor translates to more than the front-line supervisor simply enforcing the conscious rules and expectations. In other words, looking and staying busy are manifest. The favor, milking the job, helps to mediate a potential confrontation between the front-line supervisor and

the union worker as well as possible repercussions throughout the work crew. Rodney stated, “The bosses are not here to deal with the shit. So, by permitting the worker the opportunity to stay on the clock, he will owe me some favor in the future.” When probed to say more about this, Rodney allowed, “Some favor, like if I need someone to pull scrap or paint the railings, or to fill in for a call off or whatever. He now owes me this favor.” Rodney, in effect, created a mediating instrument needed to resolve some future contradiction. Especially since this is a primary contradiction, the favor converted the primary contradiction to a peripheral one by subverting a power issue (such as in the form of the employee not putting forth his or her best effort, causing worker cynicism through negative attitude, or legally refusing extended overtime) that would create increased shop-floor problems carrying heavier sanctions. The peripheral contradiction now rises through carrying a worker on the day’s pay roll opposed to corporate expectations to send unnecessary workers home. Through this created mediating instrument, though, the front-line supervisor actually secured a future favor from the worker that has potential to offset other expenses costing more than the worker’s daily wage.

When I questioned Rodney about this “agreement,” he stated, “Other than having to deal with “hearing” it, I gave the worker his shift’s work expectations but I also told him “look busy” and make the job last for the entire shift otherwise he would need to clock out.” Again, probing further, he added, “Every worker here knows about favors and I have done this before. The trick is, even though the worker is not working that hard, they [the other union workers] know and understand this situation since they too have done it and probably will again so “keeping it within the shop-floor is the best course of

action and is accepted as part of the environment.” Rodney understood the shop-floor dynamics and the unspoken rules and practices. The division of labor also included considering that labor does not always directly translate to physical work but played a role in creating future mediating artifacts to address surfacing contradictions. Once more, this is where the hidden, latent, outcomes prove to be very prominent and is part of the large hidden world of front-line supervisor leaning and knowledge.

Cultural artifact – the evolving class biography (and its family: language codes, demeanor/comportment, humor, etc.). These micro-social processes can be thought of as some group’s or individual’s inclusion in some action or operation within the activity network. Sometimes the front-line supervisor’s decision that refurbishing work needs to be done is not as important as the worker they choose to assign the task. Due to power issues as well as their acceptance by the union workers, and even as well as who (on the part of the union workers) is doing the including, the decision of assigning the task is actually more involved than understood. Beyond this, a qualified union worker may engage in the task without hesitancy for one front-line supervisor but will be combative for another. This seems to be pointing to very individual-specific relational and perception issues within the division of labor in light of each person’s history with the union both individually and collectively. The front-line supervisor is aware of the specific duties located with the division of labor. However, it is not that simple as many implications lie just beneath the surface.

A front-line supervisor who did not come up through the ranks (or at least having a close older relative who worked in the steel plant) and/or in one way or another is simply not familiar with the full intricacies (the manifest and the latent) of the different

operations and maintenance positions may experience a compromised agency within their role. Manifest is those mediating instruments, rules, intended outcomes, and front-line supervisor actions that are readily visible and are conscious. The latent is the unintended outcomes, front-line supervisor actions, rules, and mediating instruments that are hidden and lie below the surface. Again, looking at class biography especially if a front-line supervisor had a parent(s) working in the steel mill, many subtle shop-floor nuances exist. The manifest exists in what is openly visible or conscious. When a production error occurs and fails to meet customer expectations and tolerances, its classification becomes a disposition. Reworking disposition products provides the means of bringing the product in acceptable tolerances. The task of coil refurbishing is a manifest example as well as the worker to whom the task is assigned. Front-line supervisors learned that compromised coils can be accepted by the customer if properly refurbished. Looking back, they learned this through an intended outcome through interactions with the customer. This was a goal driven action bounded within the Production Schedule activity system.

The job then is not just a matter of reworking coils but becomes an rich, operation-filled action embedded within a socially constructed culture shaped by the specific people present, the current workplace political reality, and the current, and recent, corporate perception on behalf of the union workers. The front-line supervisors have the goal of assuring the suspect coils get refurbished such that the customer accepts them. Among their action then is the consideration of which union-worker gets the assignment. This is where the latent knowledge lies. Although the front-line supervisor has the recognized and formal power to assign tasks, it is not without ramifications in that the decision potentially carries back talk and bad attitudes. Again, it is not just a matter of

running the business but knowing the workers well beyond just knowing their skills and certifications. The formal rules exist that gives the front-line supervisor the ability to issue a direct order to any union worker qualified to complete the task (denial of which is insubordination that carries possible heavy sanctions – again, formal rules). The community has historically made this common practice. But, again, this does not happen in a vacuum either. If a front-line supervisor were to send someone home subject to time-off or dismissal, the front-line supervisor may pay for it through the worker's potential relational, social, or political acquaintances. Moreover, although the union cannot sanction the front-line supervisor, they can make their role negotiation very demanding, contentious, and miserable.

This production error example begins to illustrate how technical and business problems (e.g. customer satisfaction and its impact on future orders) are always cultural, political and personal as well. This spoke to front-line supervisors learning the latent knowledge (like assigning workers to some task) mostly through unintended outcomes vis-à-vis “learning which worker to use and when” and “intra-department politics.” Successive activity network iterations allow front-line supervisors to grasp solidly this knowledge and the activity network's subsequent development that accounts for both group and individual learning. Resolving suspect coils is institutionally important but how it is resolved is complicated and part of the large hidden world of learned practical knowledge required for front-line supervisors' role negotiation success.

Supervisory style. Supervisory style is that practice of where the front-line supervisor chose the manner in which to interact with and direct the union workers. Among the traditionally accepted styles are dictator, collaborative, empowering, shared

(Gilley & Egglund, 1989; Nora, 1990; Peters & Waterman, 1982; Roethlisberger, 1968; Rothwell, Sullivan, & McLean, 1995)

Supervisory style arose from noticing several aspects involved with the specific front-line supervisors. The front-line supervisors' emotions, current state-of-mind, biography and associated considerations seemed to shape how one engaged with the union and upper management. Through focusing on three specific front-line supervisors, Paul, Scott, and Vincent, as they seem to exhibit two very different supervisory styles while they performed their shop-floor duties. Nick, Rodney, and Benjamin seemed to be along the continuum between Paul and Scott on one end and Vincent on the other end.

Paul had the majority if not all the office and storage locker keys and access to tools and assured that the workers had the correct/proper tools needed for their shop-floor role. He maintained fairness and garnered union worker respect even though they expressed hatred as well. Vincent seemingly used the tools to which he had access to bribe workers to either do their job or as a means that they would like him and listen to him when he needed to issue a not-so-popular company-directive. From observations and interviews, it seems that Paul and Vincent are the two ends of a continuum. Nick, Rodney, Scott, and Benjamin were conducted their role performance with more confidence than Vincent and, at times, was similar to what Paul had done.

Through Vincent's interview, he expressed his frustration where he seemed to constantly battle not only his subordinate union workers but also fellow front-line supervisors, the central maintenance shops (the shops are needed for breakdowns needing more than what the department's resources can effectively address) as well as the mediating instruments (such as the specific parts of the production line and his lack of

knowledge regarding them). His inability to negotiate his role successfully seemed directly to influence his learning evidenced by his continued and repeated mistakes. Vincent even stated, “I am so busy putting out fires [addressing shop-floor problems] that I can not get other things done. They [upper management] expect all these things like personal improvement projects, safety packets, and such to get done but they don’t see what I have to do. Then I get nothing but shit from the union workers. I have to keep on their ass about helping when its rough.” Further he added, “They just hate me and keep picking on me.”

Rooted in Vincent’s interview and observance of his shop-floor conduct, Vincent seems to lack the ability to appropriate and create mediating instruments needed for resolving specific contradictions. Vincent has the ability to use the instrument as intended but was never able to either manipulate an existing instrument or create an instrument to address and resolve shop-floor issues. During the interview, Vincent stated, “My background is in health and safety. I really never worked on mechanical things.” And, with his parents as business owners, Vincent seemingly was never exposed to situations that required him to develop and use mechanical artifacts while growing up and seemed to “play by the rules.” In other words, he was not required nor did he engage in building or repairing things. It appeared that his aptitude was not developed regarding tactile ability in thinking of what he needed then using available material and resources to create an artifact. Now his role on a steel production shop-floor requires him to employ such a skill but he continues to fail. Couple that with Vincent’s propensity to avoid intended and firm authoritative interaction with the union workers meaning he must direct them to engage in some action or to correct some misguided action, then his perception becomes

suspect. Also through observation, Vincent would allow his actions to be strictly informed by the formal rules. His inability to hold his position when interacting with union workers as well as his inability to work through shop-floor issues (especially if it meant bending a rule or two) rendered him a weak, or bad, front-line supervisor.

Vincent seemed to experience contracted learning at times. Meaning, what Vincent finds as hurtful or confrontational he has learned to avoid it. As mentioned earlier, front-line supervisors have the ability to distribute new instruments and tools as well as assign specific tasks to workers. Vincent experienced contentious, and sometimes explosive, interactions when assigning tasks that resulted in his wanting to avoid those situations. One thing that Vincent did not pick up on was, at times, the union workers would push back on Vincent because “he was easy.” In a side shop-floor conversation, Paul allowed that “Vincent just needs to grow some whiskers and stand his ground. That is his job.” This means he needs to be tougher and understand when the union workers push him just to “get a rise out of him.” This may be linked to Vincent’s class biography. He is not aware of specific humors, attitudes, sarcasm, and confrontation. Vincent stated, “I know they hate me and they just want to yell.” Therefore, Vincent’s inability to manipulate existing instruments, create new ones, and his class biography lead to the contracted learning that inhibits possible expansive learning. Through observation, Vincent was very confident in using instruments as designed especially formal document completion. Looking back to the looper gate situation and the drawing that the front-line supervisors created, Vincent did not remember to contact the millwright and other union workers to physically take the little time to adjust the gates. Vincent spent the time trying

to talk with the union workers to slow down the production line speed and pull scrap as needed.

Conversely, Paul, and even Scott, had better success when dealing with the union personnel and did not shy away from contentious situations or employee and/or equipment conflict. During the interview Paul stated, “I don’t play favorites. Either the person does their job or goes home. I can laugh and joke with them through the shift but they know how far they can push something. And they know when not to mess around.” Scott’s interview alluded to similar thoughts when he stated, “The union workers will be quick to screw me so I make them do their job. I won’t put up with their shit. Some of them are just miserable people. I’ll send them home and they know it.” Paul is a former union worker but received promotion to management when he earned a bachelors degree in business and now commands a certain respect from the union personnel as well as the upper management due to his strong will in keeping the corporation’s best interest. Scott was a union worker for more than twenty-five years and had social and working relations with the workers he now managed. However, Scott did not play favorites at least during the observation period and judging his shop-floor comportment, I would believe this is his practice.

Paul and Scott worked through shop-floor issues leading to improved production, quality, and safety in addition to managing the union workers’ best interests (providing maximum opportunity for earning incentives and being safe). This does not mean they were always successful, liked, or even appreciated, but they gained respect as front-line supervisors who will lead a group to address, and possibly resolve, a contradiction or crisis. Such achievements direct analytic attention to these moments as key learning

moments. Paul and Scott maintained inclusion and a voice, and respect, when socially addressing some breakdown, contradiction, or other shop-floor problem through mobilizing the current knowledge and resources and worked with the union personnel to reach some response. Paul's approach demonstrated his willingness to be a participating member of the shop-floor community thereby earning him a sense of agency. He mentioned, "Yeah, I get out there and help them get jobs done. Especially if there is a breakdown of an excessive amount of non-production related work. I give them a break." Although ramifications from such actions include grievance procedures, it seems that Paul's demeanor, attitude, and agency have built a very solid trust in the workplace. He does admit, "Sometime they want to cut my guts out and hang me. But I get paid to make the decisions." To date, Paul has no grievances filed against him. Scott mentioned, "They [union workers] bring their personal problems to me for advice. I might as well wear a white collar [allusion to a priest]." But, that speaks volumes to how the union workers regard Scott. As Scott reiterated, "I don't care if the [people] hate me. I am not here for them to like or hate. We are paid to do a job. As long as they do their job, I have no problem with them [union workers]." But with Scott being trusted enough for workers to confide in him speaks to Scott's ability to be an respected leader.

Through observations, it was as if Vincent spent significant time trying to "not upset" and/or appease the workers and seemed to try to stay on "their good side" such that they would just do their job with minimal to no grief. He offered in the interview, "I thought if I give them new stuff to use they would appreciate it." If the union workers did as he needed with minimal grief, he would only have to address his supervisors. When contradictions arose, he seemed to overreact and became angry in a scared way. When

Vincent learned of a production problem on critical product, he began using profanity with everyone. When asked he said, "I just want them to listen to me. I get tired of this shit."

Paul seemed to be able to receive news more calmly and be able to formulate an action, given the available information and resources at the time that would address, and many times resolve, the situation. Albeit, many resolution avenues were very contentious, and explosive at times when ordering union workers exacting the discussion, but the means to address to situation was developed and implemented and life went on. As Paul had said, "it is what it is and you know this going into it. I get paid the big buck to deal with problems. You can't get upset. You just need to see what's up, then get things in place to deal with it. Then explain it to the bosses."

Where as Vincent demonstrated a more panicky mode and did not remember many things that he, along with the specific union workers, had done from a previous similar situation. This speaks to no learning occurred or learning did occur but it was negative. In other words, Vincent learned that to address this situation meant he will need to directly order the union workers (i.e. make them do something they wish not to do). Otherwise, and although, the conditions may not have been perfectly replicated at least as far as the specific union personnel, incoming product, etc., there should have been some sense of knowledge recall located within the activity upon which he could have drawn as a viable option over panicking and making poor decisions. Although formal policy had some visibility at least as far as adhering to the SQPs, SJPs, etc., the social nature of the situation demanded the front-line supervisor to draw upon additional aspects.

A major point to take from the preceding discussion is that learning also is negative meaning that one learns something but its consequences do not include smooth or successful resolution. Vincent learned that the goal directed actions were going to incur significant union worker resistance and he chose to not experience it. In a sense, what was happening was the front-line supervisors (the subject) were being transformed through activity participation. Vincent became more agitated and panicky during a production crisis (whether it was a breakdown, personnel problem, quality problem, or a safety problem) which had direct implications on the activity network.

Summary

This chapter illustrated the space in which learning can be empirically observed and describes. These spaces involve front-line supervisors being engaged in and interacting with social relations and the environment. It described the identifications of five, distinct, but overlapping activity systems in which front-line supervisors participated. Three were dominant and two were more latent. This chapter also illustrated the importance of one's class biography and how it implicated front-line supervisors' learning.

The second part of this chapter detailed how front-line supervisors learned through three mediational types. Namely, using mediating instruments as designed, appropriating existing mediating artifacts through manipulation, and creating new mediating artifacts. Their latter two speak to learning since front-line supervisors were able to externalize their knowledge and shop-floor understanding to resolve surfacing contradictions.

Through investigating the overlaps, this study shed light on aspects related to developing and using supervisory skill was the front-line supervisors' ability to appropriate mediating instruments as designed and subtly change the artifact's use through strategically manipulating them. For example, Scott and Paul were able to manipulate the delivery end equipment to resolve the contradiction created by running dry product when the oil coating was not permitted by the customer. They drew upon their knowledge of the production line, they investigated and grasped the existing conditions, they were able to mobilize the union workers to address the contradiction, and were brazen to take chances in doing something different. Whereas Vincent would shy away from directly and forcefully engaging the union workers to mobilize them in ways similar to Paul and Scott and experience further negative learning. Vincent's inability to appropriate mediating instruments limited his choices available to mediate his operations and actions thus maintaining his caught in the middle situation. Also with this inability, their actions often proceeded on false assumptions regarding in grater contradictions including explosive relations with the union workers that led to enforcing a substandard front-line supervisor.

The third aspect informing supervisory skill was front-line supervisors' ability to create new artifacts. Being caught in the middle indicated they had limited choice to mediate their actions and operations. If a front-line supervisor could not effectively create new artifacts through confident externalization to manage the contradictory 'caught in the middle' situations, they again limited their choices to mediate their operations and actions. As illustrated in Chapter 6, using mediating instruments as designed did not fully address many shop-floor contradictions and situations since the underlying conditions

rendered the mediating instrument as either not relevant or inadequate. For example, Paul was able to turn primary contradictions to peripheral ones through generating favors that increased his options for mediating operations and actions. This speaks to Paul having the shop-floor awareness combined with his knowledge of the formal shop-floor aspects synthesized with the latent one.

In summary, front-line supervisors drew upon their ability to convert primary contradictions into peripheral ones and for generating mediating instruments for future use through addressing the present contradictions. They also drew upon their ability to use the artifacts in the three way of mediation. They were using an artifact as designed, using an artifact through appropriation of an existing one, and by creating new mediating artifacts. The specific mediation employed rises from their access to and grasp of the underlying conditions as well as the latent shop-floor aspects.

Chapter 7

Linking Back to the Literature

Informal learning is abundantly discussed in the literature but there is little that offers an empirical explanation describing such instances and what it is. This study found several aspects that shaped and guided front-line supervisors' informal learning. It shed light on describing the extent to which the workplace is a site for "significant development and adult learning." Remembering Fenwick's (2006) statement, "...workplaces are well recognized as significant developmental sites for adult learning, change, and resistance." This study described such developmental sites as it examined the micro-social process and the moment-by-moment material and socially mediated responses to surfacing contradictions. It adds to the workplace learning and adult education literatures by describing the aspects related to adult learning by focusing on steel production front-line supervisors. While performing their role, front-line supervisors are firmly entrenched within the underlying shop-floor conditions. The conditions present served to shape what goals the front-line supervisor established. The unintended outcomes are what lies beneath the surface of the shop-floor environment and are the latent realities with which the front-line supervisors that provides the impetus and the foundation as a developmental site.

This study built upon Sawchuk's (2006) argument that "culturally and materially mediated social participation to move centre stage in analysis of learning practice (p. 244)" which thereby allowed the examination of front-line supervisors' interactions with the environment and their engagement in social relations. The center stage includes the manifest, intended practices of reviewing business related statistics and evaluating front-

line supervisors' ability to meet upper management's expectations. However, tracking and measuring the social, and micro-social, realms of unintended or latent practices is difficult if not impossible. They do not readily lend themselves as explicit or visible on business spreadsheets, production/quality and safety reports, formal corporate decision-making and assessments of the bottom line. They do not factor in when developing formal training programs in response to perceived deficiencies exhibited by front-line supervisors negotiating their role or their yearly performance review meetings.

This study shed light on the latent aspects and showed how they are one aspect of center stage when analyzing learning practice. The latent shop-floor aspects are veritably the most concrete aspects implicating the daily shop-floor business during front-line supervisor role negotiation. Front-line supervisors' learning was shaped and informed by the direct inclusion in various shop-floor interactions. These interactions were concrete by exploring the specific interaction zone located between specific facets, i.e. the self, social relations, and environment.

Drawing upon Figure 6.1, front-line supervisors learned during addressing a contradiction firmly entrenched shaped by a specific interaction zone shaped and informed by the underlying conditions and the mediating instruments. The specific zone provided the space to make empirically available "culturally and materially mediated social participation" through bringing the social and micro-social process to center stage. In light of the findings in Chapter 6, Table 7.1 illustrates the outcomes regarding front-line supervisors' ability to grasp the latent aspects and well as learning the intended, more manifest in meeting upper management's formal expectations.

Table 7.1: Key Identified Intended and Unintended Outcomes

Intended Outcomes	Unintended Outcomes
Learn formal document completion Learn what specific language to use on formal documents Learn how to use mediating instruments as designed Meet customer expectations How others view (perceive) the individual (consciously projected)	Learn which worker to use and when Learned intra-department politics Learned inter-department politics Learned “creative” mediating instrument use Learned how to appropriate and manipulate instruments beyond used as designed Experience how others view (perceive) the individual Learn what not to say and when to say it Learn what is important in spite of what is formally said Learn what is important to specific upper managers

Revisiting (Marsick & Watkins, 2001) where they state that “Informal and incidental learning take place wherever people have the need, motivation, and opportunity for learning” (2001, p. 28), this study provided an empirical opportunity to identify the need, the motivation, and the opportunity for learning. Front-line supervisors’ were significantly involved in social relations on the shop-floor interactions with which shaped and informed their goal-directed actions. Front-line supervisors who had access to the latent shop-floor codes, artifacts, and rules had more success in negotiating their role that provides part of their opportunity for learning. The implication was, without this access, a front-line supervisor made decisions based on either poor interpretation of the shop-floor conditions or did not exhibit the expected comportment in the union and upper managements perception. All these aspects serve to inform the self as they interact with the environment and engage with social relations.

The above discussion illustrates the front-line supervisors' ability to experience internalization such that they gain shop-floor awareness allowing their capacity to have full command over employing, manipulating, and creating instruments as second nature – i.e. the operations level. Front-line supervisors are motivated to gain such comportment as illustrated in the above discussion such they made educated decision operationally in the conditions or through proper goal establishment. Their need to convert primary contradiction to peripheral one and to convert peripheral contradictions to manageable opportunity to employ mediating artifacts greatly increases their operation and action choices.

Vincent was not able to rise to the competency of externalization resulting in a couple implications mostly due to his inability to convert primary contradictions to peripheral ones. Or, even if he became proficient to understand the shop-floor language, humor, and expectations would have provided some response to Marsick and Watkins's triggering events. They argued that "... we note that learning begins with some kind of trigger, that is, an internal or external stimulus that signals dissatisfaction with current ways of thinking or being." (2001, p. 29). Resultantly, due to Vincent's lack of access to, and grasping of, the latent, informal shop-floor rules and knowledge, his use of the artifacts was greatly limited in mediating his actions and operations that maintained old and current "ways of thinking and being. He made errors in judgment as well as not exhibiting the posture and agency demanded of a front-line supervisor to both the union workers and upper management.

On the other hand, the five other front-line supervisors, especially Paul and Scott, exhibited many externalization periods rooted in their access of the latent shop-floor

aspects and their ability to use them in mediating their operations and actions. The triggering event was to resolve surfacing contradictions. They were able to experience the necessary internalization regarding the material, the social and micro-social processes including the latent shop-floor aspects, including understanding the language, codes, humor, symbols, rules, and mediating instruments that facilitated new ways of thinking. Moreover, through their shop-floor successes in mediating operations and operations, front-line supervisors' "promote-ability" and compensation increases since upper management can grasp tangible data and track each front-line supervisor's career path and decision-making. The tangible data exists in the form of meeting the business plan, actively practicing safety, and producing quality material leading to customer satisfaction. In other words, these outcomes reveal the front-line supervisor's ability to "run the business."

CHAT's Usefulness

Cultural Historical Activity Theory provided the comprehensive and exhaustive framework allowing for analyzing both the manifest and latent shop-floor processes. The structure provided by the triangular diagrams and the associated diagrams detailing multiple ones provided the opportunity to maintain a conscious effort regarding all the data. This means it provides the structure to place the various data pieces in the respective CHAT elements (such as rules, mediating instruments, etc) and analyze how interact with, shape, and transform data in other CHAT elements. The other ability of major importance was the role of contradictions. Analyzing their role and how front-line supervisors addressed and resolved them permitted me to empirically describe how they experienced learning. It permitted investigating the hidden world of front-line supervisors

learning lives in respect to their accessing and grasping the latent aspects related to the division of labor, the unspoken rules, and the development and use of mediating instruments. In addition, the historicity principle proved useful when analyzing how different rules, mediating instruments, and divisions of labor originated and eventually evolved in response to changing conditions.

This study drew upon the ideas of underlying conditions. This proved to be very instrumental in the analysis as it provided the opportunity to compare front-line supervisors' operations and actions. In other words, if a front-line supervisor established the same goal in two different times, how the difference in operations and actions could be explained. One way, this study found, was to grasp what the underlying conditions were at the time of the observation.

An assumption of a thorough CHAT analysis is grasping and knowing the goals and motives of the subject. This is not a CHAT weakness but it was very painstaking to determine the goals and motives. Knowing and understanding these on my part proved beneficial in my analysis.

Future Research

Although no hard evidence supported this, it seemed that one front-line supervisor was not completely accepted and maybe even similar unto "not part of the clique." He demonstrated significant shop-floor struggles where he could not establish proper goals or not grasp the latent aspects. I sensed that Vincent was not accepted as a shop-floor community member. The fact that a supervisor isn't accepted in a clique say, is likely related to their capacities across these three forms of mediation. The different forms of mediation constructed in the five key activity system overlaps that give rise to the

specific forms of contradictions to which the three different mediational forms must respond. However, if one front-line supervisor does not have access to all manifest and latent shop-floor aspects, their operations and actions will be not properly responsive in light of the underlying conditions.

This study's perspective was from the front-line supervisors' position. All assumptions made and conclusions drawn were in light of this fact. This study provides continuing discussion regarding front-line supervisors' learning live. It does not focus beyond that. As subsequent studies are conducted from other roles within the division of labor perspectives, a more complete picture of workplace learning will add to the workplace learning knowledge base.

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Appendix A: Initial Interview Guide

Union-shop, steel production front line supervisors

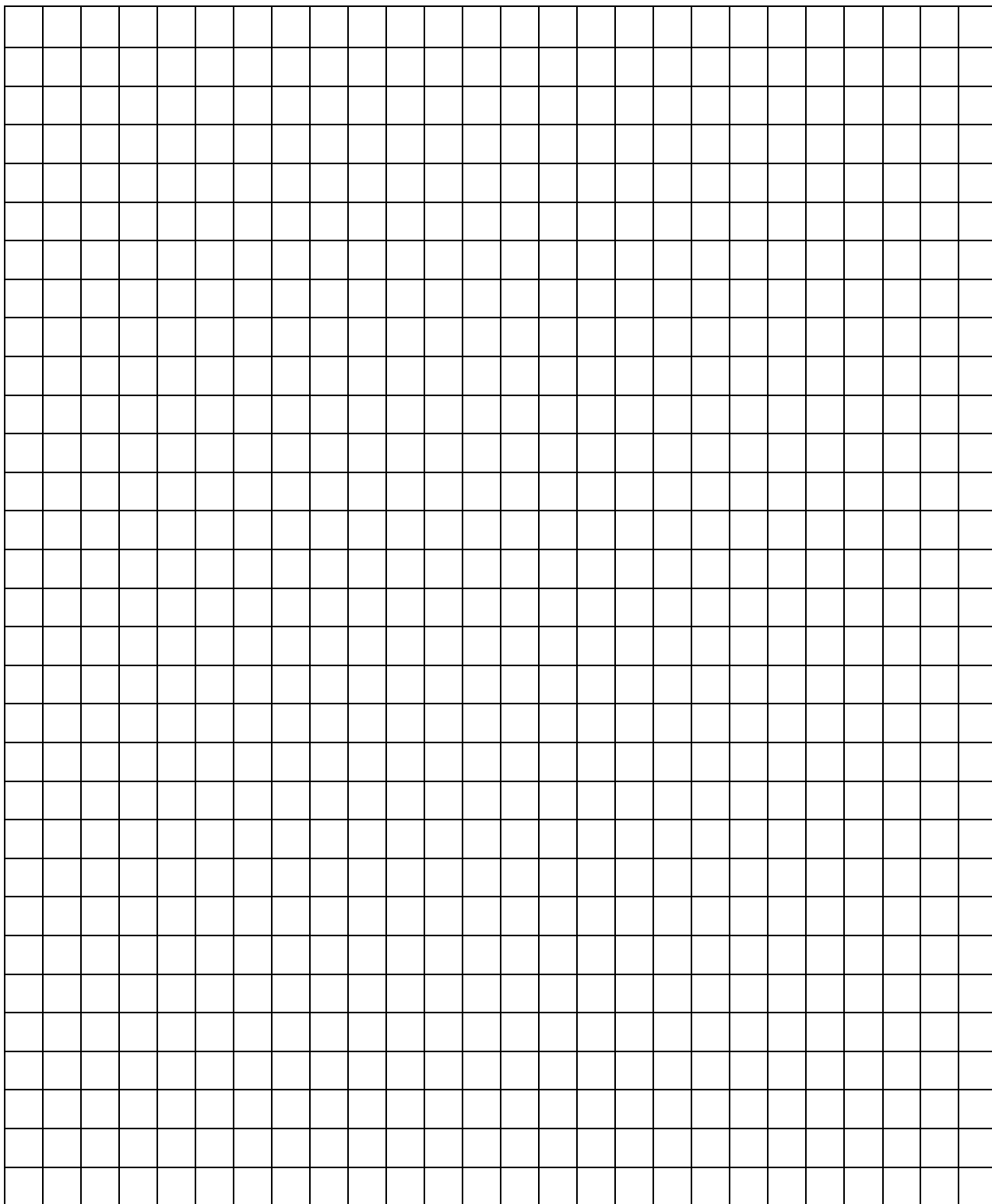
Guiding Questions for Initial Interview.

Prompt	Notes
1. Tell me about your job?	
2. What do you do as you work your job?	
3. Tell me about your formal training experience.	
4. Give me an example of when formal training was useful on the shop-floor.	
5. What do you think about making decisions?	
6. Tell me about a time when you had made a successful decision.	
7. Tell me about a time when you had made a failing decision.	
8. Tell me about a crisis situation and how you addressed and resolved it.	
9. Tell me about your working relationship with your supervisors, particularly as it relates to the decision	
10. Tell me of a time when you and your supervisor argued.	
11. Tell me about your working relationships with your subordinates, particularly as it relates to the decision	
12. Tell me of a time when you and your subordinates argued.	
13. Tell me about being on the shop floor?	
14. How do you perceive the position of front line supervisor?	
15. Tell me when you felt powerless or insignificant.	
16. Tell me when you felt that you had some power.	
17. What advice would you give to those thinking of working as a Front-line Supervisor?	

Appendix B: Final Field Observation Guide

Field Observation Guide		Date: _____ Page _____ of _____	
Situation (Contradictions, reason for engagement, mediating instrument use, conversation topic, specific spoken words, gestures, etc)	Specific Environment Location	Division of Labor	Mediating Instruments
Specific Front-line Supervisors (attitude, demeanor, mood, etc)	Specific Environment Location	Division of Labor	Existing Conditions

Appendix B (continued, side 2)



Vita

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Education

Ph.D. in Adult Education August 2009 Penn State University
Dissertation Title: Managing contradictions from the middle: A cultural historical activity theory investigation of front-line supervisors' learning lives. Emphasis in work and learning, qualitative research, cultural historical activity theory, and critical theory.

Invited Papers, Book Chapters, and Presentations

“Bargaining Unit.” *Human Resource Encyclopedia*, (W. Rothwell, Ed) (in press).

Cultural Historical Activity Theory colloquium. Penn State University, University Park, PA. 2006, 2008, 2009.

University of Toronto/Ontario Institute for Studies in Education, Toronto, Ontario, Canada, November 3, 2006.

Rethinking Work & Learning Conference, Ontario Institute for the Studies in Education/ University of Toronto, Toronto, Ontario, Canada, June 3-5, 2006.

Mayor's Council on Literacy Technology Conference, Temple University, Philadelphia, PA, May 15, 2004.

Professional Experience

2003 - 2009 Graduate Assistant/Adjunct Faculty/Researcher, Penn State University

2001 - 2003 ABE/GED Instructor, Goodwill Industries of Pittsburgh, Pittsburgh, PA

1988 - 2001 USX / United States Steel, Mon Valley/Clairton Works, Pittsburgh, PA

Professional Service & Honors

Workplace Learning Special Interest Group / American Education Research Association. Proposal reviewer for conference inclusion. 2008 and 2009 conferences.

Cultural-Historical Special Interest Group / American Education Research Association. Proposal reviewer for conference inclusion. 2008 and 2009 conferences.

Steering Committee. Midwest Research-to-Practice Conference. 2005-present.

Chaired the Critical Theory Special Interest Group of the Commission of Professors of Adult Education. 2006-present.

Awarded the Fischer Fellowship by the Adult Education program, Department of Learning and Performance Systems, Penn State University.