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**AN EXAMINATION OF HIGH-PERFORMANCE WORK SKILLS
AMONG MANUFACTURING WORKERS IN ONE
PENNSYLVANIA METROPOLITAN STATISTICAL AREA**

A Thesis in
Workforce Education and Development

By

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ABSTRACT

The high-performance model (also known as the high-involvement, flexible, democratic, participative, or high-commitment model) is one workplace re-design innovation being considered by American manufacturers in response to increasingly intense global competition. Front-line workers in such environments assume tasks and responsibilities far different from those performed in a traditional factory. In order for companies to successfully pursue this high-performance option, they must have a workforce qualified in the necessary skills.

This study examined the occurrence and distribution of fifteen skills associated with the high-performance/high-involvement model within an existing manufacturing workforce. A worker-centered survey was used to collect the data. The objective was to determine the frequency of the skills within the sample and the distribution of the skills across ten selected variables. Further, the study sought to determine the feasibility of predicting, through the use of logistic regression, which cohorts of workers would be most likely to possess the skills.

The skills identified in the study represent an additional skill set beyond the basic employability and job-specific skills required in traditional work environments. This additional layer of skills is termed Level 3 (with basic employability skills being Level 1 and job-specific skills Level 2). Level 3 includes knowledge of such competencies as decision making, problem solving, systems thinking, team skills, and self-directed learning.

The concept of the high-performance workplace is an evolving one; many questions about the practices and demands of these settings are being researched and debated. This study investigated concepts relevant of the high-performance workplace and offers an overview of the current status.

The findings indicate a high degree of confidence among the 237 respondents in using the Level 3 skills. This degree of confidence was evidenced without regard to the variables of gender, age, educational level, tenure with the current employer, or total years of experience in the workforce. It was likewise unaffected by the company-related variables.

When subjected to logistic regression analysis, only three of the variables (education level, experience, and age) were significant. The attempt to assign the cases to membership in either a traditional work skills group or a high-performance work skills group was frustrated by the unexpected homogeneity of the sample.

The study provokes additional research questions about the sources of the skills that the workers profess to have, the validity of the knowledge level implied by the responses, and the variables that do allow the desired classification into the groups discussed above.

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Chapter 1

Introduction

Background to the Study

Intense competitive pressures, both domestic and foreign, have forced American manufacturing companies to reconsider the effectiveness of their workforce practices. During the past three decades, manufacturers have sought a new workplace model adapted to the steadily-growing demand for enhanced efficiency, productivity, quality, and flexibility. In general, the options for creating a responsive, adaptive production environment focus on developing either a technology-centered solution or a people-centered one (Appelbaum & Batt, 1993; Lynch & Black, 1998). This study focused on innovations emphasizing the people-centered/social system approach to reengineering organizations.

In the literature, these strategies for capitalizing on an organization's human resources are variously known as high-involvement, high-commitment, participative, democratic, flexible, or empowered workplace models (Neal & Tromley, 1995). This study uses the general term "high-performance workplace" (HPWP) to encompass these concepts.

The foundation for these innovative workplaces is employees with the particular skills needed to successfully contribute within a high-involvement organizational structure. These skills are required for extensive participation by production workers in organizational problem solving and decision making; this demands a significant enhancement of those skills traditionally expected of manufacturing workers. An understanding of how these high-performance/high-

involvement skills are represented in the current workforce would provide a valuable insight into the feasibility of converting to alternative workplaces and the extent of the workforce preparation effort required.

This examination of the skills needed in the workplace was prompted at the end of the 20th century. The realities of changes in international competition compelled manufacturers to seek alternatives to a traditional organizational model which concentrated decision-making power within the top layers of a management hierarchy. This historical artifact, based on a rigid stratified structure, fails the contemporary tests of flexibility and responsiveness since competitive advantage in the new economy lies, to a large degree, in a company's ability to quickly adapt (Ichniowski, Kochan, Levine, Olson, & Strauss, 1996; McCaffrey, Faerman, & Hart, 1995).

The high-performance/high-involvement workplace model offers the benefit of organizational flexibility by engaging the full potential of all employees in the innovation process. The distinction between labor and management is blurred as employees at all levels participate in decision making and take responsibility for process improvements within the context of a team-based environment. As Appelbaum, Bailey, Berg, and Kalleberg (2000) observed in *Manufacturing Advantage: Why High-performance Work Systems Pay Off*, such settings are a major shift from the traditional command-and-control factory.

An overview of the new industrial workplace describes a work setting with redefined front-line worker involvement and increased employee responsibility; one

in which production employees make decisions, have access to information, and assume ownership in ways unknown in traditionally-managed organizations (Boutwell, 1997; Carnevale, 1990; Hudson Institute, 1987; Rifkin, 1995; Thurow, 1996). If this vision of high-performance is to be realized, then industry needs workers equipped differently than those produced by the existing employee development models; the vision requires workers equipped with the expertise needed in the expanded role they are asked to play. While the traditional basic skills and task-domain skills are still expected, the new workers for the new workplace will need additional competencies that until recently were not widely demanded (Appelbaum, Bailey, Berg, & Kalleberg, 2000; Bailey, 1997). Paul, Niehoff, and Turnley (2000) contend that such a transformation will require a new contract between employer and employee in which the latter will share more equally in the success of the company as a reward for increased contribution.

This high-skills/high-wages version of manufacturing's future in which high employee wages are justified by high productivity (Gray & Herr, 1998) contrasts sharply with the competing version in which companies adopt low-skills/low-wages strategies. In the low-skills approach, competitive advantage and profitability come not from an investment in human capital, but through an investment in technology and process control. Contributions by workers are minimized since the goal is to reduce the size of the workforce (i.e., cut cost) by automating processes and to "de-skill" the work to lessen human capital investments. Technology is the champion in this scenario (Gordon, 2000; Osterman, Kochan, Locke, & Piore, 2001). The choice

between these two options is a critical one with diverse impacts that affect not only the companies but also society and the economy.

Adopting the high-performance workplace model is one option companies have, but implementing this option requires employees who possess the skills needed to participate within these unique environments. These skills represent an additional skill set (termed Level 3 Skills in this study) for the employees in addition to the employability skill set (Level 1) and the job-specific skill set (Level 2) that are sufficient in the traditional work environments. Figure 1 illustrates the general differentiation among the three skill sets.

Skill sets were less of a controversial issue as long as the basic skills were defined as reading, writing, computation, and “good work ethic.” Individuals were expected to acquire these abilities through education and their early work experience. That education and experience would then be sufficient to carry them through their work career. But, the post-industrial workplace is making substantial additional demands of the workforce as employees are expected to participate in problem solving, decision making, data analysis, quality control, and cost containment activities in an environment that is increasingly team-oriented. It is also an environment in which change is a constant, so the ability of learning how to learn becomes a basic requirement. This new environment demands new skills that are not necessarily (or adequately) gained in the normal educational- and career-development paths (Educational Resource Information Center, 2000).

The dilemma inherent in the situation regarding the high-performance option

Traditional Workplace

(2 skill sets)

Level 1: Basic Employability Skills
Punctuality, appropriate dress, dependability, appropriate social behavior, basic reading, writing, computation skills, general workplace skills, good work ethic

Level 2: Job-specific Skills
The skills that relate to the job description. Such things as using tools and equipment, knowledge of materials, safety procedures, calibration techniques, etc.

Level 3: High-performance Workplace Skills
The skills that an employee needs in order to function and succeed within a high-performance work environment (i.e., problem solving, decision making, team skills, systems thinking, critical thinking, etc.

High-performance Workplace

(3 skill sets)

Figure 1. A comparison of the skill sets required in a traditional workplace versus the skill sets required in a high-performance workplace.

is that while companies want workers with the new Level 3 Skill set (and all the benefits that accrue to the organization as a result), they prefer that workers enter the labor force already equipped with the new “basic” skills. Non-task-specific skills training is an expense businesses would rather not incur (Appelbaum, 1997; Lynch & Black, 1998; Stasz, Chiesa, & Schwabe, 1998). Thus, a fundamental question is: What is the current state of Level 3 Skills acquisition in the workforce compared with what is needed in the transforming work arena?

Much research has been conducted during the past decade concerning the parameters of the high-performance/high-involvement work system. Questions have focused on the practices and skills utilized in these environments, employee relations issues, the roles of the various constituencies, the generalizability of the research findings, and the ultimate impacts of such systems on organizational performance. In spite of this attention, many questions about high-performance organizations lack definitive answers. The theory of high-performance work systems is an emerging one; this study synthesized current thinking about several aspects of the concept.

Definition of High-performance/High-involvement Workplaces

The literature offers no universally accepted definition of the high-performance workplace (Coye & Belohav, 1995; Delaney & Huselid, 1996; Lawler, 1994; Osterman, 1994; Osterman, 2000; VanBuren, 1996). Certain themes, though, recur within the many widely offered definitions of high-performance workplaces. Tables 1, 2, and 3 present a summary of the practices, policies, skills, and knowledge

that characteristic such work settings. Table 1 presents a company-level perspective of the distinguishing practices and policies identified by researchers who examined high-performance organizations. Tables 2 and 3 complement Table 1 by listing the employee-level skills and knowledge reported in studies of innovative workplaces.

The common denominators among the studies are:

- Flatter horizontal structure instead of vertical hierarchy
- Work done by teams organized around processes; teams empowered to make decisions so management is decentralized and participative
- Empowered workers with enhanced skill levels and cross-training; rewards for team performance
- Collaboration among teams, between labor and management, and with suppliers
- Focus on customers, quality, and continuous improvement
- Flexible technologies

The term high-performance workplace is both a descriptor of the outcomes achieved by such work settings and a reference to particular sets of human resources practices used within these settings (Hunter & Hitt, 2003). The theory of high-performance workplaces is discussed in detail in the “Conceptual Framework” section of this chapter and in Chapter 2. Here, it is sufficient to state that such environments are flexible, responsive, and innovative; that they leverage all their resources toward focused goals . In this, high-performance is both a management philosophy and a

Table 1 (page 1)

Characteristics of High-performance Workplaces (HPWPs)

Characteristics: Practices and Policies	Gordon (2000)	Cappelli & Neumark (1993)	Appelbaum & Batt (1993)	Baldrige Award (2002)	Osterman (1992, 2000)	Marshall (1994)	AFL-CIO (1994)	DOL., OAW (1993)
1. Profitability	X							
2. Productivity	X							X
3. Information sharing	X							X
4. Human capital investment	X					X		
5. Leadership, common vision	X							
6. Flexible culture, adaptability	X					X		X
7. Focus on customer satisfaction	X					X	X	
8. Focus on quality	X						X	
9. Customized production	X							
10. Decentralized control, empowerment	X		X			X	X	X
11. Team-based culture	X	X	X				X	
12. Performance-based reward system	X	X						
13. Established TQM programs		X	X					

Table 1 (page 1 continued)

Characteristics of High-performance Workplaces (HPWPs)

Characteristics: Practices and Policies	SCANS (1992)	Hillgreen (1998)	Pfeffer (1995)	Reich (1994)	Wagner (1994)	Handel & Gittleman (1999)
1. Profitability						
2. Productivity						
3. Information sharing			X		X	
4. Human capital investment	X	X	X			
5. Leadership, common vision		X				
6. Flexible culture, adaptability	X					
7. Focus on customer satisfaction						
8. Focus on quality						X
9. Customized production						
10. Decentralized control, empowerment	X	X	X			
11. Team-based culture				X	X	X
12. Performance-based reward system			X	X		X
13. Established TQM programs						

Table 1 (page 2 continued)

Characteristics of High-performance Workplaces (HPWPs)

Characteristics: Practices and Policies	SCANS (1992)	Hillgreen (1998)	Pfeffer (1995)	Reich (1994)	Wagner (1994)	Handel & Gittleman (1999)
14. Self-directed work teams		X	X	X		
15. Job rotation						X
16. Cross-training for jobs and tasks			X			
17. Incentive structure to reward all stakeholders						X
18. Computer usage by non-managers						
19. Decision sharing at all levels	X					
20. Employee involvement					X	
21. Employee well-being, morale				X		
22. Continuous improvement						
23. Leading-edge technology				X		
24. Common vision				X		

Table 2

High-performance Skills and Knowledge: HPWP Studies

High-performance Skills and Knowledge	DOL, OAW (1995)	Lawler (2001)	Glasner (1991)	NSSB (2001)	MSSC (2000)	AFL-CIO (1994)	Marshall (1994)	Appelbaum & Batt (1993)
1. Understanding business information	X	X					X	
2. Understanding continuous improvement	X			X		X	X	X
3. Adaptability, flexibility	X					X	X	
4. Problem solving skills	X	X		X	X	X		
5. Work team skills	X	X	X	X	X	X	X	
6. Operating autonomously	X		X		X	X		
7. Collaborating with other workers	X							X
8. Decision making skills	X	X		X	X	X	X	X
9. Data collection and analysis skills		X		X	X			
10. Systemic knowledge of organization		X				X		X
11. Change management			X		X			
12. Thinking critically			X					
13. Learning to learn			X				X	

Table 3

High-performance Skills and Knowledge: Employability Studies

High-performance Skills and Knowledge	Carnevale (1990)	Gordon (2000)	SCANS (1992)	ABLE (1999)
1. Understanding business information		X	X	
2. Problem solving skills	X	X	X	X
3. Meeting with customers		X		
4. Operating in work teams	X		X	X
5. Decision making skills			X	X
6. Influencing others	X		X	X
7. Data collection and analysis			X	
8. Systemic knowledge of organization		X	X	
9. Thinking critically		X		X
10. Learning to learn	X	X	X	X
11. Organizing and planning				X
12. Utilizing creativity	X	X	X	

series of practices. Much of this definition is about a company's ability to anticipate and react to, if not actually create, change using the socio-technical systems approach. Successfully applied, these practices translate into competitive advantage, market share, and profitability. The opportunity can be anywhere among new products or features, value-added service, superior quality, innovative process flow, maximized equipment usage, or imaginative cost management delivered in collaboration with employees (VanBuren, 1996).

Cappelli and Neumark (1999), two principal investigators in the subject, cite the common theme among the high-performance practices as an underlying attempt to tap into employee knowledge and motivation through greater employee involvement in workplace decisions. They acknowledge that the term "high-performance work systems," while potentially confusing, consists of a wide range of practices that share this common theme of employee involvement in achieving organizational goals.

Bailey (1997) listed five principles of such workplaces. (1) tasks and jobs are integrated through broad job definitions or cross-functional teams, (2) workers are given more initiative and take more responsibility, (3) employees solve problems in non-routine situations, (4) there is an emphasis on continuous improvement, and (5) workers are expected to understand their functions within the context of the broader purposes of the organization.

The important thing to note in the descriptions is the degree to which such establishments rely on worker cooperation and participation, along with a sense of

ownership and empowerment. This is the explanation for the new, Level 3, skill requirements.

It should be noted that the high-performance model is not the right solution for all organizations. There may be factors affecting the circumstances of a particular employer that negate the high-performance option. Neal and Tromley (1995) caution that companies should undertake the high-performance option only if they are willing to adapt their culture as well as their behavior. If the core values, beliefs, and assumptions that comprise the culture are incompatible with the expected changes, the effort will fail.

Importance of the Issue

As of 2002, 12.8% of U.S. employment was in the nation's 329,300 manufacturing firms (U. S. Chamber of Commerce, 2003). These manufacturers contributed 16% of the Gross Domestic Product. The rapid decline in the number of manufacturing jobs in the United States (a net loss of 2 million jobs, from 18,500,000 to 16,500,000, between 2000 and 2002 according to the National Association of Manufacturers, 2003) makes the transformation of manufacturing from a traditional assembly-line mode to a high-performance mode an issue of major importance to employers, workers, unions, and society. Domestic manufacturing can maintain its competitive position only through ever-increasing productivity. These productivity gains must be made through a combination of human resources and technological resources. This study focused on the people side of the equation.

Against the backdrop of the global economy, the nation's collective ability to create and sustain a new definition of "worker" affects the United States' competitive position in international markets (U.S. Departments of Commerce, Education, & Labor, 1999). On the domestic front, this transformation of the workforce has implications for the financial, operational, and market performances of virtually every manufacturer. No less important, it also affects the standard of living for manufacturing employees through its potential impact on enhanced productivity and the resolution of the high-skills/high-wages debate.

The Emergence of the High-performance Workplace Model

The high-performance/high-involvement production model is receiving extensive attention because it addresses fundamental concerns of manufacturers such as productivity, process flexibility, cycle time, and resource utilization that ultimately affect profitability and competitive position (Osterman, 2000). Applebaum and Batt (1993) contend the traditional organization models are proving to be unresponsive in the new economy. They say that American complacency with the traditional organization of production has reduced market share in the face of sharply rising international pressure. "Business as usual," they conclude, "is no longer sufficient to make U.S. firms competitive" (p. 1).

Therefore, U.S. firms are seeking ways to undertake innovations in their work systems. Substantial evidence now exists in the literature that American firms can no longer contend by organizing production along traditional assembly line thinking.

Companies, unions, managers, workers, and government leaders have become aware of the necessity, if not the inevitability, of organizational restructuring to improve U.S. competitiveness (Reich, 1994). Organizations “must replace mass production systems with new, high-performance work systems that achieve continuous improvements in quality as well as efficiency” and that embrace new forms of organizational learning that “mobilize the knowledge and problem-solving abilities of front-line employees” (Applebaum & Batt, 1993, p. 7).

But these new demands are being made of a workforce that may not be prepared to respond to them (Stasz, Ramsey, Eden, Melamid, & Kaganoff, 1996). Many people employed in manufacturing are the products of an educational and work-preparation system geared toward a model of factory work that sharply limits their decision making role and intellectual contribution to the company. It was, and is, a system that ignores important psychological and social needs of employees in the process; they merely do what they are told and collect their paycheck. “As a result, [mass production systems] not only fail to tap important sources of motivation and ideas from employees but in many cases cause employees to withhold effort and compliance with management directions” (Cappelli & Neumark, 1999, p. 1).

Gee, Hull, and Lankshear (1996) claim that this command-and-control approach to manufacturing created workers “hired ‘from the neck down’ to engage in allegedly mindless, repetitive, and meaningless pieces of tasks, the whole of which the worker did not need to understand and certainly had no control over” (p. 17). These authors further reinforce the perception that the system also produced a

hierarchical organizational structure in which middle managers were needed to pass information between the top and bottom of the hierarchy. It was a system that prospered for decades, but the legacy of it is that the current workforce education system in the United States developed at the turn of the last century (Gray & Herr, 1998) and prepared workers for a rigidly structured workplace.

The current pressures on the hierarchical structure of the workplace are a direct confrontation with the old assumptions about the economy and society. Osterman, Kochan, Locke, and Piore (2001) assert that the old system was based on five fundamentals: the immunity of the U.S. economy from foreign competition, the role of women in society and the workforce, the idea of permanent employment, the stability of corporations with a hierarchical structure, and the social contract between employee and employer. As these fundamentals were undermined during the final quarter of the 20th century, there developed an ever-growing “mismatch between the institutional structure and the reality of today’s world of work...” (p. 5).

The impetus for workplace reform is a reaction to the global economy. Leach (1993) argues that until 1970 there was no need for American mass-market capitalism to question its way of doing business since competition was not particularly stiff amid massive and unsaturated markets for consumer goods. For 70 years this led to unprecedented economic success for large corporations marketing mass-produced goods. This factory model of production required workers who merely functioned as units of production; they could be looked upon by management with the same detached objectivity as the equipment the employees operated.

Then, starting in the 1970s, market in-roads from offshore manufacturers applying revolutionary thinking forced domestic industries to closely examine their operating philosophies. Galagan (1994), writing in *Training and Development*, nicely summarized this upheaval. By the 1980s, with the advent of serious overseas competition, the rules began to change. “Suddenly production efficiency wasn’t enough to make a company competitive. Customers demanded high-quality products and services that were customized, convenient, timely, and delivered with speed at the right price...” (p. 22). These expectations forced companies to rethink virtually every aspect of doing work, using technology, and increasing human capability in the workplace; which led to the introduction in the early 1990s of corporate efforts toward restructuring, reengineering, reinventing, and, as this study emphasized, the advent of high-performance/high-involvement workplaces.

Workers in this scenario are not just cogs in the machine, but partners in a collective organizational effort. This is a very different point of view from the factory model.

The New Worker for the New Workplace

The Secretary’s Commission on Achieving Necessary Skills (SCANS) (1992) captured the essence of the situation by saying, “When all is said and done, the high-performance future requires a radically different organization of work and *a radically different kind of workforce*” [italics added] (p. 5). For the past decade managers,

researchers, and unions have been attempting to define what “radically different” means.

An outline of these new skills is emerging from the recent radical changes occurring within the manufacturing sector. Since these changes are set against a historical context, a picture of the new work arena can be drawn by a comparison between the traditional and the innovative. Within this comparison, the practices of the alternative workplace differ extensively from many of the practices and operating principles that defined American business during the 20th century. As with any transformational change, there are tensions created as the entrenched past is modified by the emerging future. The effect of this tug-a-war between tradition and innovation is apparent in the debate over high-performance workplaces.

The transition means that both employers and employees need to be prepared to operate within a different conceptual framework than that of the first three quarters of the 20th century. As Osterman et al. (2001) succinctly describe this greater degree of participation, “Employees need new and higher skills in order to cope with the changed environment.” And, since firms rely more heavily on human capital as a competitive asset, the firms need to reward this enhanced contribution; “the net result of these developments is that the wage premiums attached to education and skills have increased dramatically...” (p. 29).

As to what the content of this learning and the substance of these skills should be, many researchers have explored the question of what the alternative workplace models might look like. The design of the workplace dictates the skills needed. So a

key to the success of any high-performance model is the existence of a responsible, highly trained, and flexible participative workforce.

A summation of the arguments promoting high-performance workplaces is presented by Potter (1994):

American competitiveness is in a state of flux. The new global marketplace and pace of technological change are redefining products, production, markets, and the nature of work itself.... Advances in technology, telecommunications, and transportation have globalized research, production, and the marketplace. They also have redefined the nature of work and skills needed in the workplace.

Successful employees today are those with the ability to help companies adapt to rapid market and technological changes. Employee-involvement cultures contribute to the flexibility and adaptability that are essential prerequisites to success in the global marketplace. (p. 6)

Levels 1, 2, and 3 Skills

Many authors, researchers, and agencies propose classification systems, often expressed as tables or graphics, to organize worker skills. Many of the taxonomies, further discussed in Chapter 2, suggest that there is a hierarchy of skills, with more advanced skills building on the basic skills (International Labour Organization, 2003). The overview of the high-performance emphasizes that the workers in the new manufacturing workplace are expected to have three sets of skills compared to the

two sets demanded in the traditional workplace. For this study these skill sets will be referred to as Levels 1, 2, and 3. All three are needed in the HPWP.

The Level 1 Skills include the employability skills common to all workplaces. The Educational Resource Information Center (ERIC) (2000) describes these skills as essential functional knowledge, skills, and attitudes necessary for success at all levels of employment. Contained within this list are dependability, basic social skills, punctuality, the ability to follow instructions, personal hygiene, good work ethic, and foundational academic skills (reading, writing, and computation).

Level 2 Skills in this model are job-specific/domain-specific skills. These will vary with the job, the equipment, and the work setting. This is the task level of job classification such as that found in the U.S. Department of Labor's *Dictionary of Occupational Titles*.

Levels 1 and 2 include the threshold skills specific to each job. They are the ones that gain an applicant consideration for at least an entry-level position. The Level 3 Skills, explained further on, are the particular skills required in a high-performance work environment in addition to the Levels 1 and 2 Skills. Whether the applicant brings these Level 3 Skills to the job or they are provided on the job, the need is still there to obtain them.

In discussing the three skill levels, there is considerable agreement in the literature about the generic categories included in job skills; but there are, as may be expected, differing views as to where the skills belong in each author's taxonomy. What one researcher considers a basic skill, another may consider a more advanced

skill. For example, team skills, which are at Level 3 for the purpose of this study, are classified as basic employability skills in other taxonomies. The reason for this is the degree of proficiency or sophistication that the employee is expected to demonstrate. In the example, the spectrum of skills associated with team membership ranges from simply being able to function within a group (i.e., get along with others) to highly cognitive skills of understanding group dynamics and consensus building.

Regardless of the ordering of the skills, the important point, according to Osterman et al. (2001), is that “the demand for skills is increasing for a variety of reasons, but three explanations stand out: globalization and increased competition from new entrants into deregulated industries, the spread of computer technologies, and the spread of new work systems.” These new work systems “put a premium on flexibility, problem solving skills, and teamwork” (p. 44).

The High-performance Skills (Level 3)

There is wide acknowledgment in the manufacturing sector that new high-performance job skills are desirable for workers in the emerging workplace. Carnevale (1990); Gee, Hull, and Lankshear (1996), and Spikes (1995) are among the authors who write about employers’ desire for workers at all tiers who are team-oriented, flexible, self-directed, and innovative; that is, the skills associated with the high-performance/high-involvement workplace (Cappelli & Rogosky, 1994).

The special HPWP skills and knowledge identified in the literature include:

- Team skills (functioning as both a team member and a team leader)

- Decision-making skills (both individually and in a group)
- Problem-solving skills (both individually and in a group)
- Self-direction (being able to work without direct supervision)
- Systems knowledge (comprehending the “big picture”)
- Organization culture knowledge

These skills for the most part involve higher order cognitive and analytical skills than do those of Levels 1 and 2 (Cappelli & Rogovsky, 1994; SCANS, 1992). In the traditional manufacturing plant the important skills are physical strength, hand-eye coordination, dexterity, visual acuity, following instructions, and conforming to standards. The new skills favor interpersonal skills and systems knowledge. Yet, the skill sets are not mutually exclusive; workers need a blend of all the skills. Members of the workforce are adaptable and versatile, it is encouraging that there are currently production workers who, as needed, have acquired and use the high-performance skills in conjunction with the traditional skills (Fisher & Fisher, 1998).

The qualitative difference between the old and new work skills can be represented by considering the critical thinking skills required of line employees in HPWPs. Critical thinking in the high-performance workplace requires that employees (1) become aware of the unintended effects and consequences of their actions; (2) identify and challenge the validity of the assumptions and beliefs upon which decision-making criteria and operating practices are based, and (3) expand their awareness to include alternative perspectives modes of thinking, and possible courses of action (Pierce, 1991).

Such critical thinking involves high order cognitive skills that are relatively complex; require judgment, analysis, and synthesis, and are not applied in a rote or mechanical manner (Halpern, 1998). Higher order thinking is thinking that is “reflective, sensitive to the context, and self-monitored.” Critical thinking is “the kind of thinking involved in solving problems, calculating likelihoods, and making decisions... critical thinking also involves evaluating the thinking process” (p. 451). This is a competency far removed from the mindless task repetition of the Tayloristic factory model. Indeed, it depicts a significantly more sophisticated worker.

The Problem

The overarching problem investigated by this study is that America may be entering a new age of industrialism with a workforce that is lacking in the essential abilities to make the transition. That is, how well prepared is the existing labor pool to participate in an innovative work environment?

The problem addressed by this study can be presented as a syllogism:

Point 1: Manufacturers desire the benefits to be derived from the high-performance strategy. Point 2: To gain these benefits, the manufacturers need to build their workplaces around high-performance policies and practices. Point 3: In order for these policies and practices to be effective, the workers in these environments must possess and apply Level 3 Skills.

Thus, the research issue at hand is: What is the current status of the skills evident within the manufacturing workforce relative to the Level 3 Skills required in the high-performance/high-involvement work environment?

This question can be answered in part by examining the occurrence and distribution of Level 3 Skills within an existing manufacturing labor force. Since these employees have the mobility to move between companies within the local area, they represent potential recruits for a company converting to a HPWP. Further, their preparation may also be indicative of the extent and content of workforce education and training that occur in the region.

The problem introduced in this paper is but a microcosm of a larger situation. It may be, Pearn (1994) notes, that the nation is not investing enough in this development of our human capital. This shift in skill emphasis has occurred in a comparatively short time, less than one generation. Consequently, the situation as recorded by the American Society for Training and Development in 1989 persists today, “it has been difficult to move from an economy run on physical strength and energy to one run on skills, knowledge, and understanding. And it is increasingly difficult for the U.S. to keep up with the rapid pace of change in the volatile global economy” (p. 2).

Purpose of the Study

There were three primary purposes to this study. The first was to determine the occurrence and distribution of training and/or experience for each of the Level 3

Skills within an existing manufacturing workforce. It was not necessary at this step to identify the employers as being traditional or high-performance workplaces. A worker could possess some or all of the skills but not be using them in their current employment. The training referred to could be either formal (planned) or informal (unplanned) in nature.

Planned training is defined by Rothwell and Sredl (1992) as “organized instruction, in which the training is structured before delivery, often in the form of using an outline or lesson plan based on job requirements or duties” (p. 485). Lynch and Black (1998) add to this by identifying formal training as “structured training including all types of training activities that have a predefined objective” (p. 79). As examples, they offer seminars, lectures, workshops, and apprenticeships. Informal training, then, is unstructured; “nobody plans the outcomes in advance, and a trainee’s progress is difficult to track” (Rothwell & Sredl, 1992, p. 485). For Lynch and Black, it is an unstructured one-on-one situation, where employees learn by observing others doing the job.

The second major purpose of the study was to establish how the occurrence of the skills was affected by the demographic and company variables presented in the study. These variables included, for employees, (1) gender, (2) age, (3) educational level, (4) tenure with current employer, and (5) total years in the workforce; and for companies, (1) principal product, (2) total number of employees, (3) union/non-union status, (4) annual sales revenue, and (5) number of employee involvement programs during the past five years.

The final major purpose was to determine if the participants could be assigned to either a traditional work skills group (those employees possessing predominately Levels 1 and 2 Skills) or a High-performance work skills group (those employees possessing sufficient Level 3 Skills along with the Levels 1 and 2 Skills). The variables used in this sorting were the demographic information and company information. This purpose required the creation of an idealized high-performance worker profile as described in Chapter 3.

Significance of the Study

These results will be of benefit to employers, employees, unions, human resources and human resources development professionals, and other researchers. The study operationalized a working definition of high-performance in a unique and precise way in order to construct a profile of a minimally qualified high-performance worker. The synthesise of proposed high-performance skills, derived from a meta-analysis of the literature and validated by an expert panel, provides a valuable reference for further discussion of the topic.

By providing a better understanding of the frequency of occurrence of HPWP skills among workers, this study yields four key results. First, and perhaps most importantly, the study provides a systematic view of the concept of HPWP skills. In doing this, the results focus thinking about these Level 3 Skills. It adds to the body of knowledge a worker-centered perspective instead of the management-centered view common in many analogous studies (Appelbaum, Bailey, Berg, & Kalleberg, 2000).

The second major result involves the issue of management expectations. Organizations can use this information for making decisions about future directions. High-performance workplaces are an attractive alternative structure; but, there are prerequisites for adopting them, one of which is qualified workers. The methods used in this research can assist employers in assessing the available labor markets.

Thirdly, the study provides information employers can use to better manage the recruitment process by identifying the desired skills, allowing them to more precisely design the selection tools. Doing so will improve the odds of a successful fit between the person, the job, and the organization which, in turn, will contribute to the efficiency and effectiveness of the firm.

It benefits education and training plans by highlighting the disparity between what workers know and what they need to know. This will encourage the introduction of these topics into the educational process (cultivating critical thinking skills versus rote learning is an obvious example) and into the workplace training process. It will help industry to communicate with education providers about any gaps between the needs of industry and the curricula of the schools.

Also, it is a valuable issue for the society; the better we understand the high-performance work environments, the better chance we have of translating that knowledge into productivity gains that affect the general economy. This is a critical point, one path to sustainable economic growth and equitable distribution of wealth is the constant creation and enhancement of high-level skills within the workforce.

human capital investment relates directly to the high-skills/high-wages versus low-skills/low-wages debate.

Research Questions

The specific research questions were:

1. (a) What amount of Level 3 Skills training and/or experience exists among the currently employed manufacturing workforce in the State College Metropolitan Statistical Area? (b) For which of the skills are training and/or experience most common, for which are they least common?
2. How are such training and/or experience distributed across the demographic and company variables used in the study?
3. Can the workers in the study be assigned to either a “traditional work skills group” or a “high-performance work skills group” based on the demographic (age, gender, educational level, tenure with current employer, and overall years in the workforce) and company (type of product, number of employees, union/non-union status, annual sales revenue, and number of employee involvement programs) predictor variables?
4. What additional training have employees received other than those categories listed in the study survey?
5. What additional training would employees like to receive other than those categories listed in the study survey?

6. How useful to the employees has the training they have received been in terms of preparation for their jobs, preparation for advancement, increasing their productivity, quality, business awareness, team building, and other considerations?

Assumptions

Various assumptions were made by the researcher. The first was that the skills identified as Levels 1, 2, and 3 are a clear differentiation of real skills in the workplace. It was also assumed that the Level 3 Skills identified in this study describe the competencies needed in a high-performance workplace.

A second assumption was that the Level 3 Skills are transportable between establishments and across industries in the manufacturing sector. The sector includes such a wide range of products (ranging from powdered metals to electronics) produced in such a wide range of settings (primary to finished goods, durable goods and non-durable goods, large companies and small companies) that it is problematic as to how much mobility an individual worker has within this spectrum of employers. The mobility may be determined by job skills.

Finally, it was assumed that the occurrence of training in and/or experience with any of the Level 3 skills is a sufficient indicator of an understanding of the skill, such that the employee can apply the skill in the workplace. This issue of self-assessment of ability is a crucial one. The person doing the reporting can err in either direction about her/his confidence level; she/he may report a greater or lesser degree of confidence in ability than is in fact the case.

Limitations

In limiting the study to only currently employed workers, other segments of the labor pool were excluded. Within the excluded group were those members of the labor force seeking employment, those potential manufacturing workers who were currently employed outside the sector, and students who would soon be entering the labor market.

The study was limited by the defined population of workers in manufacturing firms within the State College (PA) Metropolitan Statistical Area. This limited the generalizability of the findings since this population may not be representative of the manufacturing sector in other geographic areas in regards to education levels, prior work experience, mix of manufacturing concerns within the manufacturing sector, and general demographic characteristics. The State College MSA population of 5,000 factory workers (3,660 of whom were eligible for the study) represents less than 1% of Pennsylvania's total of 872,000 workers engaged in manufacturing.

This study was limited to only the manufacturing sector. The service sector is by far the larger of the two sectors of the economy, employing four times as many workers as the manufacturing sector. The wide variety of job descriptions and attendant skills in the service sector may be very different from those in manufacturing. Even though the high-performance work skills are supposedly universal (Cappelli & Rogovsky, 1994), the degree to which they actually transfer between economic sectors is unknown and no such transferability is supported by this current study.

The methodology for the study involves self-reporting by the employees and the management representatives. Such self-reporting is subject to the biases of social desirability response and self-perception (Dillman, 1978).

This study established whether employees have received training and/or experience in any or all of the Level 3 Skills, either in their current workplace or elsewhere. For those employees who did not possess a certain Level 3 skill, no inference is made about their ability to acquire that skill. The only related conclusion is that they had not received training and/or experience in that skill at the time they completed the study survey.

Definition of Terms

The following definitions are used in the study:

Manufacturing industry: Manufacturing is defined as “the mechanical, physical, or chemical transformation of materials or substances into new products” (U.S. Census Bureau, 2002, p. 1). The manufacturing sector includes nine diverse three-digit (codes 315 through 339) industry groups within the North American Industry Classification System (NAICS).

Metropolitan Statistical Area: For the purpose of this study the manufacturing concerns will be those located within the State College (PA) Metropolitan Statistical Area (Federal Information Processing Standards code 8050). A metropolitan statistical area (MSA) is “an integrated economic and social unit with a population of at least 50,000” (U.S. Census Bureau, 2000, p. 5).

The emerging workplace: This refers to the redefined workplace that has resulted from new technologies, globalization, and changing demographics. According to Godard (2001), “they are generally viewed as representing alternatives to the individualized work arrangements commonly associated with work organizations in the postwar era” (p. 776). This innovations “seek greater degrees of flexibility in work organization, cooperation between labor and management, and worker participation in the decisions and financial well-being of the company” (Ichniowski et al., 1996, p. 300).

High-performance workplace: an organizational context characterized by the use by all employees of team skills, interpersonal skills, decision making skills, problem solving skills, and enabling skills. Creating high-performance workplaces requires joint ownership and control of organizational change efforts, and a joint vision, commitment and hard work by both management and union (Office of the American Workplace, 1994).

High-performance job skills (Level 3): These are the skills required by workers in the new workplace beyond the traditional skills of employability traits and specific job/task skills. These new proficiencies include systems knowledge, interpersonal skills, analytical skills, innovation, and the team skills discussed in this study (Carnevale, Gainer, & Meltzer, 1990; SCANS, 1991).

Conceptual Framework

The framework for this study was the concept that the high-performance workplace model exists in practice and is a viable organizational structure that companies can aspire to. This is supported by the fact that there are functioning work sites that manifest the high-performance concept.

The Office of the American Workplace (1994) provided the foundation for this discussion in the *Road to High Performance*. Such organizations integrate their business, human resource, and technology strategies and share several common characteristics:

- they push responsibility down to front-line employees, often by organizing work into self-managing teams, and provide workers with the information necessary to exercise a high level of autonomy and discretion
- they give workers a stake in the performance of the organization through employee ownership and skill-based pay compensation systems
- they base their worker-management relations on trust and cooperation
- they focus on satisfying customers, on improving quality, and on building organizations that adapt easily to market change
- they create employment security strategies that recognize the value of workers to long-term economic performance
- they invest in training and retraining to develop their workers as critical business assets, rather than treating them as costs to be minimized
- they provide workers with safe and supportive work environments

Following the principles listed above, high-performance organizations build employee participation and empowerment into their organizational structures. Rather than taking a piecemeal approach to redefining their structures, these organizations implement a systematic, comprehensive workplace change. Each workplace practice complements and supports others (Office of the American Workplace, 1994).

Chapter 2

Review of the Literature

How to organize work so that it might maximize benefits to both employees and employers has been a central question in social science throughout the past century (Cappelli & Neumark, 1999). The topic under consideration in this study is the emergence of a new United States manufacturing model, known variously as high-performance work systems, high-involvement work systems, democratic workplaces, or participative workplaces, in which the roles of workers and managers (to use the traditional distinctions) are dramatically altered. Within this alternative work arrangement, front-line workers assume responsibilities that historically were the domain of management. The implications this rearrangement has for organizations and employees are still being identified; the process by which this new workplace will emerge is yet evolving. What is known for certain is that this transformation requires a careful rethinking of many of our paradigms about work, about the workplace, and about preparation for work.

Guiding this discussion within this paper are three questions, starting with what are these new skills (referred to as Level 3 Skills in this study) and with what frequency do they occur in the sample? The second question is, how is this distribution affected by ten variables selected for both the employee and the employer? The final question is, can the participants in the study be assigned to either a traditional work skills group or a high-performance work skills group based on the independent variables of the study? This means, has the employee acquired

enough Level 3 Skills at a minimal entry level to have crossed the threshold between the traditional workplace and the high-performance workplace?

This review of the literature examined ten aspects of high-performance workplaces and associated skills. The topics are: (1) the transforming workplace, (2) the importance of knowledge to organizations, (3) workers' roles in the traditional and the emerging workplaces, (4) skill sets for the new workplace, (5) the efficacy of high-performance practices, (6) teams in the HPWP, (7) empowerment in the HPWP, (8) barriers to the acquisition of Level 3 skills, (9) options for HPWP skills acquisition, and (10) current studies.

The Transforming Workplace

Pfeffer (1995) observed that as the other factors of competitive success become less relevant, the remaining crucial factor is the culture of the organization. This means the effect of management (or better yet, leadership) on the behavior of the employees and how they contribute to achieving mutually desired goals with the larger organization. The position held in this paper is that this socio-technical approach to the workplace is a key to organizational success.

While the prospect of maximizing human capital is compelling, the practical application of high-performance practices is problematic; different establishments will have different interpretations of what high-performance means and how it is achieved (Kerka, 1995). Lawler's (1994) comment that "what appears to be needed is a contingent view of what constitutes the best management approach" implies a

flexibility in definition that is consistent with the flexibility behind the high-performance model. A review of the literature revealed that it is a very fluid notion (“protean” is the adjective Kerka employs) with many possible elements and it appears that few organizations utilize the full spectrum of elements. Given the number of models, comments Osterman (2000), there may not be a one-size-fits-all solution.

The high performance workplace (HPWP) is a concept that may exist more in theory than in practice (Lawler, 1994). Many of the concepts used by researchers in defining high-performance workplace characteristics are vague. For instance, empowerment is a desired state but it implies layers of skills and practices that lead to an empowered condition. It is, therefore, a by-product of other inputs.

The theory of the high-performance workplace is an evolving one for which many definitions have been advanced but no one definition has attained universal acceptance (Handel & Gittleman, 1999; Reich, 1994). The common threads in the definitions are that such workplaces promote worker involvement in decision making, encourage continuous learning, share responsibility, and share information. As seen in Tables 1, 2, and 3 (Chapter 1), there are differing opinions as to the defining elements of these innovative work settings.

Even after a decade of study, the term “high-performance” remains imprecise (Lawler, 1994; Pil & MacDuffie, 1996; Varma, 1999). By one usage, any firm that produces exceptional results (compared to its competitors) around indicators of

profitability, market share, time to market, stock value, and the like can be hailed as a “high-performance” organization. These results could be accomplished, though, without utilizing any of the socio-technical workplace practices implicit in the definition of HPWP used in this paper. Exceptional results can be obtained by a manufacturer through the installation of new technology, or a breakthrough in product design or process, or even by means of radical cost cutting/downsizing. In the extreme, high-performance financial results could be obtained on the basis of measures and policies totally contrary to the principles of employee investment and empowerment (Coye & Belohlav, 1995).

In the socio-technical version of high-performance systems, “continuous improvement is expected to come from two sources: decision making autonomy for employees and treating work as a system rather than a set of individual jobs” (Appelbaum & Batt, 1993, p. 28). The thinking is that since the workers have an intimate knowledge of the work process, they can contribute to the organization of work along with managers and engineers. Improvements, thus, emerge from a blending of the experience of the workers (the human component) with the technological and process components.

In *Organizing for High Performance*, Lawler, Mohrman, and Benson (2001) profess that such a composite approach to management can equate to a powerful competitive advantage, although this connection has not always been acknowledged. Prior to the 1980s, “companies competed on the basis of their ability to execute traditional management practices. They all generally accepted the bureaucratic,

hierarchical organization model...” (p. 3). In contrast, the authors note that in emerging innovative workplaces companies use group decision-making, group problem-solving, team-building, employee business knowledge, performance-based incentives, employee involvement, knowledge management, and empowerment as practices that produce major benefits for all stakeholders.

Appelbaum and Batt (1993) concluded in their study that there are two distinct models: “lean performance” which relies on centralized coordination premised on managerial and technical expertise and “team production” which applies socio-technical techniques and tends to decentralize work flow and decision making. The two differ in the extent to which front-line workers participate in the responsibility for continuous improvement and decision-making processes.

In 1992, the Secretary’s Commission on Achieving Necessary Skills (SCANS) regarded high-performance as the route to increased international competitiveness. HPWPs utilize decentralized and trimmed management structures, relying on workers who can analyze and act on new situations quickly and effectively. Such organizations place a premium on moving decisions closer to the front lines, treating their workforce as an investment to be developed, not a cost to be controlled. The U.S. Department of Labor (1993) defines high-performance workplaces as those companies “that treat workers as assets, invest heavily in training and continuous learning, and equip workers with the education and skills they need to affect products and services.”

Ray Marshall, economist and former Secretary of Labor, provides a representative overview of high-performance practices that emphasizes a worker-centered approach to workplace redesign. Marshall's "8 Points for High Performance Work Systems" include:

1. effective use of all company resources
2. acute concern for the quality of products and services
3. a participative and non-authoritarian management style
4. internal and external flexibility (meaning rapid adjustment to internal production processes and to changing economic and social trends)
5. a positive incentive structure
6. leading-edge technology
7. a well-trained and well-educated workforce
8. an independent source of power for workers (in this case, a reference to unions) (Baugh, 1995)

The Importance of Knowledge to Organizations

In order to achieve the goals of the high-performance model, there is an increased demand for a new type of worker, one who displays the dual abilities of knowing how to learn and know how to think clearly about the information available to them (Halpern, 1998). This is in stark contrast to the historic system of mass production in which management was the repository of all knowledge about the

production process (International Labour Organization, 2003). This emerging demand by companies for employees with team skills, systems knowledge, critical thinking skills, and similar skills is driven by very practical reasons—it is one path to adding value to the organization in the form of increased productivity, quality gains, continuous process improvement, new product development, and process flexibility. All these equate to competitive advantage and sustainable profitability for the organization.

Commercial organizations exist to make a profit on capital investments. One of the ways they do this is to gain competitive advantage within their markets. Lester Thurow (1996), the noted economist, states that in the classical theory of comparative advantage, location of production depended on two factors: natural resource endowments and factor proportions (the relative abundance of capital and labor). The theory worked through the Industrial Age; today, though, he concludes, knowledge and skills stand alone as the only source of comparative advantage. “With everything else dropping out of the competitive equation, knowledge has become the only source of long-run sustainable competitive advantage, but knowledge can only be employed through the skills of individuals” (p. 74). The economy will require of workers “both new and much more extensive skill sets than have been required in the past....without skills there are no successful organizations” (p. 76).

Many business analysts, educators, labor representatives, and researchers agree that this drive for competitive advantage is subjecting the American workplace to radical changes (Hudson Institute, 1987; Gray & Herr, 1995; Senge, 1990; Gee,

Hull, & Lankshear, 1996). One version of the future of the workplace is that of a high-performance workplace in which workers will be required to possess well-developed technical, interpersonal, and leadership skills. The skills workers will need in order to participate in this workplace will be very different from the traditional workplace skill sets of employability skills (Level 1; basic work ethics) and technical skills (Level 2; job specific).

The emergence of this new workplace of the future has major significance for the field of workforce education. It raises questions of what skills are required, how much of each skill is required, complementarities of skills (these complementarities are defined by Appelbaum, 1997, as two practices in which doing more of one of them reduces the cost or increases the return to doing more of the other), and the workforce preparation by which workers acquire and maintain these skills. New forms of work settings require new modes of workforce preparation.

Workers' Roles: Traditional versus Redesigned Workplace

Gray and Herr (1998) contend that the current United States workforce education system has its roots in the early 20th century. The social-industrial context in which the occupational development philosophies emerged during the first three quarters of the 20th century was very different from today's circumstances.

Taylorist scientific management, an industrial management design philosophy that teaches manufacturing efficiency, receives much of the blame (rightly or wrongly) for the current organization of the workplace. Efficiency in this model is realized by

reducing production activities to their simplest constituent tasks and assigning each unique step to a worker in an assembly-line fashion. Gray and Herr (1998) noted that in this system efficiency was achieved by concentrating all decision making at the managerial level leaving few decisions to the workers.

From the end of World War II until the early 1970s, this 'old' industrial mass-market capitalism had massive and unsaturated markets for consumer goods. This led to unprecedented economic success for large corporations marketing mass-produced products. By 1990's standards, competition was not particularly stiff and was more domestic than global in nature.

This economic climate produced two categories of workers below the executive level according to Gee, Hull, and Lankshear (1996). The first category was made up of low-level workers engaged in mindless, repetitive pieces of tasks the whole of which they did not need to understand and certainly had no control over. The second category was made up of middle managers who existed to pass information within the hierarchy and to supervise bottom-line workers. At the top of the classic hierarchical pyramid are directors and executives who issue the marching orders to those below them.

Now the traditional factory structure, as described, is changing. What used to be represented as an isosceles triangle with the upper management at the peak, is giving way to new forms of organizational structure. This triangle was illustrative of the way in which access to information, decision making, planning, and power were concentrated in those few persons located at the peak of the organization.

In this new environment employees will be expected to possess and apply a greater selection of job skills. As organizations “flatten” the pyramid by eliminating layers, more responsibility will be passed to front-line workers, who will then need to “demonstrate considerably more judgment, creativity, risk taking, adaptability, and interpersonal skills than has hitherto been necessary. This is because of the fundamental power shift in our society away from physical and toward mental work” (Rothwell & Sredl, 1992, p. 234).

In this setting, it is the middle managers who fail the test of organizational value-added activities. As Gee, Hull, & Lankshear (1996) observed:

Middle managers, as they pass information back and forth, slow the business down just when it should be responding as rapidly as possible to its customers. They insulate it from the fast-changing market at a time when businesses must respond quickly and adaptively. They bloat large companies just when they must get as “lean and mean” as possible. They separate leaders from workers who are on the front-line closest to the customers and who most deeply affect their level of satisfaction. (p. 18)

But, if layers of middle management are eliminated, the responsibilities that they represented must be transferred to lower levels within the organization (Rentsch, Heffner, & Duffy, 1994). To do this requires workers who can learn and adapt quickly, think for themselves, take responsibility, make decisions, and communicate

what they need and know to leaders who coach, supply, and inspire them (Gee et al., 1996). While this may seem to be a reasonable strategy, it is the very issue of how prepared are workers for this increased responsibility that is at the heart of this study.

Gray and Herr (1998) note:

Gone is the concept of the heroic manager who makes all decisions.

Ensuring quality calls for a new involvement of workers at all levels of

the business enterprises. Only with significant increased investments

in workforce education will the workforce be prepared for this

expanded role....Work teams are 'in'; top-down management is 'out'.

Preparing nonprofessional workers for this role will take a

revolutionary rethinking of all of education including workforce

education—especially an emphasis on teams or cooperative learning.

(p. 50)

Sustaining a culture of participative management requires a steady stream of ideas on creative ways to conduct business from all levels of the organization. This can be a difficult goal to achieve in organizations whose cultures discourage an intellectual contribution by the majority of the workforce. Preparing production workers to view themselves as an intellectual asset to the company is a significant goal of aspiring high-performance workplaces. Adopting the organizational philosophies of problem-solving groups, continuous improvement, total quality management, and learning organizations promotes the concept of an entirely revised

process for employee development (Deming, 1986; Hammer & Champy, 1993; Senge, 1990).

Skill Sets for the New Workplace

For this study, the emphasis was on the skill set required for participation in a high-performance/high-involvement workplace. An examination of prior attempts to classify workplace competencies, expressed as skill standards, served as a foundation for this discussion. Along with the phrase “skill set”, the term “workplace literacy” is also used in the literature to encompass those skills that permit an employee to adapt to and function successfully within a given work environment (Imel, 1995).

A skill standard is “a statement that specifies the level of knowledge and competency required to successfully perform work-related functions,” thus providing an objective and verified process for identifying the critical skills and levels required for various positions. This provides an objective methodology for identification of the critical skills and required levels of proficiency (Northeastern Pennsylvania Works, 2000, p. 2). As noted by Stasz, Ramsey, Eden, Melamid, and Kaganoff (1996), this concept is used to analyze both the characteristic of a job and the characteristics of the person performing the job. Skill sets, then, are the aggregate competencies needed in a particular work setting.

Skill sets were important to this study because the study depended on a subtle transition in the development of a worker. Based on an assortment of acquired skills, at some point a worker may cross the threshold for having the skills that qualify him or her as a high-performance worker. This is a hypothetical point that in actual

practice will vary with the local work environment. (see Figure 2). An idealized profile of such a worker was generated in this study for research purposes

Since there is no definitive, universally accepted skill set for the high-performance workplace (Stasz, Chiesa, & Schwabe, 1997), the researcher operationalized such a list based on the literature and the input of an expert panel. Tables 1, 2, and 3 are a tabulation of the skills associated with the high-performance worker derived from the literature. The development of the operationalized profile is explained in Chapter 3.

As has been noted in earlier sections of this paper, the meaning of literacy in the workplace for most of the 20th century has been concerned with reading, writing, basic math, and other skills required for entry-level adaptation to the organizational environment. A much broader concept of literacy, though, is needed to understand and confront the complex issues and problems of today's workplace and its interaction with the world (Pierce, 1991).

Many of the skill set/workplace literacy graphics stress the interrelations between the skills and create a hierarchy of skills as the skills complement and reinforce one another; therefore, it is typical to refer to basic, intermediate, and advanced skills. This is consistent with the concept of the high-performance skill set in which the skills interweave. As shall be discussed later in this paper, there are key Level 3 Skills that signify the transition of a worker from a state of possessing

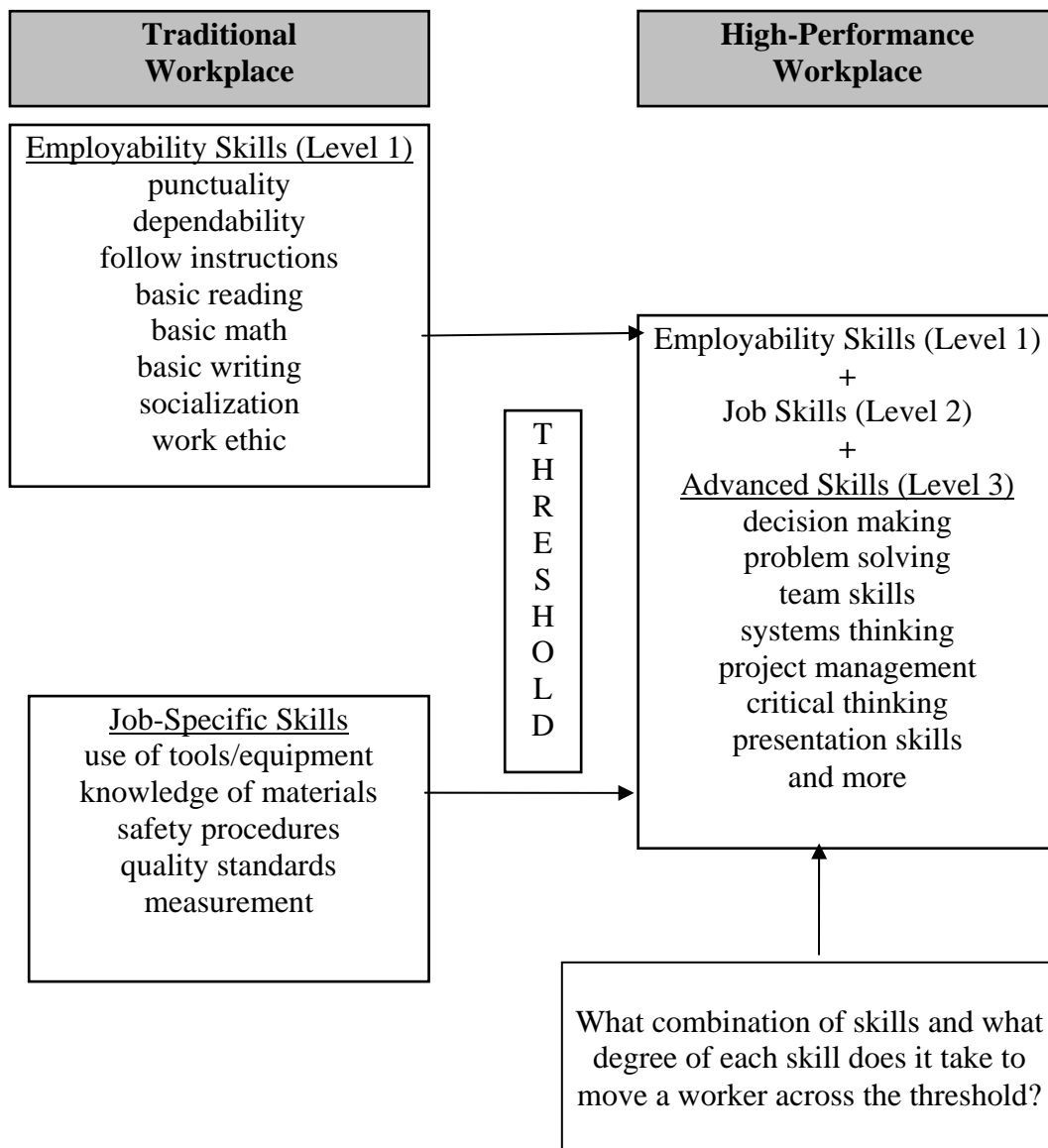


Figure 2. The threshold concept between traditional and high-performance workplaces.

primarily Level 1 and Level 2 Skills to possessing sufficient Level 3 Skills to be considered qualified to effectively perform in a high-performance/high-involvement work environment. The following examples show the diversity of opinion considering which skills are needed in the workplace and their relative importance.

During the last twenty-five years, there has been a constant expansion of the meaning of workplace literacy that reflects the changing workplace and economy. A 1999 publication by the Interagency Coordinating Council notes that the definition of job literacy has been expanded beyond reading, writing, and computation to include the skills needed to acquire self-sufficiency; obtain, maintain, and advance in employment; and contribute to the well-being of families and communities.

Stasz, McArthur, Lewis, and Ramsey (1990) defined generic skills as part of their study of vocational education programs that claim to develop such skills through their programs. They discerned two basic categories: basic or enabling skills (ranging from reading and simple mathematics to “life skills,” which could be reading a schedule or filling out an application) and complex reasoning skills such as problem solving, critical thinking, knowledge acquisition, an analysis. The latter closely mirrors the Level 3 Skills of this paper.

The Pennsylvania Department of Education, Bureau of Adult Basic and Literacy Education (ABLE), presents a skill set represented as a circle with Basic Employability Skills and Basic Workplace Skills as segments of the circle (Adult Basic and Literacy Education, 1999). Details on each of the skills is provided in an

accompanying publication, *Foundation Skills: Framework for Building Pennsylvania's Workforce* created in 2000.

Another skill set compiled by the Pennsylvania Workforce Improvement Network (PAWIN), under the auspices of the PA Department of Education identifies three segments of worker lifelong learning: basic workplace skills, basic employability skills, and basic organizational skills. For the most part, the workplace skills of the PAWIN model are a combination of the Levels 1 and 2 Skills of this study. PAWIN lists them as entry-level reading, writing, and mathematics, speaking, and listening, but also adds observe critically, locate and use resources, and use technology.

Many of the skills that PAWIN considers Basic Employability Skills, this study classifies as Level 3. These items include work in teams, solve problems, make decisions, demonstrate effective self-management strategies, and demonstrate interpersonal relations. PAWIN's Basic Organizational Knowledge is comparable to the Level 2 Skills referenced in this study. The difference in the classification systems is explained by the degree to which the skill is manifested. For example, the PAWIN concept of teamwork is a less sophisticated version than that expressed by the self-directed work team concept. As such, teamwork within the PAWIN model serves as an preliminary movement toward the Level 3 concept of team skills.

Regardless of the exact classification, it is important to note that in general the elements are similar. There is agreement that the needed skill set consists of a diverse and demanding variety of capabilities whose exact composition is determined

by the requirements of the specific workplace. These preliminary attempts at skills classification establish a precedent for building a high-performance workplace skill set.

One of the challenges for researchers examining high-performance workplaces is the lack of a definitive, universally accepted list of the skills and practices that characterize such workplaces. Cappelli and Rogovsky (1994) attempted to resolve this issue in a study designed to identify the skills needed by workers in high-performance work systems. They interviewed 561 workers in ten U.S. public utilities using the criteria of employee empowerment and participation in decision making, teamwork, job rotation/cross-training, and supportive personnel practices (pay, training, socialization programs) to provide operational definitions for the study.

The workers were asked what skills they used to improve their performance and the extent to which they used work practices associated with high-performance systems. The first five questions were from the Job Diagnostic Survey, one of the standard instruments used to measure whether the tasks that individual workers perform are “enriched” in the behavioral tradition practices of autonomy, variety, significance, feedback, task identity, decision making, and teamwork. Each assessment of work practices was broken down into “high” and “low.”

The authors presented the statistical results of their study by comparing the high and low scores; but the scores were not that much different. Using data from a 1 to 5 Likert-type scale, they reported spreads of only 0.13 at the most. Even though

Cappelli and Rogovsky claim statistical significance (at $p < 0.1$ through $p < 0.05$ levels) for the results, the close comparisons raise the question of practical significance.

Efficacy of HP Practices

The test of any workplace innovation is whether or not it produces results that are valuable to the organization (Lawler, Mohrman, & Benson, 2001) and to the workforce (Handel & Gittleman, 1999). As stated earlier, an organization seeking to redesign its work environment can choose between several competing, and often contradictory, management theories. It can adopt the low-skills/low-wage approach, the command-and-control approach, the lean manufacturing approach, or the high-performance approach, among others. Whichever one it chooses, the assumption is that the decision will enhance the competitive position of the firm. Since there is risk associated with any of the approaches, the firm needs assurance that the investment in any of the workplace innovations has reasonable expectations of yielding the desired results.

The straightforward question becomes, do HPWPs work to the benefit of all involved? During the 1990s, there was little systematic study of the outcomes of HPWPs. There was much anecdotal enthusiasm for the processes, but it lacked objectivity and quantification. One popular conclusion was that the practices were neither widespread nor did they penetrate deeply into the total work forces of most organizations. Numerous studies, as reviewed by Bailey (1997), have attempted to estimate the usage of high-performance practices in American industry. The

conclusions range from five percent to over fifty percent of responding companies have adopted one or more of the practices. The problems are determining how many of which practices must be utilized to consider an organization high-performance and what proportion of the workforce must be included. The literature at this time does not offer a conclusive statement about the extent of high-performance practices.

Following are the results of studies that have been conducted to test the efficacy of high-performance techniques. Efficacy in this regard encompasses both the attainment of organizational goals and the full engagement of employees.

One of the essential measures of alternative work arrangements is the degree to which they address the social needs of the employees. Godard (2001) states that the literature on work design shows higher motivation and work commitment on the part of employees whose social-psychological needs are fulfilled. In his study he distinguishes between the experience of work (psycho-social) and the outcomes of this experience (attitudinal and behavioral) for the worker. Using data from a 1997 telephone survey of 508 employed Canadians, the author considered the effect on workers of alternative work practices (AWPs) associated with the high-performance model. The study sought to determine if the implications for workers of these AWPs were essentially negative or positive.

In a balanced workplace, both the employer and the employee benefit proportionally from the collective effort, but establishing this balance in organizations is difficult; inequities, both actual and perceived, are common. Godard suggests that AWPs may offer a “trajectory” (an apt term) that both improves the quality of

working life for the employee while simultaneously producing gains for the employer. Research findings, though, have been mixed according to Godard. Both opponents and proponents of alternative work practices offer research to support their positions.

For his purposes, he divided AWP into “on-line” and “off-line” effects. On-line indicates those innovations applied to the actual design of team-based system and include items like team autonomy, responsibility, multi-skilling, and job rotation. Off-line issues address employee participation, such as meetings, problem-solving, and joint steering committees. The concept of “organizational citizenship” is important to Godard, successful AWP increase the extent to which employees are willing to engage in behavior not required by their job and not directly rewarded but of value to the organization.

The results of Godard’s study present some interesting and perplexing statistics, the correlations are not strong in magnitude even though they are positive and statistically significant. The on-line AWP “team-based work” had positive correlations with Belongingness (.28), Task Involvement (.16), Empowerment (.18), Job Satisfaction (.20), Self-esteem (.08), Commitment (.10), and Citizenship Behavior (.22). These represent the highest scores recorded in the study and tend to reinforce the benefits of the socio-technical workplace model. All the results except for Self-esteem and Commitment were statistically significant at the .01 level. Team-based work appears to have highly positive implications for employees. But the

results for Team Autonomy and Responsibility are contrary to what proponents of AWP and high-performance expect. These results indicate that although team-based work has positive effects, these effects may be diminished by the introduction of team autonomy and responsibility for a specific product. Godard's conclusion is that a curve exists for the degree of positive implications for the new work practices and that this curve peaks fairly early in the implementation process. His explanation for this curve is an increase in stress imposed by empowerment and task involvement. He acknowledges that his findings run contrary to popular assumptions about HPWPs, but allows that the observed negative effects may result from the companies in the study failing to adopt the necessary HRM policies that ensure workers can cope with the high levels of stress associated with increased responsibilities.

Ichniowski, Shaw, and Prennushi (1997) investigated the effects of innovative employment practices within seventeen steel companies. They underscored the synergistic effects of clustering the practices. In their study they identified the most common combinations of practices in the production lines as follows: System 1, the most advanced system, included all seven of the innovative practices (incentive-based pay, extensive screening for new hires, off-line training in technical skills, problem solving teams, job rotation, information sharing, and an implicit employment security pledge); System 2, this system exhibited four of the practices, teams, labor-management communication practices, extensive skills training, and higher levels of worker involvement in teams; System 3, this system had only two specific innovative

practices, teams and labor-management communication practices, and System 4, a final system that was a traditional system with no innovative practices.

Field interviews at the seventeen companies produced 2,190 observations that were analyzed by correlations and regression. The researchers paid particular attention to intercorrelation, complementarities among the practices, which is consistent with the declared interest in clusters of practices.

The data showed that systems (clusters) of innovative practices positively affect productivity and quality, while implementing work practices on an individual basis has little effect. The productivity coefficients for System 1, containing all the innovative practices exceeded the scores of the other three systems in all categories. The most extreme differences were associated with “high participation” practices (System 1 = 0.095; System 4 = -0.023), “job rotation” (System 1 = 0.084; System 4 = -0.021), and “information sharing” (System 1 = 0.077; System 4 = -0.003). All the System 1 scores were significant at the 0.01 level. The results emphasize the importance of adopting these workplace practices as clusters, and may help explain why such efforts fail in companies that introduce the practices in a piecemeal fashion.

Wagner (1994) compared the results of eleven articles on relationships between employee participation and performance or satisfaction. The conclusion of this meta-analytic replication review was that participation can have statistically significant effects, but the average size of these effects is small enough to raise concerns about practical significance.

The author finely tunes the definition of “participation” as a process of influence sharing. He distinguishes it from delegation (in which the manager relinquishes all influence) and consultation (in which subordinates are involved in idea generation but excluded from involvement in final idea selection). He also makes a distinction between participation and other approaches that involve influence sharing but are more sweeping in process or intent. Such processes are labeled “multivariate” since they contain simultaneous changes in several organizational variables. Included in this list are job enrichment interventions, socio-technical redesign procedures, and quality of work life programs. “Participation,” for Wagner, “is a process in which influence is shared among individuals who are otherwise hierarchical unequals... participatory management practices thus balance the involvement of managers and their subordinates in information-processing, decision-making, or problem-solving endeavors” (p. 312).

Positive associations between human resources management (HRM) practices and perceptual firm measures were found by Delaney and Huselid (1996) among 590 for-profit companies. Their findings were from the National Organizations Survey (NOS), a special module of the General Social Survey (GSS) conducted in 1991 by the National Science Foundation. The NOS surveyed a representative sample of U.S. work establishments about their structure, context, and personnel practices. The researchers used multiple regression to examine the individual and joint effects of the HRM practices. The authors considered employee participation, empowerment, job design, team-based production systems, employee training, and performance-based

incentive systems as characteristics of progressive human resources practices that are believed to improve organizational improvement.

Delaney and Huselid formulated two hypotheses. Hypothesis 1 was that progressive HRM practices will be positively related to organizational performance. Hypothesis 2 was that complementarities or synergies among progressive HRM practices will also be positively related to organizational performance.

The two dependent variables of their analysis were organizational performance (quality, customer satisfaction, new product development) relative to similar organizations over the past three years and (for profit-making organizations) the market performance (profitability and market share) of the company relative to competitors. The measures were relative (benchmarked) in the sense that they were derived from questions asking informants to assess organizational performance relative to the performance of industry competitors.

Seven independent variables were utilized: staffing selectivity, training, incentive compensation, grievance procedures, decentralized decision making, internal labor market, and vertical hierarchy. "Taken as a whole, these seven items provide a reasonably broad reflection of the progressive HRM practices that have been identified in the literature" (Delaney & Huselid, p. 955). In order to acknowledge that there are other factors that can influence the adoption of HRM practices and organizational performance they established several control variables. These were subsidiary status, log of total employment, firm age, market competition, product, service, and union/non-union status.

In the results, Delaney and Huselid reported the results for the control variables, perceived organizational performance, and perceived market performance. The correlation between the two dependent variables was .51; the relationship between the HRM practices and perceptual performance measures was generally positive (11 of 14 correlations). The magnitude of the correlations was small to moderate. Associations among HRM practices also tended to be positive (19 of 21 correlations). Five of the seven HRM practices coefficients were positive and significant (the exceptions being internal labor market and staffing selection)

In conclusion, they note that the overall model was always significant, and joint-F tests indicated that the HRM practices jointly explained a significant amount of the variance in perceived organizational performance. The findings are consistent with Hypothesis 1, HRM practices are positively associated with perceptions of performance. Their results do not support the assertion in Hypothesis 2 that complementarities among HRM practices enhance firm performance. This differs from the conclusions of Ickniowski et al (1997) and others.

Varma (1999) conducted a survey to examine the antecedents, the design, and the overall effectiveness of initiatives to improve the financial and operational performance of organizations. According to Varma, four pieces of organizational architecture need to be highly integrated for efficiency and effectiveness: information, technology, people, and work. High-performance work systems (HPWS) attempt to find the best fit among these components, rather than merely inserting employees into

an existing framework. He concluded that organizations need to completely overhaul the way they do work if they want real and tangible results from their reform efforts.

While the results of Varma's study indicated that HPWSs can have beneficial outcomes, the response rate was extremely small, only 39 out of 1,500 organizations responded. Based on this sample, the researcher arrived at these conclusions: there was significant improvement in the competitive advantage position of the firms; before the implementation of high-performance practices the competition score was $m = 2.81$ (on a five-point scale) with $s.d. = 0.93$. After implementation, this increased to $m = 4.07$, $s.d. = 0.70$. There was a positive cultural change, employees reported significantly higher levels of job satisfaction. Regression analysis revealed that this job satisfaction had a positive impact on both financial performance ($F = 8.98$, $p < .01$) and operational performance ($F = 8.23$, $p < .01$) for the firms.

A relevant study from the service sector was conducted by Zamanoiu and Glaser (1994). They examined the feasibility of changing organizational culture by increasing employee involvement. This was a longitudinal empirical study of a communication intervention program designed to change a governmental organization from a hierarchical structure to a participative one. This cultural shift was triangulated through the use of questionnaires, interviews, and observations. Subjects completed the Organizational Culture Scale (OCS) twice over a two-year period. The OCS is a 5-point Likert-type scale (strongly disagree to strongly agree) that includes 31 items belonging to six subscales. The six subscales are: teamwork, morale, supervision, involvement, information flow, and meetings. The results of the

OCS provided a quantitative description of the culture of the organization which, when combined with qualitative measures, provide an examination of the depth of the culture. The post-intervention results were statistically analyzed and compared to the pre-intervention data. The organization changed significantly in information flow, involvement, morale, and meetings.

Zamanoiu and Glaser's hypothesis was that ratings at Time 2 (after the intervention) would be significantly higher than those at Time 1 (pre-intervention) in all six subscales of the OCS. The study was conducted on a six-division county department in the Pacific Northwest and included 322 employees from every level. The OCS was administered and the subjects interviewed twice within two years. Two hundred and forty three responded in Time 1 and 190 responded in Time 2.

In their discussion, Zamanoiu and Glaser state "the findings of the present study suggest that organizational cultures can be managed, and that this change may have a positive impact on employee morale and the quality of service provided to customers" (p. 497). They reported that members at all levels learned skills in active listening, giving and receiving praise and criticism, raising difficult issues, and clarifying misunderstanding that resulted in positive gains for the organization.

Coye and Belohlav (1995) used Lawler's conceptualization of employee involvement to examine programmatic participative management efforts within Fortune 1000 firms. The four critical processes that influence participation according to Lawler are information sharing across levels, training in specific operations and general organizational issues, decision making across all levels, and the types of

rewards used within the organization. Three issues are covered: what levels of involvement (degree of power sharing) do they represent? What employee involvement processes are used? How widespread (horizontally and vertically) are they?

Null Hypothesis 1 was that the number of participative management programs would not be significantly related to the level of employee involvement within an organization. Null Hypothesis 2 was that the level of participation in participative management programs would not be significantly related to the level of employee involvement within an organization.

The questionnaire was mailed to the 500 largest manufacturing and 500 service companies as defined by *Fortune* magazine; 326 useable responses were returned. The independent variables were operationalized versions of Lawler's four characteristics of high involvement organizations. Two measures of participative management effort were used as dependent variables: the number of participative management programs within an organization, the extent of employee participation within each of the programs.

An intercorrelation matrix of Coye and Belohlav's results revealed no strong linear relationship among the independent variables. Regression analyses revealed that information sharing and training were significantly related to both of the dependent variables. On the basis of their findings, Coye and Belohlav rejected both the null hypotheses.

Handel and Gittleman (1999) used the Survey of Employer-Provided Training for 1995 (SEPT95) from the Bureau of Labor Statistics to address the question of whether or not workers in establishments with innovative practices were paid more than their counterparts at traditional firms. Their general conclusion is that, in most cases, high performance work practices do not raise workers' wages. These findings, which even the authors acknowledge are unexpected, do not deny that firms adopting innovative practices have better performances, the findings appear to say that the benefits of these improved performances do not pass to production workers in the form of increased wages. The researchers offer the possibility that the new work practices may result in intangible benefits for the workers such as greater dignity of work or more intrinsically interesting tasks.

High-performance/high-involvement practices affect not only the company but the employees. The influence of such practices on wages and on employment stability was the topic of a study by Black, Lynch, and Krivelyova (2003). They used the Educational Quality of the Workforce National Employer Studies (NQW-NES) of 1993 and 1996 to test their hypothesis that innovative workplace programs are likely to benefit manufacturing workers because they anticipate a share of the gains. The NQW-NES surveyed seven hundred establishments nationwide.

The findings, which are consistent with Handel and Gittleman's, were that wages in high-performance firms are higher, but especially for managers, supervisors, and technicians. The pay of the production workers was unaffected except for those production-level employees in unionized firms that have adopted high-performance

practices. The explanation for these results may be in the sample, in the time period in which the survey was conducted, or by what the authors refer to as “data quality issues”. This situation may have altered in the intervening eight years since the surveys were taken.

Their conclusion on the association between high-performance practices and reductions in employment is that it is a “mixed picture” with both negative and positive effects. Black, Lynch, and Krivelyova cite self-managed teams as associated with employment reductions and job rotation as stabilizing employment. This study contributes to the inconclusiveness of our knowledge of the dynamics of innovative work systems.

Teams in the HPWP

High-performance workplaces rely on work teams to enhance worker contribution. According to Manz (1992), they are typically introduced with the objective of improving productivity for the organization and quality of working life for the employee. In fact, teams, along with empowerment, are key indicators of high-performance work environments (Morley, 1995). The teams normally associated with HPWPs are problem-solving teams and one of the forms of self-directed teams. Informal teams, traditional supervisory-oriented teams, and leadership teams (steering committees, advisory councils) are associated with other work structures (Huszczko, 1996).

The proliferation of teams is part of a logical response to the changes taking place in organizations. While teams have been used in industry for decades, it is the shape and practice of the team that is different within the HPWP. Teams, in the most basic sense, have long existed in the American workplace in the form of crews that poured steel in mills, assembled engines in locomotive shops, and performed a thousand other tasks that required cooperation. But in these cases the task was the objective and the “team” only a tool to achieve the end. As has been discussed earlier, the crucial determinant is the treatment of power within the organization. Teams with power, empowered teams, are critical to the existence of a true HPWP. Brown (1994) asserts that as teams move upward in the power continuum that it is not until they attain the self-directed level that a surge occurs in performance. Until that point, true power has not shifted and much of the advertised “empowerment” is mere tokenism.

As the number of middle managers decreases, the essential functions these managers performed still exist. Since some of these residual duties are delegated to employees, the issue becomes how to ensure that these duties are executed properly? The answer is teams. In *Tools for Team Excellence*, Huszco (1996) lists the benefits of teams to the organization as a source of stimulation for employees, of high-quality solutions by employees, of involvement, of satisfying belongingness needs, of an opportunity to develop leadership skills, of improved productivity, and of generating interdependence.

In the same way that “high-performance” has multiple definitions, team terminology is used in seemingly contradictory ways. Fisher and Fisher (1998) write

that “while some managers used the word team to describe a participatory workplace, others use same terminology to reinforce the traditional autocratic paradigm” (p. 41). They then offer the definition of teams as work structures with responsibility for decision making, problem solving, and organization design. They are based on commitment as opposed to control, and compared to traditional structures rely on empowerment rather than management direction.

Work teams are characterized by Sundstrom, DeMeuse, and Futrell (1990) as interdependent collections of employees who share responsibility for specific organizational results; they typically produce whole products and exhibit interdependence among members. Such teams have complex interpersonal processes that revolve around norms, cohesion, and roles; these, in turn, are affected by leadership, communication, and groupthink. These teams usually fall somewhere along an imaginary continuum from external control to self-management (Banker, Field, Schroeder, & Sinha, 1996; Manz, 1992). Teams may take the form of work teams or project teams, with either having responsibilities for scheduling work assignments and time off, hiring, peer performance assessments and problems, safety, maintaining equipment, and coordinating with other work teams (Fisher, 1993; Hackman, 1986; Scholtes, 1991).

Thompson (2000) describes teams as an interdependent group which shares information, resources, and skills in a combined effort to achieve a common goal. Five key defining features of teams are presented by Thompson : teams exist to achieve a shared goal, team members are interdependent regarding some common

goal, teams are bounded and stable over time, team members have the authority to manage their own work and internal processes, and teams operate in a social system context (p. 2).

There are basic competencies required by team members. The following is a composite list from several sources: ability to learn, problem solving skills, initiative, communication skills (including presentation skills), interpersonal skills, conflict resolution skills, project management skills, needs assessment, data collection and interpretation ability, consensus building techniques, strategic thinking, and process knowledge (Fisher, 1993; Fisher & Fisher, 1998; Huszco, 1996; Wellins, Byham, & Wilson, 1991). Many of these are included in the list of skills needed for the HPWP, which is not surprising since teams are the arena in which much of the HPWP work gets accomplished.

“Teamwork skills are critical for improving individual task accomplishment at work because practical innovations and solutions are reached sooner through cooperative behavior.” (Carnevale, Gainer, & Meltzer, 1990, p. 32). This ability of members within teams to learn together is sometimes referred to as “working smarter.” Thus, the ability to perform within a team environment, which is very different from an employee being accountable only for their own performance, becomes a necessary employee attribute.

The trade-off for organizations and employees in exchange for the desired benefits of a team arrangement is an increase in complexity, dynamics, and skill qualifications (Thompson, 2000). Part of the dynamics are the re-distribution of

power, roles, status, and the like within the organization. A team structure severely disrupts the alleged stability of the command-and-control architecture as hourly employees, supervisors, and managers have to work out new relationships, communication networks, information sharing processes, etc. For the employees, participating in a team means having to acquire new skills along with new ways of thinking and behaving. It also means accepting the kind of responsibilities that only managers previously administered.

The historical roots of teams in the workplace are usually traced to the origins of the Socio-Technical Systems Theory from the 1950s research at the Tavistock Institute. Since that time, the investigation has focused on the best work arrangement to capitalize on the synergy of groups. This stands in direct contrast to the assembly line version of work where each employee performs a specific task in isolation from other workers. The evolution of the team concept has led to quality circles, work groups, manufacturing cells, and SDWTs. The importance of teams to their proponents is the way in which they concentrate creative energy and unify efforts at the same time that they encourage ownership and commitment.

Socio-Technical Systems Theory states that organizational productivity is comprised of both technological and social strands. Therefore, any long-term successful work design has to recognize both. In this concept, the worker's psychological needs are just as important as the requirements of the task being done. The SDWT model incorporates and capitalizes on this theory (Glaser, 1991). Glaser asserts that the transition from a traditional work group to a self-managing team is a

learning event of major proportions. Musselwhite and Moran (1991) expand on this thought by noting that team members must master a wide range of new technical, interpersonal, and administrative/supervisory skills to accomplish the goals before them. To fully appreciate what this means is to appreciate the vast difference between traditional and emerging workplace cultures. Peer reviews, a common practice in self-managing teams, is a notable example of the sort of advanced responsibilities team members are expected to execute.

Currently, these self-directed work teams (also known as self-managed teams, self-initiating teams, high-performance teams, autonomous work groups, self-maintaining teams, and self-leading teams) are at the pinnacle of the cooperative work arrangements (Glaser, 1991). Musselwhite and Moran (1991) define a SDWT as a group of highly trained employees who assume full responsibility for a defined segment of the production/service process within the context of the total process. They not only manage their segment of the process, but they manage their own performance on a day-to-day basis, independent of direct outside supervision. The workers are cross-trained, have authority for the work and process, and have access to relevant information. They are rewarded for their performance through base pay and team compensation systems. “This structure is almost the direct opposite of the classic assembly line where people do only a narrow piece of the overall work and rarely see the complete process, the final result, or the big picture” (p. 13).

In high performing work settings, self-directed teams are a permanent part of the way the business is managed on a day-to-day basis. Therefore, both the initial and ongoing training for team members is crucial.

Morley's (1995) study related team participation with empowerment. He assessed the impact of work teams (as affects empowerment) on job satisfaction. This empowerment is achieved through the balancing of autonomy with a group-based work structuring approach. The intent was the development of a highly skilled, coordinated, committed workforce coupled with a leaner, flatter organization.

The study included three basic research questions: (1) does high performance job restructuring, dedicated to the introduction of a team approach to work structuring, and characterized by a broad nonsegmentalist approach to work, with broad job definition and high skill variety and feedback on performance, result in job characteristics and satisfaction improvement? (2) Does high-performance job restructuring result in a modification in an organization's culture and beliefs system? (3) Does high-performance job restructuring impact on the bottom line? In this case, the criteria of quality and productivity were used as measures.

This research was set within a high-tech manufacturing facility. One selected area was reorganized into teams of six to fifteen members across production boundaries. Team responsibilities included work scheduling, material ordering, inspection, and quality control. A modified version of the Job Diagnostic Survey was used to collect information on employee perceptions of job characteristics, including

autonomy and general satisfaction. Culture and belief were measured using Shaskin's Organizational Beliefs instrument.

The study revealed positive results in work characteristics and satisfaction. Work variety, autonomy, feedback on performance, satisfaction with suggestion/idea input improved significantly ($p \leq 0.001$). With respect to culture and belief changes, six of the nine dimensions improved (belief in the importance of having fun through one's work, belief in the importance of people as individuals, in superior quality and service, of economic growth and profits, of hands-on management, and of a recognized organizational philosophy). The three that remained unchanged were a belief that people in an organization should be innovators and should take risks without being punished, in the importance of attending to details in doing a job, and in the importance of informality to improve the flow of communication the one dimension less evident is the belief in being the best at what the company does.

Morley concluded that "members of the high performance work teams report[ed] a significant increase in work variety, autonomy, and satisfaction with feedback on performance, with work allocation, and with suggestion/idea input" (p. 61). Further, the high performance job restructuring intervention, aimed at creating a better 'person-environment' fit, had not only resulted in job characteristics and satisfaction changes, but had also produced a cultural and belief shift in the area.

Banker, Field, Schroeder, and Sinha (1996) reported the results of a longitudinal field study examining the impact of work teams on manufacturing

performance. The results showed that both quality and labor productivity improved over time after the formation of the teams. They empirically examined and documented the impact of work teams on manufacturing performance over time in a natural setting. This was a naturally occurring experiment of conversion to high-performance work teams since during the course of the study no other interventions were undertaken in the plant that would have affected performance outcomes.

Like Fisher and Fisher (1998), they created a team autonomy continuum running from low team autonomy to high. Banker, Field, Schroeder, and Sinha offer a definition of high performance work teams (HPWTs) that is different from that encountered in most of the literature. The essential differences in their definition are that membership is mandated by the management, not voluntary, and teams are not cross-functional. The first qualification could have an adverse effect on the commitment dimension. (Although, this enforced membership may be unavoidable in certain work situations such as cellular manufacturing arrangements.) The second restriction could affect effectiveness.

The researchers employed two statistical models in order to examine the impact of HPWTs, a fixed-effects model and a “seemingly unrelated regressions model” (the researchers’ term). The latter model allows the coefficients of the independent and control variables to differ by production line while recognizing relationships across the lines.

The locale of the 21-month (1992-1993) study was a unionized manufacturing plant within a division of a Fortune 500 firm. Each of the four HPWTs involved

consisted of production workers from the line as well as the production engineer assigned to the line, the production planner, and the plant manager, along with a facilitator. Qualitative information (meeting logs, interviews, training documents) was collected with an emphasis on issues of participative decision making, trust, and conflict. The teams received extensive training in a variety of group dynamic and problem solving topics. As a gesture toward empowerment, the teams were authorized to implement process improvements costing less than \$200.

Quality (manufacturing defect rate) and labor productivity (ratio of the number of units produced to total production hours) were the dependent variables. The two independent variables were postteam time trend and the impact of HPWTs over the time of the study. Control variables included overtime, headcount additions/deletions, product diversity/complexity, capacity utilization, engineering changes. These latter were things that could have affected productivity independent of the team initiative manufacturing performance, quality, and labor productivity.

The results showed a correlation between the logarithm of manufacturing defect rate and the post-team time trend that was negative and statistically significant at the 1 percent level (there was a 38% reduction in the defect rate). The correlation between the logarithm of labor productivity and the post-team trend was positive and significant at the 5% level (representing a 20% improvement). These results support the arguments of those who favor the participation/team work arrangement. The teams observed were still functioning effectively when the authors revisited the plant a year and a half after the study.

Team building can be an arduous exercise. A study of 134 teams in 88 companies by Tippett and Peters (1995) indicated that overall companies are doing a poor job of developing teams. Thompson (2000) listed the potential problems associated with team building as the prolonged learning curve for members, conflict resolution, lack of management support, inappropriate composition of teams, unrealistic expectations, the culture of the parent organization, and complex team dynamics.

Employee Empowerment in the HPWP

Empowerment is another keystone of the high-performance/high-involvement concept; as with teamwork, the degree of empowerment distinguishes these workplaces from traditional environments. Empowerment means that employees at the lowest hierarchical levels have the right mix of information, knowledge, power, and rewards to work independent of upper management control. Empowered employees see themselves as integrated into the key political channels for getting work done in organizations (Spreitzer, 1996). The appeal of empowerment is that it encourages employees to contribute ideas to the organization that would not necessarily be offered in a traditional environment (Herrenkohl, Judson, & Heffner, 1999; Paul, Niehoff, & Turnley, 2000).

Foster-Fishman, Salem, Chibnail, Legler, and Yapchai (1998) define empowerment as “the process of gaining influence over events and outcomes of

importance to an individual or group... empowerment theory assumes that empowerment takes on different forms for different people” (p. 508). The recurrent themes in the empowerment literature, according to these authors, are access to information and resources, sociopolitical support, opportunities for autonomy and control, and the ability to influence organizational decision making (p. 528). Thus, empowerment can vary in form across time and setting; not all persons in the same situation desire the same degree of empowerment. This individualized and dynamic complexity creates a significant challenge for those interested in empowerment research and interventions.

Many empowerment theorists have observed that empowerment takes on multiple forms across people, is contextually embedded, and shifts over time. Foster-Fishman et al.’s (1998) exploratory case study provides empirical support for these three critical assumptions of empowerment theory. The article chronicles the empowerment experience of 49 employees within a human service delivery organization. At the time of the study the organization was involved in an extensive empowerment initiative using a participatory, strategic planning process; the intent was to increase workers’ influence over the decision making process through an inverted pyramid model. In addition, managers were encouraged to adopt a more participatory management style, encouraging autonomy and the delegation of more decision-making responsibility to their employees.

A constructivist investigative approach was used. Empowerment emerged as a dynamic, highly individualistic, contextually layered process. Three questions are

explored by Foster-Fishman et al. (1998): (1) what are the multiple forms of empowerment experienced by employees within one organization? (2) what are the multiple contexts that shape empowerment within one organization and how does empowerment differ across these contexts? (3) how does empowerment's dynamism manifest itself? The researchers used a triangulated method that included phenomenologically driven interviews, observation, and an archival data review. The phenomenological approach attempts to minimize deductive reasoning and the influence of the researcher on the discovery process.

Six distinct pathways to employee empowerment were discovered in this study: (1) opportunities for job autonomy (2) freedom to be creative (3) gaining job relevant knowledge (4) feeling trusted and respected (5) experiencing job fulfillment (6) participating in decision-making. The researchers concluded that "while the employees' experiences of empowerment could be categorized into the six pathways described, the actual processes that constituted these experiences were idiosyncratic and varied" (Foster-Fishman et al, p. 521).

The three objectives of Herrenkohl, Judson, and Heffner's (1999) study were to define employee empowerment, to develop a measure of the concept, and to examine the validity of the measure. To do this a 140-item measure was administered to 698 employees of a high technology company. The responses were factor analyzed and an 8-factor solution was identified as best representing the concepts underlying the responses. The eight dimensions were then used to differentiate among 28 work

groups as more empowered or less empowered. The researchers were able to correctly classify 60% of the cases using these criteria.

For this study, empowerment was a set of dimensions that characterizes an environment's interaction with persons in it so as to encourage their taking initiative to improve process and to take action. Four broad dimensions were considered: (1) shared vision, (2) supportive organizational structure and governance, (3) responsibility for knowledge and learning, and (4) institutional recognition. Under these four headings were 11 sub-issues: clarity of goals, responsibility for achieving goals, leadership, teamwork, risk taking, accountability to customers, problem solving, trust, communication, acknowledgment of accomplishments, and knowledge of rewards.

More empowered groups were described as solving real problems, needing little outside direction, seeking new ideas, acting independently, being confident about their abilities, and having positive interactions among members of the work group. Less empowered groups lacked these qualities. Thirty-five work groups were categorized with twelve groups (109 respondents) labeled more empowered and sixteen groups (367 respondents) labeled less empowered (seven groups, 186 respondents, could not be labeled).

The eight most significant factors were: fairness of the recognition system, clarity of company goals, response to risk taking, responsibility for quality, encouraging work in teams, responsibility for company success, decisions about work

processes, and responsibility for company problems (Herrenkohl, Judson, & Heffner, 1999).

Even though Spreitzer (1996) surveyed middle managers and not line workers in her study, her definition of and comments on empowerment are worth noting. She offers this definition of empowerment: “the intrinsic motivation manifested in four cognitions reflecting an individual’s orientation to his or her work role. The four cognitions are meaning, competence, self-determination, and impact” (p. 484). Meaning involves a fit between the requirements of a work role and a person’s beliefs, values, and behaviors. Competence refers to self-efficacy specific to work; a belief in one’s ability to perform work activities with skill. Self-determination is a sense of choice in initiating and regulating actions; it reflects autonomy over the initiation and continuation of work behavior and processes; making decisions about work methods, pace, and effort are examples. Impact is the degree to which a person can influence strategic, administrative, or operating outcomes at work. Various researchers argue that the four dimensions combine additively.

The influence of high-involvement systems on empowerment is both cognitive and motivational, according to Spreitzer. Cognitively, high-involvement systems enable employees to better use information and to understand how they can influence organizational activities. From a motivational perspective, “high-involvement systems facilitate employees’ trust in an organization and increase their sense of control, ego involvement, an identification with it” (p. 485).

In Spreitzer's study, six work unit social structural characteristics create a work context that facilitates empowerment: (1) low role ambiguity, (2) working for a boss who has a wide span of control, (3) sociopolitical support (endorsement or approval from or legitimacy granted by organizational constituencies and is typically gained from membership in organizational networks), (4) access to information, (5) access to resources, and (6) participative unit climate. Five factors were derived from the exploratory factor analysis of the items from the five social structural measures with multiple measures; these five factors explained almost 70% of the common variance (with a reliability of $\alpha > .70$). The results of the study were mixed and at times counterintuitive; for example, access to resources was not related to empowerment according to the data.

Barriers to the Adoption of High-performance Skills

Companies that want to make innovative changes in their core systems have three basic options: they can take a technology approach (which includes process redesign), an employee-centered approach, or a combination of the two (Appelbaum & Batt, 1993; Cappelli & Rogovsky, 1994). The technology approach is appealing in part due to the mystique of technology. During the past two decades, many observers have attributed much of the U.S. gains in productivity to the introduction of technology. In some ways, this approach is easier than the employee-centered approach since it bypasses, to a large degree, the often-difficult cultural change element of transformation. This approach obviously yields more benefits to the

company than it does to employees since it often is accompanied by downsizing of the workforce and job de-skilling.

While the appeal of the high-performance organization may be strong, the literature reveals many barriers to the creation of such constructs. The challenge can start with managers who may not want to invest in the training and development of workers for fear that they will lose them to other employers, or managers may not truly believe that the workforce is capable of the responsibilities bestowed on them in this arrangement. They may feel that workers trained in the old system may have a hard time adapting their attitudes toward work and workplaces (Department of Commerce, 1999). Rothwell and Sredl (1992) write of a resistance to change on the part of managers who have a classical notion of worker competencies. Gee, Hull, and Lankshear (1996) note there is the danger of widespread cynicism in the workforce, based on the idea that “fast capitalist practices are meant to ‘dupe’ the worker into working harder and longer for less reward—or at least with greater risk—in the service of elites who still formulate the basic vision in their own interests” (p. 31).

Boutwell (1997) expands on this thought by writing that there exists a long standing distrust of management by labor and labor by management. He refers to this as the dismantling of the tacit contract American executives had with their workers and with the American public, “thereby undermining much goodwill between themselves and their employees and customers” (p. 106). This is combined with the reluctance of managers to participate in, as they perceive it, the loss of power to subordinates (Kouzes & Posner, 1995).

Pil and MacDuffie (1996) were intrigued by the paradox between the empirical evidence that innovative work practices improve organizational performance and the resistance to adopting such practices. They found three key reasons why high-involvement work practices (the researchers prefer the terms “high-involvement” to “high-performance”) were adopted by some organizations more rapidly than by others. Their investigation concluded that a complex mix of factors influence the decision to adopt high-involvement work practices and that of these the drivers were (1) the presence of complementary human resource practices, (2) low levels of success with existing practices, and (3) organizational factors that reduced the cost of introducing the new practices.

Their data were derived from two rounds of surveys, spaced five years apart, from forty-three automobile assembly plants. The dependent variable of the study was the bundle of high-involvement work practices identified by the authors in a prior study. The independent variables were an index of human resources practices thought to be complementary to high-involvement work practices, flexible automation, two measures of plant-level productivity and quality, employee job tenure, company actions that reduce trust, and major product changeovers and significant new additions to the plants.

Pil and MacDuffie analyzed the means from matched-plant data. The most noteworthy shifts were in the High-involvement Work Practices Index (a movement of 34.6 to 46.9 on a scale of 0 = low use to 100 = extensive use of such work practices); percentage of employees on work teams (15.7% to 46.3% during the five-

year period), and percentage of suggestions implemented (38.2% to 50.8%). A negative finding was that during the study time frame, there was little movement in the responsibility for quality; on a scale of 1 = production workers are responsible for quality to 4 = specialists are responsible, the movement was only from 1.6 to 1.7.

Appelbaum and Batt (1993) contribute extensively to the list of barriers to skills acquisition and application. They note that the high cost of training, internal “turf” battles, short-term financial objectives which run contrary to long-range transformation, and resistance to change (both management, hourly employees, and unions) around the distribution of power deter companies from embracing the high-performance model. In addition, the adoption of such practices is often compromised by issues of role clarification, access to information, lack of firm models, and competition from firms that choose the low-cost, low-wage approach. When viewed in this light, the obstacles are daunting.

Two diametrically opposed themes compete in the literature concerning new skills acquisition within the manufacturing workforce. One underscores the desperate lack of basic skills training among the labor pool; the other, as is presented in this paper, is the equally desperate need to upgrade the skills of the workforce in response to the new competitive realities. The contradiction between these two is significant; how can workers who lack basic skills be expected to participate in a workplace that requires advanced skills? Obviously, the true state of any “skills gap” within the American workforce is a crucial consideration, an issue covered extensively by Stasz, Ramsey, Eden, Melamid, and Kaganoff in *Workplace Skills in Practice* (1996).

If it is the case, as stated in a recent American Management Association (AMA) survey (2000), that over 36% of job applicants lack the necessary basic skills (Levels 1 and 2) to perform at the jobs applied for, then how is this same labor pool going to provide workers for the more demanding high-performance environments? The high-performance strategy hinges on the belief that workers must and can acquire the requisite skills. The AMA best practices response to this dilemma is for companies to strengthen their training efforts, establish remedial training programs, and establish corporate citizenship programs to promote education.

The findings of the AMA study are supported by the results of the National Adult Literacy Survey (NALS) which found that 40 percent of the labor force scored at the two lowest levels (on a scale of five levels) of literacy proficiency while only 25% scored at the two highest levels. Workers in manufacturing had the lowest proficiencies. The results were based on a sample of 13,600 adults randomly selected to represent the adult population of the nation. The survey, which was funded by the U.S. Department of Education, had separate sections for prose, document, and quantitative literacy and measured ability to interpret the types of informational materials that people encounter in their daily lives (National Center for Education Statistics, 2000).

The NALS data raises questions as to the feasibility of instructing workers in high-performance skills unless they are first provided with remedial skills. According to the survey results, perhaps 10 percent of America's labor force can perform the following tasks consistently: interpret or compare views expressed in newspaper

editorials; construct bar graphs with given data, or calculate the cost of a catalog order. These are analogs to tasks the workers would be asked to do in high-performance work environment.

The NALS findings are reinforced by a 1997 survey by the National Association of Manufacturers. This study reports that 50 percent of member companies find their employees lack appropriate math, reading, and written comprehension abilities, and about half believe that their employees cannot read and translate drawings, diagrams, and flowcharts.

The contrasting point of view is the need for advanced, Level 3, skills. These Level 3 Skills are necessarily higher order reasoning skills that require an understanding of data analysis, group dynamics, organizational dynamics, critical thinking, and the like which supplement the advanced technical skills in the new workplace. Yet businesses are asking these advanced skills of workers who apparently lack the functional workplace literacy skills.

Fundamental institutional issues identified by Appelbaum and Batt (1993) also inhibit the move to high-performance. They claim that the very framework of the U.S. economy, its training system, capital markets, and labor law, is adapted to the old organization of production and does not provide appropriate supports for the emerging high-performance work systems. "Introducing public policy alterations to this framework is an important condition for transforming American firms into companies that can offer workers middle-class wages and still compete effectively in world markets" (p. 42). This theme is reinforced by Kerka (1995) who writes that

“the infrastructure still supports mass production, incentives keep managers focused on the short term and the bottom line, and many organizations remain more accountable to stockholders than to more broadly defined stakeholders (customers, employers, suppliers)” (p. 3).

McCaffrey, Faerman, and Hart (1995) raise the question of why there is such a discrepancy between the endorsements and adoption of participative methods, despite the strong arguments for them and their intuitive appeal? In their paper they argue that there are systemic reasons why many managers are saying one thing and doing another. They answer their question with the suggestion that the structures and attitudes impeding participative systems are usually more highly valued than the prospective gains from the system. This may be another way of saying that the status quo has a staying power that is hard to overcome. The realities of the workplace are that new ideas have to contend with factions, power struggles, personal agendas, and office politics. “In the United States, at least, participative systems are simultaneously appealing and exceptionally difficult to develop” (p. 605).

There are barriers to be overcome, but the advocates of HPWSs insist that the efforts are worth the reward. Gaining competitive advantage through the development of the workforce inevitably takes time to accomplish, but “once achieved, competitive advantage obtained through employment practices is likely to be substantially more enduring and more difficult to duplicate” (Pfeffer, 1995, p. 65).

Options for Level 3 Skills Acquisition

The acknowledgment of HPWP skills as essential workplace attributes is a recent development. As recently as 1990 Carnevale, Gainer, and Villet in the introduction to *Workplace Basics Training Manual*, referred to the “*movement* [emphasis added] toward more participative management as employers aggressively involve workers in decision making...” This movement indicates that a “new kind of American worker is being ordered up. This worker will be expected to have a broad set of skills that previously were required only of supervisors and managers” (p. 2). There has not been much time for the education and training delivery systems to adjust to the need.

The first stage of development is through the primary and secondary school systems. But even in 1987, before the emergence of the high-performance concept, the Hudson Institute observed that there may be a mismatch between the needs of business and industry and the workforce preparedness systems. According to the report, the amount of education and knowledge needed to make a productive contribution to the economy is ever increasing, with a direct connection between human capital formation and the speed with which the economy can grow. Jones (1997) continues this analysis, “Unfortunately, while the need is for ever more efficient education processes, too many of our elementary and secondary schools are designed around an age-graded assembly-line pattern derived from the ‘efficient factory’ model of the last century” (p. 19). To play their proper role in equipping students for the new economy, schools should reshape their curricula around world-

class standards reflecting employer needs. “It only matters that what is being taught is relevant to the world of work” (p.20).

Against the background of this constant revision of our paradigms, we assess the capability of our lifelong educational system to produce the required workers of the future. The argument is that managed change depends on clarity of vision about the nature of the change combined with the ability to inspire and mobilize people toward successfully implementing the change. Thus, employee development becomes a strategic issue in determining our national well-being. The cultivation of qualified workers is too important a matter to be left merely to chance.

Beyond high school, employers are the major source of employee training (ASTD, 1989). But there are other options that employees may access for skills acquisition. Carnevale et al (1990) identify eight sources of formal training that exist outside the workplace: colleges and universities, community colleges and technical institutes, vocational schools; professional, trade, and labor organizations; training industry, community organizations, tutors and private instruction (the researcher would expand this to self-directed learning), and the government. These can be used by current employees, entry-level employees, and prospective employees to attain workplace skills.

An important point about employer-supplied training that distinguishes it from general education is the job-specific nature of the content. “The employer’s interest in employee education and training is utilitarian. It revolves around the core concern that new information and skills be readily applicable to employee responsibilities in

the workplace” (Carnevale et al, 1990, p. 28). Lynch and Black (1998) in their study of employer-provided training arrived at a similar conclusion; they found a much lower incidence of training for topics that were portable between concerns, unless the employers could find some way to “capture” their investments in such training. This point is important because, in the case of high-performance workplace skills, the employer will support the learning of these skills only if they see a direct connection between the need for these skills and the strategic goals of the company. Without this justification, the skills that comprise this list may appear superfluous to the workings of the organization. In other words, the need for high- performance skills will only be apparent (and their expense justifiable) to firms that aspire to being high-performance workplaces.

There is a dilemma and a challenge in the development of the worker for the high-performance workplace. Simply stated, the literature indicates that the current workforce is not receiving the education/training it requires in the first two levels of workplace skills, and a high percentage of those in the labor market do not have adequate basic skills. This situation co-exists with a growing need to demand even more skills (Level 3) from workers. What we can learn about the ways in which workers who are already possess HPWP skills acquired those skills may tell us much about how to organize the development of future high-performance workers.

Current Studies

The topics of this study were the nature of the high-performance work practices and the acquisition of the skills employees need to perform within these practices. Traditionally, the emphasis of worker skills development has been on Level 2 task knowledge (welding, wiring, baking, etc.) along with the cultivation of Level 1 good work habits (attendance, appearance, reliability, etc.). Now we may have to consider a greatly expanded set of workplace skills, Level 3 Skills. Where in the educational-career development experience are opportunities for the worker to acquire these skills?

Several studies have been done that employed problem statements and methodologies similar to those in this study. The National Center for Research in Vocational Education (1996) conducted a study to improve understanding of skills as they are manifested in technical work and to understand how the institutional context affected the application of skills. As reported in *Workplace Skills in Practice*, the study focused on the three skill areas of problem solving, communications, and teamwork since, the authors reasoned, these are lacking in the workplace and require public policy action to improve them. Included in the findings were the observations that generic skills and dispositions vary with work context and employers have weak connections with education providers for supporting acquisition or development of workforce skills. These two ideas relate to the purpose of this study.

Osterman (1994; 2000) addressed two basic questions in his two-step study: Do high-performance work organizations continue to spread? and, Do productivity

and quality gains redound to employees' benefit? These are important questions for both employers and employees since the answers help determine the inclination to invest in the Level 3 Skills. If the high-performance practices are not spreading, it may indicate that the results from early adopters have not been encouraging. Therefore, there will be little incentive by employers or employees to allocate time and money to skills acquisition.

The data source used by Osterman for this study was a 1997 telephone survey that replicated and extended a 1992 survey. Design and definitional considerations included the number of practices that must be present in order for an organization to qualify as high-performance and what percentage of the employees of those companies must be actively included in the process. These are two important parameters since an organization could claim to be high-performance on the basis of having a small proportion of employees engaged in a few high performance practices.

Each of the telephone surveys polled a representative sample of American establishments that were in the private for-profit sector and had at least 50 employees. The 1992 survey response rate was 65% and the 1997 survey was 58%. Of the 806 establishments in the 1992 survey, 462 were reinterviewed in 1997; plus, an additional sample of 221 new establishments (representative of the 1992 participants) were selected.

The data show that the use of high-performance practices grew considerably in the years following 1992, with the only exception being the use of teams, which dropped from 41% to 38%. The use of problem solving groups grew from 27% in

1992 to 58% in 1997; job rotation went from 27% to 56%, and total quality management programs moved from 25% to 57%. Osterman suggests that the decline in teams may reflect the inherent challenge with this practice since teams “are the most difficult work innovation to implement and the one that is most likely to be disrupted by turnover and restructuring” (p. 186). After the 1997 survey, Osterman wrote that “when combined with the appropriate human resource policies, these innovative work arrangements did indeed produce high levels of output and quality than did more traditional systems” (p. 180).

His other two conclusions, though, were mixed. He noted in the first that high-performance work organization (HPWO) practices continued to spread in the 1990s despite the organizational turmoil engendered by restructuring. But his second conclusion was that these HPWOs do not seem to have lived up to their promise of “mutual gains,” given that they are positively associated with layoffs and have no relationship to pay gains.

This second point is disturbing to advocates of high-performance practices and casts doubt on the value of the skills training investment. In commenting on this finding, Osterman discusses the complexity of the issues that affect gross organizational performance; there are factors totally independent of innovative work practices that ultimately affect the implementation and sustainability of those practices. These factors include the micro- and macro-economy, changes in firm ownership, changes in the executive personnel, external pressures on the company,

changes in business models, and reorganizations. Any of these occurrences can neutralize the potentially positive effects of workplace innovations.

In another study Cappelli and Rogovsky (1995) surveyed workers and supervisors in several industries about the perceived importance of skills. The order of importance was problem solving skills, first; ability to work with others, second; communication skills, third, and ability to work in teams, fourth. These are topics that are included in this study.

Cappelli and Neumark (1999) conducted a study for the National Bureau of Economic Research which examined the question of whether or not high-performance work practices actually produced results. Their findings are that employee involvement practices, while raising labor costs, tend to point to positive effects. Cappelli and Neumark are cautious in their endorsement of high-performance practices, noting that they tend to benefit employees (through higher wages) while not harming a firm's competitiveness. They conclude that there is no net effect on labor efficiency (the combination of labor cost and labor productivity). The researchers make an interesting point in comparing performance at the individual level with performance at the organizational level. The first uses productivity effects (defined in the study as sales per employee), the second uses overall performance effects which includes the financial performance of the organization which is affected by many variables (like the ones in Osterman's conclusions), including the cost of labor. They pose, but leave unanswered, the question as to why strong relationships between practice and performance at the individual level do not necessarily aggregate up to the

organizational level. It may be similar to a situation where a microeconomic analysis of a firm and a macroeconomic analysis of the firm's industry sector yield contradictory conclusions.

The dependent variables as indicators of high performance used by Cappelli and Neumark included sales per worker, total labor costs per worker, and the ratio between the two (as an index of efficiency). While these are traditional indicators for organizational performance, they are not the only ones or necessarily the most appropriate. Even though financial returns are important, the monetary returns, especially over a short term, do not necessarily express the true value of workplace innovations. This is, in fact, a built-in obstacle to many well-intended attempts at workplace innovation; transformations that require time have to prove themselves on a schedule dictated by the quarterly and annual results mentality of most U.S. companies.

The National Center for the Educational Quality of the Workforce (EQW) conducted a survey that documented how employers satisfy their needs for skilled employees. It asked the questions "Is there a discernible advantage for American firms either to hire workers with more education or to educate their current workers?" and "When employers invest in training, what kinds of instruction do they provide and from whom?" It further poses the questions of how willing employers are to invest in employee skills, what their current and future skill needs are, and to what extent they rely on schools to supply these skills to prospective workers. The results

of this study provide “a baseline from which to document the practices and expectations of employers in their search for a skilled and proficient workforce” (EQW, 2002). This speaks to one of the research questions of this study since it queried managers and owners of over 3,000 firms about their employment, training, and hiring practices with the intent of relating their responses to the firms’ productivity. While the EQW research offers some interesting connection between school-to-work programs and the tendency of companies to use high-performance work systems, it does not explain whether the students brought the necessary skills to the workplace or were only better prepared to learn the skills once in the workplace. There is a difference between the two.

Of particular relevance to this study is the EQW’s conclusion that the use of high-performance work systems remains the exception rather than the rule among businesses. They report that despite the considerable attention given to HPWPs, only 12 percent of the workers covered in the survey participated in self-managed teams. They did report that 54 percent of workers participate in regularly scheduled meetings to discuss work-related issues.

The Policy Information Center (part of Educational Testing Service) compiled a 2000 report titled *What Jobs Require: Literacy, Education, and Training 1940-2006* using BLS/Census statistics on employment by occupation, the National Literacy Study (NALS), and the Position Analysis Questionnaire (PAQ). The main purpose of the study was to generalize the knowledge requirements for occupations and project these into the future.

While this report does not directly address the concept of high-performance workplaces, its conclusions suggest that jobs that are increasing in number have substantially higher language, math, and reasoning requirements than jobs that are declining. In the jobs that are declining (which includes the manufacturing sector), the researchers assert that the skill levels are staying the same or are being reduced by de-skilling of the jobs. This is contrary to the notion of high-performance workplaces, but is consistent with the observation that employers who elect a low-skills/low-wage option are reluctant to invest in workforce human capital. Such employers rely on technology and process improvements for productivity gains rather on human resources.

A major limitation of this study, acknowledged by the Policy Information Center, is that the dynamics of the workplace are highly fluid and there can be substantial difference between the macro-view and the micro-view, often related to new technology and process innovations. Jobs are constantly being redefined. The report notes that “all in all, it is not a simple matter to track the education and training requirements for entry into the U.S. workforce” (p. 32). In spite of the equivocation about the specifics of the situation, the report concludes that “it is simultaneously true that both educational credentials and something beyond educational credentials [competency] have become increasingly important in determining employers’ demand for workers” (p. 35).

These studies demonstrate ways in which the problem can be approached. By studying the techniques for data collection and data analysis, insight was provided into how to approach this study's particular requirements.

Summary of Literature Review

A review of the literature suggests that while there is much interest in high-performance workplace concepts, there is no general agreement about the practices that define such an environment or the set of skills required by workers in high-involvement organizations. Herrenkohl, Judson, and Heffner (1999) assert that concepts, in order to be useful in research, must be operational; meanings must correspond to empirically observable facts or situations. High-performance, by this assessment, is an imprecise concept that in the literature is treated as an amalgam of different skills and practices with no unifying definition (Coye & Belohlav, 1995).

However, many authors/researchers advance definitions and profiles of high-performance companies, and the various characteristics they propose are useful in guiding an exploration of the concept. Also, it is helpful to learn from the writings of critics of the concept who pose legitimate questions about the validity and viability of the philosophy in both the organizational and the social contexts.

A conclusion that is relevant to this study is that much of the literature deals with the outcomes and practices involved with the high-performance workplace from a theoretical, systems perspective, but little of it confronts the question of what such a system looks like from the worker's point of view. There is little substantive

information that describes the skill sets workers need to successfully perform in this new environment.

One conclusion from the literature review of particular importance to this study was the minimal research describing exactly how a manufacturing worker becomes a high-performance employee. While there are plentiful suggestions as to the skills needed in innovative work environments, the methods by which a worker acquires the skills has received slight attention. The literature highlights the seeming contradiction between an established educational process that perpetuates the “old” workplace relationships and an economic system that seeks to re-make the American worker. It is an interesting tension between the status quo and the future vision, with education providers and workforce education practitioners challenged to produce a solution .

The literature does attest to a core of research attempting to resolve both the basic issues (i.e., a shared definition of high-performance and a confirmation of the requisite skills) and the complex issues (i.e., how to achieve the transformation from the current bureaucratic system; how to prepare the workforce for success). Also, the literature documents the importance of developing alternatives to the inflexibility of the traditional workplace.

Chapter 3

Methodology

This study examined how fifteen skills (referred to in the study as Level 3 Skills) that characterize innovative, high-performance/high-involvement workplaces were distributed among currently employed manufacturing sector workers within the State College (PA) Metropolitan Statistical Area. Ten independent (predictor) variables, five each for the individuals and for the companies, were applied to determine their effect on this distribution.

Creating this profile of the workforce was a starting point for further investigation of the educational-training mechanisms by which workers obtain the Level 3 Skills. The need for these skills is discussed within the context of the dynamics of the emerging global economy.

Additionally, four open-response questions were used to gather information concerning the training experiences of the respondents. Further, the study sought to determine if the individual cases in the study could be assigned to membership in a high-performance work skills group based on the predictor variables using logistic regression.

This study had three main purposes, the first of which was to examine how Level 3 work skills (those required for participation in a high-performance/high-involvement organization) were distributed within an existing manufacturing workforce. The intent was to determine whether or not the front-line employees

sampled possessed the skills, even if they were not actually using the skills they possessed in their work environment at the time of the study.

The second purpose was to ascertain the degree of perceived confidence self-reported by employees for each of the 15 skills. A 4-point Likert-type response scale used the degree of training and/or experience as a proxy for proficiency. Thus, the combined amount of training and experience translates into increased confidence.

The third main purpose was to determine if the production employees in the sample cases could be assigned membership in either a traditional work skills group or a high-performance work skills group based on the ten predictor variables of the study. Logistic regression was used to test this supposition.

This chapter discusses (1) the target population of the study, (2) the sampling method, (3) the variables, (4) the development of the instrument, (5) the expert panel, (6) the data collection techniques, (7) the response rate, (8) the statistical analysis procedures with emphasis on (9) logistic regression. The chapter presents this information as it relates to the overall study and to the individual research questions.

Target Population

The population for this study was manufacturing companies (with 8 or more employees) included under the North American Industry Classification (NAIC) System's 3-digit codes 315 through 339 within the State College (PA) Metropolitan Statistical Area (Federal Information Processing Standards code 8050). The State College MSA comprises all of Centre County and is one of fourteen MSAs within the

Commonwealth and 261 within the United States (U. S. Census Bureau, 2000).

Manufacturing is defined by the U.S. Census Bureau's *Annual Survey of Manufacturers* (2002) as "the mechanical, physical, or chemical transformation of materials or substances into new products" (p. 1). There were 85 manufacturing establishments listed in the *Harris Directory-Industry 2004* in the population, 48 of which met the eight or more employees requirement.

The total manufacturing workforce within the study area consists of approximately 5,500 workers (Chamber of Business & Industry of Centre County, 2004). The total labor force in Centre County is approximately 69,000. Statewide, 872,000 persons are employed in manufacturing out of a total workforce of 4.9 million (Bureau of Labor Statistics, 2002). Nationwide, some 16 million persons are employed in manufacturing (National Association of Manufacturers, 2003).

Sampling Method

The sample for the companies was stratified by size of company (large = more than 80 employees; medium = 26 to 79 employees, and small = 8 to 25 employees). The minimum size of eight employees was selected to protect the anonymity of the participants. No more than fifty cases were selected from any one company so as not to skew the results toward large companies.

Because participation by both the companies and the individual workers was voluntary, the sampling was opportunistic. For those companies that posted multiple

Table 4

Descriptions of Each of the 18 Participating Companies

	NAICS ¹	Size	Union Status	Revenue ²	# Programs ³
#1	327	40	No	\$1.5M-\$5M	0
#2	323	20	No	\$1.5M-\$5M	1
#3	333	12	No	\$1.5M-\$5M	1
#4	334	60	No	>\$5M	2
#5	337	60	No	>\$5M	2
#6	323	9	No	<\$1.5M	0
#7	323	10	No	<\$1.5M	0
#8	323	30	Yes	\$1.5M-\$5M	1
#9	334	30	No	\$1.5M-\$5M	1
#10	334	30	No	>\$5M	0
#11	323	300	No	>\$5M	1
#12	336	30	No	>\$5M	1
#13	336	30	No	>\$5M	0
#14	337	120	No	>\$5M	3
#15	334	50	No	>\$5M	1
#16	323	40	No	>\$5M	0
#17	327	12	No	<\$1.5M	0
#18	334	20	No	>\$5M	0

¹ North American Industrial Classification System code

² Annual Sales Revenue in millions of dollars

³ Number of Employee Involvement (EI) programs within the last five years

shifts, provision was made to collect responses from all shifts. No inducements were offered to participants.

Variables

The primary dependent (criterion) variable for the logistic regression analysis was membership in one of two dichotomous groups: traditional work skills group or high-performance work skills group. This main criterion variable was derived from fifteen subscale variables representing the skills required in the high-performance/high-involvement workplace. The sum of the individual case scores (from the 4-point response scale) for all fifteen subscale criterion variables was re-coded to produce binary, discrete values for the primary dependent variable.

Two of challenges of this study were the decisions to either (a) treat all 15 skills as being equal in importance or (b) devise a weighting scale to emphasize the importance of some of the skills in comparison to the others. Many variations on both these approaches were applied during the analysis of the data, but the manipulations did not alter the outcomes (as reported in Chapter 4).

The independent (predictor) variables were chosen on the assumption that the criterion variable of group membership is affected by characteristics of both the individual employee and their company. These variables are ones commonly used in workforce studies (Black, Lynch, & Krivelyova, 2003; Handel & Gittleman, 1999; Lin, 1998). The assumption was these characteristics could be used to differentiate which workers were most likely to possess, or not possess, the fifteen subscale

criterion skills of interest and the aggregate collection of these skills. The predictor variables for the logistic regression for individuals were age (4 levels), gender (2 levels), education level (5 levels), tenure with the current employer (5 levels), and total years in the workforce (5 levels). For each participating company the variables were principal product (6 levels based on NAICS codes), number of employees (3 levels), union status (2 levels), annual sales revenue (3 levels), and number of employee involvement programs during the past five years (5 levels).

Instrumentation

The instrument of the study was a four-page survey (see Appendix A) completed by non-supervisory, production employees. Participation in the study was voluntary and anonymous. The survey required about 15 minutes to complete. This study was unique in that it surveyed front-line employees directly (Appelbaum, 2003); the literature search revealed only one other employee-centered study, the remainder of the studies were management-centered.

The first section of the survey consisted of twenty statements concerning workplace skills for which the respondents recorded their degree of training and/or experience expressed as their confidence in their ability to use the skill. The amount of training and/or experience and the resultant confidence in the application of the skill was accepted as an indicator of the respondent's competency with the skill.

Table 5

Levels for Each of the Predictor Variables for Individual Employees

<u>Predictor Variable</u>	<u>Description of Levels</u>
Gender	0 = female 1 = male
Age	0 = 25 years or younger 1 = more than 25 years, less than 31 years 2 = 31 years to 40 years 3 = more than 40 years
Education Level (select the highest)	0 = not a high school graduate 1 = high school graduate or GED 2 = beyond high school (trade/business school/college) 3 = graduated trade/business school/2-yr. college 4 = graduated 4-year college
Tenure with Present Employer	0 = less than 1 year 1 = 1 year to less than 6 years 2 = 6 years to less than 10 years 3 = 10 years to less than 20 years 4 = 20 years or more
Total Years of Experience in the Workforce	0 = less than 1 year 1 = 1 year to less than 6 years 2 = 6 years to less than 10 years 3 = 10 years to less than 20 years 4 = 20 years or more

Table 6

Levels for Each of the Predictor Variables for Participating Companies

<u>Predictor Variable</u>	<u>Description of Levels</u>
NAICS Code (principal product)	0 = 323(printing) 1 = 327 (fiberglass fabrication) 2 = 333(centrifuge machines) 3 = 334 (electronic equipment) 4 = 336 (dies and tooling) 5 = 337 (wooden furniture)
Size (number of employees)	0 = 8 to 25 (small company) 1 = 26 to 79 (medium) 2 = 80 or more (large)
Union/non-union Status	0 = non-union 1 = union
Annual Sales Revenue	0 = less than \$1.5 million 1 = \$1.5M to less than \$5M 2 = \$5 million or more
Number of Employee Involvement Programs During the Last 5 Years	0 = no programs 1 = 1 program 2 = 2 programs 3 = 3 or more programs

This was captured on a four-point Likert-type response scale with the following gradations: 0 = I do not have any training in and/or experience with the skill; 1 = I have had a little training in and/or experience with the skill but not enough to make me confident about actually using the skill; 2 = I have had a fair amount of training in and/or experience with the skill, enough to make me confident about using the skill in the workplace; and 3 = I have had a lot of training in and/or experience with the skill and feel very confident in my understanding of the skill (I could even teach it to others).

Five of the twenty statements in the survey concerned “dummy” items for which it was assumed any employee could score high. These questions, which Berg (1998) refers to as “throw-away” items, were included to provide encouragement to the person completing the survey.

The second section of the instrument asked for written responses to four items. These questions permitted the participant to add comments the content of their prior training, additional training they would like to receive, and the perceived value of their training (see Appendix A, page 3). On the final page of the survey the participants supplied their demographic information.

The survey instrument was developed by the researcher in the absence of an existing instrument. The design of the survey was influenced by a similar survey by Appelbaum, Bailey, Berg, and Kalleberg (2000). It was pilot tested on a representative group of non-management employees at two companies (not in the

sample) that draw from the target labor pool. Revisions were made before the instrument was distributed. This pilot study contributed to the corroboration of the face and content validity of the instrument.

In consideration of the employees completing the surveys, the survey was designed for ease of use and was short. While this may have resulted in some loss of precision and breadth in the results, the expected gain was an increased likelihood of participation. Dillman (1978) notes that the response rate is affected by the interest the participants have in the survey topic. If people are discouraged by the length of a survey, they may not fill it out or they may not fill it out with deliberation.

The fifteen core items of the study survey were determined by the responses from experts in the field of high-performance workplaces (HPWP) to the questions in Appendices B and C. This was a tabulation of the literature review on the practices, policies, and skills associated with high-performance workplace practices and skills. The content from which the survey was derived is contained in Tables 1, 2, and 3. The results of this input from the expert panel also provided the profile of a high-performance worker used in the logistic regression segment of the data analysis.

An additional intent of the study was to predict membership in a high-performance work skills group versus a traditional work skills group based on the independent (predictor) variables. The assumption was that at some point in their development, workers may acquire minimal competency in enough Level 3 Skills to qualify as participants in HPWPs. This threshold represents a subtle transition. For the purpose of this study, an expert panel validated a conceptual profile of a high-

performance worker for comparative purposes. Logistic regression was applied to the data to determine if the employees in the sample can reasonably be assigned to this high-performance work skills group.

The final version of the instrument was submitted to the Office of Regulatory Compliance and was approved.

Expert Panel

One intention of this study was to determine if it were possible to predict membership in either a traditional work skills group or a high-performance work skills group. Knowing how the predictor variables affected assignment to the groups could benefit companies in their recruitment processes or workers in developing marketable skills.

In order to apply binary logistic regression, which requires a binary dependent (criterion) variable, it was necessary to create a profile of an idealized high-performance/high-involvement worker in order to establish a list of the required Level 3 Skills to a degree sufficient for successful performance within a flexible work environment.

As Van Buren (1996) noted, “there is no single definition or consensus about the components of a high-performance work system” (p. 15). Therefore, since no equivalent of this profile was found in the literature, the researcher enlisted the assistance of an expert panel in creating one. Academic researchers, authors,

government researchers, consultants, and practitioners from business and unions were invited to contribute to the creation of this profile.

Forty experts who were identified through the literature review were sent a cover letter (see Appendix B) explaining the study. Each candidate received at least one email follow-up to the cover letter; in some cases phone calls were also placed. Ten contacts responded favorably and completed the questionnaire.

The results of the responses were mixed, with no firm pattern discernible. This may be a statement about the unsettled nature of the topic of HPWPs, as summarized in Chapter 2. There is no clear agreement on the definition of high-performance/high-involvement workplaces. In the absence of a consensus, the researcher adopted the characteristics of the idealized worker based on the majority opinion .

Data Collection Methodology

The appropriate manager/owner at each company was contacted by mail (see Appendix D) with a follow-up phone call to answer questions and encourage participation. For many of the companies, this initial contact resulted in an onsite interview to explain the study procedure. For those that agreed to participate, three options were offered to distribute the survey. The most used option was to deliver sufficient copies of the cover letter (Appendix E) and survey along with self-addressed return envelopes to the manager who then distributed these to the

workforce. The employees completed the survey and mailed it directly to the researcher. A second option was for the researcher to place in a common area (usually a break room) a display containing the cover letters, surveys, and envelopes along with posted instructions. This display had a built-in, secure “ballot” box in which the participants dropped the sealed envelopes. The final option was for the researcher to attend a production meeting to distribute and collect the surveys personally.

The sequence of events for the methodology were: First, compile and stratify a list of potential participating companies. Second, initiate contact with each company. Third, follow up with the necessary phone calls and visits to obtain cooperation. Fourth, establish distribution procedures with each company. Then, depending on the distribution option chosen, distribute the cover letters and surveys to employees. The completed survey data was then processed and analyzed.

Response Rate

Eighteen companies (38% of the population) cooperated in the survey. One company initially agreed to participate then withdrew because of internal events. Three companies indicated a willingness to participate but were unable to do so within the timetable of the study. The eighteen firms in the sample represented a total of 3,660 production-level employees. Of 592 surveys distributed, 237 were completed for a 40% response rate. This represents 6.5% of the entire sample population. There was wide variation in response rates among participating companies (see Table 7).

Table 7

Number of Employees and Number of Responses by Company

<u>Company</u>	<u>Number of Production Employees</u>	<u>Number of Surveys Distributed</u>	<u>Number of Surveys Returned</u> ^a
#1	40	40	6
#2	20	20	12
#3	12	12	3
#4	60	60	34
#5	60	60	9
#6	9	9	3
#7	10	10	6
#8	40	40	21
#9	30	30	7
#10	30	30	16
#11	300	50	50
#12	30	30	10
#13	30	30	2
#14	120	50	36
#15	50	50	20
#16	40	40	0
#17	12	12	2
#18	20	20	0

^a The maximum number of surveys distributed to any one company was limited by design to 50. This was done to prevent large companies from unduly influencing the results. Only those employees who volunteered to participate were provided with surveys.

Of the completed surveys, all the respondents completed the 20-item skills questionnaire section (with only 10 surveys with missing data). These were the responses that relate to research questions 1 and 2. For the four open-response research questions, 39 participants (16%) replied to Item A. Seventy-four participants (31%) replied to Item B; 218 (92%) to Item C, and 58 (24%) to Item D. See Appendices F and G for the comments from Items A, B, C, and D. The results for the tally of check marks for Item C are reported in Chapter 4.

Data Analysis

The purposes of this study were (1) to investigate the occurrence and distribution of Level 3 (high-performance) Skills within an existing work force in the manufacturing sector, (2) analyze these results according to selected variables, (3) assign cases to either a traditional work skills group or a high-performance work skills group, and (4) examine the qualitative responses to the open-response items. Table 8 details the analysis process.

The goal of qualitative research is to bring order to the data so that it may be interpreted for meaning and significance (Patton, 1987). Coding the text data provides the order referred to by Patton; the coding could be common words (frequency), positive or negative comments, or training needs.

For Research Questions 4, 5, and 6, the responses were coded following the procedure outlined by Creswell (2000): (1) an initial scanning of the material, (2) a division of the text into segments of information, (3) labeling the segments of

Table 8

Summary of Data Analysis Procedures Used in the Study

Research Question	Variables	Type of Analysis	
		Data	Technique
What degree of Level 3 skills training and/or experience exists among the currently employed manufacturing workforce?	Workplace skills	Ordinal	Descriptive Stats. Percentages Frequency
For which of the skills are training and/or experience most common? Least common?	Workplace skills	Ordinal	Descriptive Stats. Percentages Frequency
How are such training and experience distributed across demographic and company variables?	Gender Age Education Level Tenure with employer Total years in the workforce Number of employees Type of product Union/non-union Annual sales Employee programs	Nominal Ordinal Ordinal Ordinal Ordinal Ordinal Nominal Ordinal Ordinal Ordinal	Descriptive Stats. Percentages Frequency Cross-tabulation
Can the workers be assigned to either a “traditional work skills” group or a “high-performance work skills” group based on the variables?	Demographic items (IV) Company items (IV) Skills group (DV)	Ordinal Ordinal Ordinal/binary	Binary Logistic Regression Analysis
What additional training have employees received?	Types of additional training		Content Analysis
What additional training would employees like to receive?	Desired additional training		Content Analysis
How useful has been the training received to date?	Usefulness of training		Content Analysis

information with codes, (4) reducing the overlap and redundancy, and (5) collapsing the codes into themes. These themes, as suggested by Creswell, could be ordinary themes that the researcher might expect to find, unexpected themes, hard-to-classify themes that contain ideas not easily fitted into the pattern, or major/minor themes.

Logistic Regression

The classification of cases to the two categories (traditional work skills group or high-performance work skills group) was done through logistic regression. This statistical technique allows the assignment of an individual case to a dichotomous dependent (criterion) variable based on the independent (predictor) variables, which may be nominal, continuous, discrete, dichotomous, or a mix (Tabachnick & Fidell, 2001). Logistic regression is more flexible than other regression techniques, making fewer statistical assumptions about the distribution of the criterion variable and the predictor variables. The goal of the analysis is to correctly predict the category of the outcome for cases (Pampel, 2000).

Logistic regression was selected in an attempt to identify which factors (predictors) influence whether or not an employee possessed any or all of the Level 3 Skills. A representative question for this study was along the lines of “How much more likely is it that males versus females will be assigned to the high-performance skills group?”

The SPSS statistical software package was used to analyze the data. The study followed the procedure for applying logistic regression as presented in Landau and Everitt's (2004) *A Handbook of Statistical Analyses Using SPSS*.

Chapter 4

Findings

Introduction

This chapter presents information about the general case profiles compiled from the respondent data and the company data, discusses findings for each of the six research questions, and discusses results relating to each of the ten variables in the study.

The first purpose of this study was to determine within an existing manufacturing workforce the frequency of occurrence and distribution patterns for fifteen skills closely associated with the high-performance/high-involvement workplace. These skills, designated as Level 3 Skills in this study, are additional proficiencies needed by employees in high-performance/high-involvement workplaces that supplement the basic employability traits (Level 1 Skills) and job-specific competencies (Level 2 Skills) that are sufficient in traditional workplaces. The fifteen skills in this study were a combination of technical skills, such as computer aptitude, and what Lynch and Black (1998) refer to as general skills (sometimes referred to as “soft skills”), such as interpersonal skills and personal initiative skills.

The analysis of the results consisted of calculating the frequency of occurrence of the skills at various levels of confidence within the sample and reporting the distribution of the skills relative to five worker and five company

variables. This analysis provided the baseline data on diffusion and the degree of confidence for the fifteen skills exhibited within the sample.

A further intent was to compare or contrast the skill sets possessed by the workers in the sample with the skill sets needed by workers in a high-performance workplace. This comparison was expected to identify those variables that could be used to predict/explain which workers had developed the minimum Level 3 Skills to cross the threshold between the qualifications needed in the traditional workplace and the qualifications needed to perform successfully in a high-performance workplace. An idealized profile of a high-performance/high-involvement worker was created with the input of an expert panel in order to make this comparison.

Finally, to further develop the profile of participants' experiences, the study collected information about their overall training history. Four open-response questions were used to obtain data relevant to the three qualitative research questions.

General Profile of the Respondents

Gender. Of the 237 participants, 102 (42%) were female and 135 (57%) were males.

Age. Within the four levels for age, only nine (3.8%) of the participants were 25 years of age or younger. Seventy-seven respondents (32.5%) were between 30 and 40 years of age and 137 were 40 years or more (57.8%). Thus, over 90% of the cases were in two of the four categories. These numbers reflect the high degree of

homogeneity within the employee variables of age, highest education level, tenure with current employer, and total years in the workforce.

Education level. Education Level consisted of five levels, with the participants instructed to indicate their highest level of educational attainment. The majority of the cases, 56.1%, were in one level (*high school graduate or GED*). Almost 25% had attended trade school, business, school, or a two-year college, but had not graduated. For this variable, 81% of the cases were in two of the five variable levels.

Tenure with current employer. Data for tenure, with five levels, presented a mildly bi-modal distribution. The *10 years to less than 20 years* stratum contained 74 cases (31.2%) while the *1 year to less than 6 years* class included 64 cases (27.0%).

Experience (total years in the workforce). Data for total years of experience in the workforce were congregated toward the upper end of the five levels. Two level contained fully 88.2% of the cases; 64 cases (27.0%) were contained in *10 years to less than 20 years* and 145 (61.2%) in *20 years or more*.

Table 9 displays the numbers and percentages for the employee variables.

General Profile of the Companies

All forty-eight manufacturing companies in the State College (PA) Metropolitan Statistical Area with more than eight employees were targeted to participate in the study. Eighteen (37.5%) of the firms approached agreed to

Table 9

Number of Cases and Percentages for the Five Independent Variables for Employee Characteristics (n = 237)

Variable (Levels ¹)	<u>Number and Percentages</u>				
	Level 1	Level 2	Level 3	Level 4	Level 5
Gender (2)	102 (42.0%)	135 (57.0%)			
Age (4)	9 (3.8%)	14 (5.9%)	77 (32.5%)	137 (57.8%)	
Education Level (5)	4 (1.7%)	133 (56.1%)	59 (24.9%)	31 (13.1%)	10 (4.2%)
Tenure with Employer (5)	20 (8.4%)	64 (27.0%)	35 (14.8%)	74 (31.2%)	44 (18.6%)
Total Years in Workforce (5)	1 (0.4%)	16 (6.8%)	11 (4.6%)	64 (27.0%)	145 (61.2%)

¹ Description of each level for each variable:

Gender: 1 = female, 2 = male

Age: 1 = 25 years or younger; 2 = more than 25, less than 31; 3 = 31 to 40; 4 = more than 40 years

Highest Attained Education Level: 1 = not a high school graduate; 2 = high school graduate or GED;
3 = beyond high school (trade/business school or college but did not graduate); 4 = graduated trade/business school or 2 - year college; 5 = graduated 4 - year college

Tenure with Current Employer: 1 = less than 1 year; 2 = 1 year to less than 6 years; 3 = 6 years to less than 10 years; 4 = 10 years to less than 20 years; 5 = 20 years or more

Total Years in the Workforce: 1 = less than 1 year; 2 = 1 year to less than 6 years; 3 = 6 years to less than 10 years; 4 = 10 years to less than 20 years; 5 = 20 years or more

participate. The characteristics of these eighteen firms follow; this profile is based on the responses of employees participating in the study.

NAICS code. The North American Industrial Classification System (NAICS) indicates the principal product produced by a manufacturing firm. In this study, a large percentage of the employees sampled worked for companies in two of the NAICS codes. One hundred and eight employees (45.6%) worked in code 334 companies (electronic equipment) and 94 (39.7%) worked for companies in the 323 code (printing).

Size. Company size was based on the number of employees: small companies (8 to 25 employees), medium (26 to 79), and large (80 or more). Six small companies, ten medium companies, and two large companies cooperated in the study.

Union status. There are few union manufacturing establishments in the State College Metropolitan Statistical Area. One large union shop went out of business during the time frame of the study and another large union employer initially agreed to participate in the study and then withdrew due to internal issues. The results were that only 22 (9.3%) of the cases in the study worked in union environments.

Revenue. Annual sales revenue was included in the study as a measure of a company's ability to fund innovative programs. The reasoning was that company profitability impacts a firm's willingness to underwrite initiatives in alternative practices. Further, financially successful companies present a more risk-tolerant environment in which to examine new practices.

Companies with over \$5 million in sales employed 177 of the cases (74.7%). A mere 11 cases (4.6%) were from companies with less than \$1.5 million in annual sales.

Programs. The final company variable was *number of employee involvement programs during the past 5 years*. This variable created confusion as to what programs should be included. The instructions were to include activities such as formal total quality programs (i.e., TQM), ISO certification, 6-Sigma programs and similar initiatives, quality award programs (i.e., Baldrige Award nominations), and similar plant-wide, formal employee development efforts. The results for the five levels in the category were predominately for one (1) employee involvement program (123 cases, 51.9% of the total) during the past five years.

Findings for Research Question 1a

What amount of Level 3 Skills training and/or experience exists among the currently employed manufacturing workforce in the State College (PA) MSA?

In completing the survey, each participant indicated her/his level of confidence for the fifteen high-performance skills on a 4-point response scale (ranging from 0 = no confidence to 3 = high confidence). The interpretation of the score for each item is that scores of 0 and 1 indicated that the person's skill was not adequate for a high-performance workplace while scores of 2 and 3 indicated that the person perceived herself or himself qualified to successfully practice that skill.

Table 10

Number of Cases and Percentages for the Five Independent Variables for Company Characteristics (n = 237)

Variable	Number	Percent
NAICS (6)		
323 (printing)	94	39.7%
327 (fiberglass fabrication)	8	3.4%
333 (centrifuge machines)	3	1.3%
334 (electronic equipment)	86	36.3%
336 (dies and tooling)	3	1.3%
337 (wooden furniture)	43	18.1%
Size (3)		
8 – 25 employees	25	10.5%
26 – 79 employees	125	52.7%
80 or more employees	87	36.7%
Union Status (2)		
Non-union status	215	90.7%
Union status	22	9.3%
Revenue (3)		
less than \$1.5 million	11	4.6%
\$1.5 million to less than \$5 million	49	20.7%
\$5 million or more	177	74.7%
EI Programs (4)		
0	35	14.8%
1	123	51.9%
2	44	18.6%
3 or more	35	14.8%

Overall, the survey participants expressed a high degree of confidence in their ability. The number of cases (184) that indicated a score of 2 or 3 on between 10 and 15 of the skills was 77.6% of the total. Fifty respondents (21.1%) reported high confidence (scores of 2 or 3) on their ability to use all fifteen of the Level 3 skills.

Of the fifteen skills assessed, twelve had scores (2s and 3s) indicating high confidence that were at least double the number of low-confidence scores (0s and 1s); only two items received more scores in the 0 and 1 range than in the 2 and 3 range. The highest confidence ratings were in the areas of self-directed learning (225 of the participants scored themselves at 2 or 3), self-directed work team skills (218 scores of 2 or 3), workplace collaboration (217), and team skills (216). Table 9 displays the percentage of responses for each confidence level for all fifteen skills.

Findings for Research Question 1b

For which of the skills are training and/or experience most common, for which are they least common?

The skills which the respondents most confident about were Self-directed Learning (224 out of 237 respondents rated themselves at either 2 = confident in their ability or 3 = highly confident in their ability), Self-directed Work Team skills (218 were confident or highly confident), Workforce Collaboration (216 were confident or highly confident), and Team Membership skills (215, confident or highly confident).

The areas with the lowest scores were Advanced Computer skills (94 of 237

recorded 0 = no confidence or 1 = low confidence), Communications (113 of 237 with no or low confidence), Leading Teams (164 with no or low confidence), and Basic Computer Skills (169 with no or low confidence).

Table 12 reports binary scores for all variables. These binary scores were derived by transforming the 0 (no confidence) and 1 (low confidence) scores to 0 and the 2 (moderate confidence) and 3 (high confidence) scores to 1.

Findings for Research Question 2

How are such training in and/or experience with Level 3 Skills distributed across the demographic and company variables used in the study?

Gender. Cross-tabulations tables revealed that gender was not a strong indicator of the level at which a person possessed the Level 3 Skills. Sixty-two females (59.8%) out of 102 possessed the skills at the 2 or 3 level, while 87 males (64.4%) out of 135 recorded the same scores.

Age. Since 137 workers (57.8% of the sample) were in the *more than 40 years* of age category and another 77 (32.5%) were in the *30 years to 40 years* class, the distribution of this variable was limited. Given this consideration, the proportions with 2 and 3 scores across the four levels of this variable ranged from 53% to 88%, although the levels with high percentages had small representations (9 and 14 cases) in the sample.

Education level. The majority of the cases were concentrated in one of the five levels of this variable. Fully 56.1% of the participants, 133 cases, were in the

Table 11

Percentage of Responses for Each Level for Each Skill (n = 237)

<u>Skill</u>	Percentage of Responses for Each Response Option ^a			
	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>
	%	%	%	%
1. Team Member skills	1.3	7.2	30.8	60.3
2. Leading Teams	5.1	24.9	37.6	32.1
3. Basic Computer	7.2	20.3	32.9	38.8
4. Advanced Computer	31.6	27.8	24.9	15.2
5. Self-directed Work Team	1.7	5.1	35.0	57.0
6. Work Flow Knowledge	9.7	16.9	42.2	30.8
7. Communication	17.3	34.6	30.0	18.1
8. Problem-solving	3.4	21.9	41.4	33.3
9. Business Knowledge	8.9	16.9	37.6	36.3
10. Systems Knowledge	4.2	19.0	38.0	38.8
11. Quality Requirements	1.7	11.8	35.9	49.8
12. Self-directed Learning	0.8	4.2	32.1	62.9
13. Customer Requirements	2.1	10.5	43.5	43.5
14. Collaboration	1.3	6.8	42.2	49.6
15. Decision-making/Initiative	3.0	13.1	47.3	36.7

^a NOTE: 0 = no formal training and/or experience with the skill; 1= limited training and/or experience with the skill, low confidence; 2 = sufficient training and/or experience with the skill to feel confident using it in the workplace; 3 = extensive training and/or experience with the skill, confident enough to teach it to another employee

Table 12

Totals of Binary Scores for Subscale Variables for All Cases

<u>Skill</u>	<u>n</u>	<u>Number of Zeros (Little or no training/ or experience)</u>	<u>Number of Ones (Considerable training and/or experience)</u>
Teams member skills	235	20	215
Team leader skills	235	71	164
Basic computer skills	234	65	169
Advanced computer skills	235	141	94
Self-directed team skills	233	15	218
Workflow understanding	235	63	172
Communications	236	123	113
Problem solving	236	60	176
Understanding reports	235	61	174
Systems knowledge	236	55	181
Quality requirements	234	32	202
Self-directed learning	236	12	224
Customer requirements	235	30	205
Collaboration skills	235	19	216
Decision making/initiative	236	38	198

Note: The binary zeros are a re-coding of the 0s and 1s in the raw data from Table 11. The binary ones are a re-coding of the 2s and 3s in the raw data.

Note: The classification of employees as 0's or 1's indicates whether or not the employees possessed at least 12 of the 15 Level 3 Skills. This guideline was determined based on the literature review and the feedback from an expert panel.

high school graduate or GED level. The next largest level was *attended school past high school but did not graduate* with 59 cases (24.9% of the cases). Only four of the cases did not graduate from high school and only 10 graduated from college.

Tenure with current employer. This variable had more variation than some of the other variables. The five levels produced numbers of 20 cases (8.4%) for less than 1 year; 64 cases (27.0%) for *1 year to less than 6 years*; 35 cases (14.8%) for *6 years to less than 10 years*; 74 cases (31.2%) for *10 years to less than 20 years*; and 44 (18.6%) for the final class of *20 years or more*.

Experience (total years in the workforce). Of the 237 participants, 145 (61.1%) had been in the workforce for 20 or more years. This is consistent with the distribution within the age variable. Another 64 (27.0%) had between 10 and 20 years of experience. That left only 11.8% in the lower three levels, with only one respondent who had been in the workforce for less than one year.

Company-related Variables

For the five predictor variables that related to the companies, the results were as follows:

NAICS code. There were six levels of this variable that corresponded to the principle products produced at each establishment (as defined by the North American Industrial Classification System). The majority of the cases were employed in industries representing two categories (NAICS #323, printing, and NAICS #334, research equipment) with 94 cases (39.7%) and 78 cases (32.9%) respectively.

Wooden furniture (NAICS # 337) was the third largest NAICS code with 44 cases (18.6%).

Number of employees. The largest representation in the study was from medium sized companies (those with from 26 to 79 employees) with 125 cases (52.7%). The two large companies of 80 or more employees contributed 87 cases (36.7%), while the small companies with between 8 and 25 employees accounted for 25 cases (10.5%). The small companies had a slightly higher proportion of employees who scored 2s and 3s at 76%, while medium-sized companies had 61% and large companies had 62%.

Union/non-union status. This variable was highly distributed toward non-unionized companies. Only 22 cases (9.3%) were from unionized companies. The remaining 215 cases (90.7%) were not union members.

Annual sales revenue. This variable was also highly clustered, in this case toward companies with more than \$5 million in annual sales revenue. The 177 cases in this level represented 74.7% of the total. Companies with less than \$1.5 million in revenue were represented by only 11 cases (4.6%) and those firms between these two categories contributed 49 respondents (20.7%). At that, the percentages of employees falling into the 2 and 3 levels of skill confidence were very similar, with the two predominant classes at 61.2% and 62.1%.

Number of employee involvement programs during the past five years. The majority of employees responding (123, 51.9%) worked for companies that had offered only one employee involvement program during the past five years. Thirty-

five of the cases (14.8%) came from firms that had not offered any programs during that time, 44 cases (18.6%) were from establishments that had offered two programs, and 35 cases (14.8%) worked in settings that had offered three or more programs. The number of programs did not seem to have a great effect on the employees' confidence about their Level 3 skills. Employees from the companies with the largest number of programs offered had the highest confidence proportion (71.4% responding with a 2 or 3); whereas, in those companies reporting 0 programs offered 65.7% of the respondents were confident or highly confident, 1 program offered 57.7% were confident, and when 2 programs were offered 68.0% were confident). The others were not far behind with scores, respective of 0 to 2 programs, of 65.7%, 57.7%, and 68.0%.

Findings for Research Question 3

Can the workers in the study be assigned/classified to either a “Traditional Work Skills” group or a “High-performance Work Skills” group based on the demographic and company variables?

Binary logistic regression was applied to the data because the technique, unlike other forms of generalized linear regression, allows the assignment of cases to discrete dichotomous outcomes (such as Yes/No, or in this study membership or non-membership in a high-performance work skills group).

The outcome of the logistic regression analysis using the Enter technique in SPSS was that the overall model was significant at $p = .014$ while it explained

14.2% (Nagelkerke R Square = .142) of the variance. The logistic regression equation correctly predicted group membership for 83.5% of the cases. However, the equation did not correctly classify any of the cases coded a 1 (employees who possessed all fifteen of the skills at moderate or high confidence). Of the nine predictor variables, two (Education Level and Number of Employee Programs) were statistically significant, as shown in Table 13.

Table 13 shows that seven variables were not significant parts of the model. To further test the model, a reduced model was developed using the Wald forward procedure in SPSS. The Wald forward procedure includes only statistically significant variables in the equation. The final logistic regression model was significant (Model Chi square = 13.939; $df = 1$; $p < .001$) with a Nagelkerke R Square of 0.097. The final model also correctly classified 83.5% of the cases, but also did not correctly classify those cases coded as 1 on the dependent variable. The only predictor variable that remained in the equation using this method was Education Level with a coefficient of $B=1.349$, a significance of $<.001$, and an $\text{Exp}(B) = 3.853$.

Findings for Research Question 4

What additional training have employees received other than those categories listed in the study survey?

The responses to this question were in the form of open-ended written comments. As Patton (1987) states, the goal of qualitative research is to bring order to the data so that the information may be interpreted for meaning and significance.

Table 13
 Results of Logistic Regression with Membership Status in Level 3 Skills
 Group as the Dependent Variable

Variable	B	Wald	Sig	Exp(B)
Gender	.064	.023	.880	1.060
Age	.425	.450	.503	1.530
Edlev	1.482	13.803	<.000	4.401
Tenure	.438	.700	.403	1.550
Experience	-.285	.194	.660	0.752
Size	.136	.087	.768	1.146
Union status	-.054	.005	.942	0.947
Revenue	-.868	2.100	.147	0.420
Programs	.948	3.920	.048	2.560

Model Chi Square = 20.773

$df = 9$

$p = .014$

Coding for variables: The dependent variable was code a 0 or a 1. One (1) indicated the respondent self-reported that they were confident in at least 12 of the 15 Level 3 Skill areas. Zero (0) indicated they self-reported they were confident in less than 12 of the 15 Level 3 Skill areas.

Coding the text data is a means of creating this order. The coding, according to Patton, could be accomplished by grouping common words, by determining the frequency of words used, by assigning positive or negative values to comments, or by categorizing around items, such as training needs.

For Research Questions 4, 5, and 6 the responses were coded following the five-step procedure outlined by Creswell (2000). This procedure consists of an initial scanning of the material, a division of the text into segments of information, labeling the segments of information with codes, reducing the overlap and redundancy, and collapsing the codes into themes, such as major patterns of thought or opinions expressed.

Research Question 4 relates to Item A on the survey. The response rate to this question was low; 39 participants (16%) provided information. Virtually all of the responses referred to job-related training. The 75 training topics submitted were coded into the following ten categories in descending order (with number of individual topics): Job Specific (23 topics), Safety (13), Soft Skills (11), Industry Specific (10), Operations (6), Computer-related (6), Quality (6), Customer Service (2), Sales (1), and Management Development (1).

Included in soft skills were managing difficult people, problem solving between employees, thinking outside the lines, character building, sexual harassment awareness, anger management, communications, and time management. Operations included lean manufacturing, project management, workflow, charting, and kanban.

Only seven employees made reference to having received what could be considered soft skills training. A complete list of responses to Item A is provided in Appendix F.

Findings for Research Question 5

What additional training would employees like to receive other than those categories listed in the study survey?

This question was Item B on the survey. The seventy-four employees (31% of the total) who replied to this question identified 87 topics for additional training. The coding scheme was similar to that for Item A, Research Question 4. There were 11 general categories for desired training (with number of individual topics): Computer (48), Job Specific (21), Office (3), Operations (3), Quality (3), Product Knowledge (2), Soft Skills (2), Safety (2), Management Development (1), Sales (1), and Personal Development (1). More than one half of the requests were for computer training (i.e., basic computer skills, Microsoft certification, AutoCad, graphics software), and troubleshooting training.

The other training needs identified by the respondents were predominately for job-related training. There was just one request for what are often referred to as “soft” workplace skills. See Appendix F for complete results.

Findings for Research Question 6

How useful to the employees has the training they have received been in terms of preparation for their jobs, preparation for advancement, increasing their productivity, quality, business awareness, team building, and other considerations?

Two hundred and eighteen people (92% of the cases) filled out this section of the survey. The breakdown of the results are shown in Table 14.

Productivity improvement. The past training experience of the respondents indicates a generally favorable response to the impact of the training on job productivity. Of the 220 respondents, only 16 (7%) said that the training had little useful impact, 78 (35%) acknowledged that the training had some useful impact, and 126 (57%) indicated that the training was very useful.

Quality improvement. Training was thought to have had the greatest positive effect on quality. Sixty-one percent of the respondents rated it as Very Useful. Fourteen cases (6%) found the training to be of little use and 70 (32%) found it of some use.

Job satisfaction. The results for this category were that 26 (12%) indicated little use, 88 (41%) checked fairly useful, and 99 (46%), marked very useful.

Opportunities for personal advancement. The connection between training and the opportunities for advancement was not perceived as being strong. This is the only one of the five items in this section that recorded a predominately negative score. For 80 people (37%) their training was perceived as having little positive effect

on advancement. Seventy-six (76) respondents agreed that it had some effect, and for 62 (28%) it had a very positive effect.

Workplace teamwork. The effect was seen as minimal by 33 (15%) of those who took the survey. Some value was noted by 80 respondents (37%), while 104 respondents (48%) thought their training was very useful for promoting teamwork.

Overview of the Responses to Subscale Criterion Variables

The fifteen statements dealing with the high-performance/high-involvement workplace skills constituted the subscale criterion variables of the study. Each of these was subjected to the same logistic regression analysis as was the main criterion variable using the same nine predictor variables. The results of these fifteen analyses follow. For each analysis the predictor variables were re-coded to binary with values of 0 and 1 = 0; 2 and 3 = 1. The Exp(B) referred to is the change in the odds-ratio of the event or outcome occurring (coded a 1 in the binary dependent variable) for a one-unit change in the predictor variable.

Team skills. The logistic regression analysis produced a model with an “Omnibus Test of Model Coefficients” that was significant at $p = .014$. The “Model Summary” contained a Nagelkerke R Square (similar to R square in OLS linear regression) of .142. The classification table expressed a percentage correctly classified of 83.5%. For variables in the equation only two of the nine predictor variables were significant. Education level was significant at $p = <.000$ with an

Table 14
Responses to Item C (Part 1)

<u>Area of Interest</u>	Usefulness of Training Received number (% of total)		
	<u>Little Use</u>	<u>Fairly Useful</u>	<u>Very</u>
<u>Useful</u>			
Productivity Improvement	16 (7%)	78 (35%)	126 (57%)
Work Quality	14 (6%)	70 (32%)	134 (61%)
Job Satisfaction	26 (12%)	88 (41%)	99 (46%)
Opportunities for Advancement	80 (37%)	76 (35%)	62 (28%)
Workplace Team Work	33 (15%)	76 (35%)	62 (28%)

n = 218 (92% of total surveys completed)

Exp(B) of 4.401. Number of programs was significant at $p = .048$ with an Exp(B) of 2.560.

Leading teams. The model for Leading Teams was significant, $p = .040$, with a Nagelkerke R square of .077. The model correctly classified 72.5% of the cases. The variables experience and gender were significant at .003 and .043 respectively. Experience had an Exp(B) of 2.481 while for Gender this was 1.936.

Basic computer skills. The omnibus test determined that this model was marginally significant at the $p = .055$ level and according to the model summary explained 8.2% of the variation. The percentage correct in the classification table was 72.3%. Among the variables, education level was significant at .022 with an Exp(B) of 2.098.

Advanced computer skills. The model was significant at $p = .043$ and explained 8.0% of the variation. The overall correct classification was low at 59.7% correct. The only variable that attained significance was education level at $p = .001$ accompanied by an Exp(B) of 2.670.

Self-directed work teams skills. The model for SDWTs did not register as statistically significant ($p = .832$).

Workflow planning skills. This model achieved marginal significance at $p = .057$. The model summary contained a Nagelkerke R Square of .073. The overall percentage correctly classified was 73.3% with two variables displaying marginal statistical significance; experience had a significance of .066, Exp(B) = 1.767, and education level had a significance of $p = .071$, Exp(B) = 1.789.

Communication skills. This model did not achieve significance ($p = .146$).

Problem-solving skills. The significance level for this model was .006 explaining 13.7% of the variation. The classification table indicated a 76.4% correct classification. Four of the variables were at or near the .05 significance level. The results for gender were $p = .006$, $\text{Exp(B)} = 2.571$; for size, $p = .011$ and 2.777; for number of programs, $p = .039$ and $\text{Exp(B)} = 2.329$, and for revenue, $p = .056$ and $\text{Exp(B)} = .387$. The revenue Exp(B) suggests, interestingly enough, that communications skills decrease as company revenue increases.

Understanding reports. At a significance level of .005, this model explained 14% of the variation while correctly classifying 75.4% of the cases. Three of the variables contributed significantly to the model; education level had an Exp(B) of 2.074 at the .032 significance level; union status had an Exp(B) of .282 (it should be noted that union membership was poorly represented in the study), and gender had an Exp(B) of 1.887 at $p = .071$.

Systems knowledge. The significance level for the systems knowledge model was .018; the Nagelkerke R Square was .122, and the overall percentage correctly classified was 77.6%. The three variables contributing the most to the model were age $p = .023$ significance and an Exp(B) of .307; union status reflected a $p = .040$ with an Exp(B) of .262, and number of programs had a $p = .064$ and an Exp(B) of 2.173.

Quality requirements. This model did not achieve significance ($p = .091$).

Self-directed learning skills. This model did not achieve significance ($p = .323$).

Customer requirements. This model did not achieve significance ($p = .090$).

Workplace collaboration skills. This model explained 11.4% of the variation at $p = .037$. The model correctly classified 92.4% of the cases. Union status and experience were the two variables approaching significance at $p = .002$ and $p = .066$ respectively. The Exp(B) numbers were .147 and 4.121 respectively.

Decision-making/initiative skills. This model did not achieve significance ($p = .300$).

Table 15

Logistic Regression Results for Each of the 15 Subscale Dependent Variables

Skill	Model Sig. ¹	Nagelkerke R Square	% Correctly Classified	Significant Predictor Variables/Sig./Exp(B) ²
Team skills	.014	.142	83.5	Education Level .000 4.401 No. of Programs .048 2.560
Leading teams	.040	.077	72.5	Experience .003 2.481 Gender .043 1.936
Basic computer	.055	.082	72.3	Education Level .022 2.098
Advanced computer	.043	.080	59.7	Education Level .001 2.670
Self-directed team	NS			
Workflow	.057	.073	73.3	Experience .066 1.767 Education Level .071 1.789
Communications	NS			
Problem-solving	.006	.137	76.4	Gender .006 2.571 Size .011 2.777 No. of Programs .039 2.329 Revenue .056 0.387
Business knowledge	.005	.140	75.4	Education Level .032 2.074 Gender .071 1.887
Systems knowledge	.018	.122	77.6	Age .023 0.307 Union Status .040 0.262 No. of Programs .064 2.173
Quality requirements	NS			
Self-directed learning	NS			
Customer requirements	NS			
Collaboration	.037	.114	92.4	Union Status .002 0.147 Experience .066 4.121
Decision-making initiative	NS			

¹ NS = not significant, $p > .05$; ² There were ten predictor variables in the study: gender, age, education level, tenure with current employer, total years in the workforce, size of company, principal product of company (not used in analysis), union/non-union status, annual sales revenue, and number of employee involvement programs during the past five years.

Chapter 5

Summary, Conclusions, and Recommendations

Introduction

This chapter provides a statement of the problem, a summary of the research, discussions for each research question, and conclusions and recommendations based on the findings.

The primary focus of the investigation was to determine if manufacturing production workers (nonexempt) in one central Pennsylvania metropolitan statistical area possessed fifteen workplace skills associated with the high-performance/high-involvement work environment. While much research has been directed at innovative, emerging workplace models, the emphasis has been on practices, managerial behavior, specific characteristics, and outcomes of such environments; few of the studies have raised the question of what skills workers need in order to successfully participate in these settings.

Within this emerging work setting (which is also referred to as the democratic, flexible, high-commitment, or participative workplace), workers are required to apply non-traditional job skills that are distinct from the skills that had been sufficient to hold a conventional manufacturing job during most of the 20th century. This study utilized a worker-centered perspective in examining the occurrence and distribution of the required skills.

In order to conduct the study, it was necessary to identify the relevant skills from the literature and with the assistance of an expert panel. In this study the fifteen skills are referred to as Level 3 Skills to distinguish them from the Level 1 Skills (basic employability skills, such as punctuality, good work ethic, and ability to follow directions) and Level 2 Skills (job/task-specific technical skills, such as operating a lathe, welding, or blueprint reading). These Levels 1 and 2 Skills are deemed sufficient to perform successfully in a traditional work setting.

A survey of employees was used to collect information on (1) whether or not the participant possessed any or all of the fifteen skills and (2) if they did possess the skill, the degree of confidence they had in their ability to apply the skill. This second point was established based on the amount of training and/or experience they had for the individual skill. Using a four-point scale, the respondents indicated if they had (1) no training in and/or experience with the skill, (2) some training and/or experience but not enough to feel confident in using the skill, (3) enough training and/or experience to feel confident in applying the skill in their workplace, or (4) extensive training and/or experience with the skill, enough that they would feel comfortable teaching it to other workers.

After constructing this skills profile of the individuals in the study, an attempt was made to assign them to either a traditional work skills group (that is, those not possessing a sufficient number of Level 3 Skills to a sufficient degree of confidence) or a High-performance work skills group (those possessing the Level 3 Skills to a sufficient degree). This assignment was made using logistic regression.

The question of what is the most effective model for workplace practices is of major concern to employers and employees. Employers want to maximize productivity while employees want a sense of meaningful involvement to feel that their work and they themselves are important (Benkowski, 1997). The socio-technical system exhibited within the high-performance/high-involvement work environment is one path to these mutual desired goals.

Determining the extent to which this supplementary skill set exists among a sample of manufacturing workers will assist in defining the scope of the training need. Do employers and society need to undertake a massive re-education of the workforce in order to move toward the high-performance work environment, or do workers already possess these Level 3 skills (even if they currently work in situations where they are not using the skills)?

The literature review contained in this paper presents many studies supportive of the conclusion that innovative work arrangements such as high-performance practices can substantially benefit employers and employees. It is to be emphasized, though, that these practices yield the desired results only when the workers are qualified to participate in the practices. This requires that they possess the Level 3 Skills central to this study.

Statement of the Problem

The immediate problem was to determine the extent to which fifteen skills associated with the high-performance/high-involvement workplace concept were distributed within a sample manufacturing workforce. This was indicated in the study survey by the general question “What degree of training and/or practical experience have the employees had with each of the skills?” The two main points were (1) which of the skills did each of the subjects possess and (2) what was the degree of confidence in applying the skills that they did have? The aggregate combination of these two conditions for all fifteen of the skills was then used to determine if the person was qualified, using the definitions in this study, to perform in a high-performance/high-involvement work setting.

In the literature of high-performance workplaces, it is frequently noted that there is no consensus definition of a such a workplace (Delaney & Huselid, 1996) nor is there is a recognized list of the skills required of a worker in these environments. This paper offers an operationalized version of the skills needed based on a summation of those skills discussed in the literature.

The specific research conducted in this study provides foundation information relating to the larger issue of innovative workplace practices. The connection is that in order for the organizational practices to succeed, the companies need a workforce capable of performing the skills that support the practices. As Pfeffer (1995) affirmed, progressive human resource management practices, and especially synergies of these

practices, are positively related to firm performance. The practices succeed to the extent that the employees are qualified to make the practices work.

The literature emphasizes that creating empowerment is another keystone element of high-involvement workplaces. Empowerment, though, is a condition, it is not a skill in itself. It is the product of exercising skills that, as Spreitzer (1996) expresses it, reflect a person's orientation to her or his work role. For Spreitzer, empowerment "is the intrinsic motivation manifested in four cognitions," which she defines as meaning, competence, self-determination, and impact. It should be noted that these cognitions are closely aligned with the Level 3 Skills of this study. For instance, problem solving, decision making, and self-initiative are involved in creating meaning, demonstrating competence, pursuing self-determination, and exerting impact on the workplace. Empowerment in this sense emerges from the application of the Level 3 Skills.

Discussion of the Major Criterion Variable

The major dependent (criterion) variable was derived from the sum of the scores for the 15 subscale criterion variables in the study. Each of the 15 represented a skill associated with the high-performance workplace. For each of these, a participant could respond with 0 = no training and/or experience with this skill, 1 = some training and/or experience but not enough to feel confident in performing the skill, 2 = sufficient training and/or experience with the skill to feel confident in

performing it, or 3 = extensive training and/or experience with the skill, such that the person felt qualified to teach it to another employee.

Those cases registering either a 2 or a 3 on a particular skill were considered qualified to apply that skill in a high-performance work setting. In order to apply logistic regression, the dependent (criterion) variable needed to be re-coded to a dichotomous state. For each of the cases, the sum of subscale criterion scores for each of the 15 skills was summed; resulting in a maximum total of 45 points. This total was re-coded using 0 to 29 totals as “0 = not qualified” and 30 to 45 totals as “1 = qualified.” A sum of 30 or more meant that the person had scored each item at the 2 or 3 level. Then, the raw scores were re-coded with the new scores labeled as 0 = *not qualified for high-performance workplace* and 2 and 3 scores labeled as 1 = *qualified for high-performance workplace*. This new variable for each case became the criterion variable in the logistic regression calculations.

It should be noted that weighting the fifteen subscale criterion variables (e.g., applying doubled or tripled values to different skills in combination) to produce different totals did not substantially alter the output of the logistic regression attempts.

Discussion of Research Question 1a

What amount of Level 3 skills training and/or experience exists among the currently employed manufacturing workforce in the State College MSA?

One of the major findings of this study was the strength of conviction among the participants that they did possess the fifteen skills. One hundred and eighty-four workers, 77.6% of the 237 respondents, professed that they possess the majority of these skills at the 2 or 3 level of confidence based on their training and/or experience. Fifty respondents indicated that they possessed all fifteen at the threshold level.

This first finding is intriguing. It suggests that the employees may have a degree of knowledge and confidence that is not adequately acknowledged by management. This ability, if valid, represents a potential asset that companies would do well to better utilize.

An issue inherent in the survey method, as noted by Dillman (1978) is possible inaccuracy due to participant's tendency to offer socially desirable answers, that is, those that conform to the dominant belief patterns held by the responder's group. Since the 237 cases for this study were collected from 18 different companies, with no one company supplying more than 50 responses, the effects of peer pressure is unlikely. Yet, it may be that there is a universal social desirability in effect, and that there is a collective tendency to favor certain replies. Further research would be required to determine if the workers who participated in this survey do, in fact, possess the skills they claim to possess to the degree that they claim to possess them.

The large number of respondents possessing a wide range among the 15 skills is also noteworthy. As will be discussed in another section of this chapter, this poses the question of where and how the workers acquired these skills.

Discussion of Research Question 1b

For which of the fifteen skills are training and/or experience most common, for which are they least common?

In the summary of all surveys, the single skill receiving the most points was Self-Directed Learning. Team Membership was the second strongest/most common skill, followed by Self-Directed Work Team skills.

The most infrequently occurring skill was Advanced Computer; for this skill 75 cases (31.6%) indicated that they had no training and/or experience, by far the largest deficiency. Next most infrequent was Communications skills, with 41 respondents reporting that they have no training or experience. The third lowest rating was Understanding Workflow.

There is an intuitive logic to the finding that Advanced Computer Skills would rate low on the survey. The demographics of the sample are that this is a mature segment of the population with the majority holding a high school degree or GED as their highest level of education. Respondents most likely have limited experience with computers.

As to the skills that ranked high, it would be interesting in further research to determine the exact processes the employees ascribe to Self-directed Learning. This can be a complex procedure that involves motivation, analysis, synthesis, and high-level cognition. It is less surprising that the team-related skills rank high since these are a common component of employee involvement programs and training.

Discussion of Research Question 2

How are such training and/or experience distributed across the demographic and company variables used in the study?

There was little variation in the distribution of the fifteen skills across the demographic and company variables; similar descriptive statistics were obtained for each of the ten variables. This is a second significant finding of this research. The design of the study allowed for variation in effect across the ten predictor variables if some were stronger in influence than others. This differentiation did not occur. In comparing the cross-tabulations of each of the predictor variables to either the subscale or major criterion variables, it is remarkable how little variation there is in the numbers either between variables or among levels in the variables. The scores are uniformly high regardless of the factors.

This could mean three things. One, there were no variations. Two, the instrument was not sufficiently sensitive to detect the variation that did exist within the sample. The predominant profile of the participants was of production workers over 30 years of age with a high school education and 20 or more years in the workforce, most of it with the same company. The third possibility is that in filling out the survey people consistently gave themselves inflated scores. If this were so, it could have been due to the effect of socially desirable bias. Ichniowski, Kochan, Levine, Olson, and Strauss (1996) speak to the issue of response bias in their paper. They acknowledge that persons who perceive themselves as possessing certain traits are more likely to volunteer to participate in a survey inquiring about those traits.

The culture of the company is a key ingredient in the manifestation of these skills; two corollary questions to the one examined in this study (i.e., Do the employees possess the skills in the first place?) is if they do possess the skills are they using them? And, if they do possess the skills, how did they acquire them?

A study by Zamanoiu and Glaser (1994) examined the feasibility of changing organizational culture by increasing employee involvement. Their findings indicate that company culture can be managed and can result in positive gains for both employer and employees. Morley's study in 1995 of the relationship between team participation and job satisfaction produced the conclusion that not only had the implementation of high-performance teams generated a significant increase in satisfaction, it had also produced positive cultural shifts within the site.

Even if the employees possess some or all of the skills requisite to moving to a progressive alternative work arrangement, there may still be a reluctance on the part of the organization to pursue such a course. The reasons for this hesitation could be many: it could be the result of a long-standing distrust between labor and management, it could be a resistance on management's part to sharing power, it could be an aversion to risk in the face of an unknown, it could be a philosophical inability to grasp the new concept (Appelbaum & Batt, 1998; Boutwell, 1997; Kouzes & Posner, 1995; Pil & MacDuffie, 1996).

This hesitation contributes to the often-noted contradiction in which firms appear to promote the benefits of employee involvement while simultaneously ignoring opportunities to institute it (McCaffrey, Faerman, & Hart, 1995). Appelbaum

and Batt (1993) and Kerka (1995) expand on this theme by stating that not only do companies display this ambivalence toward employee involvement initiatives, but the very framework of the U. S. economy, its training system, capital markets, and labor law confound the transition.

Discussion of Research Question 3

Using logistic regression, can the workers in the study be assigned to either a “Traditional Work Skills” group or a “High-performance Work Skills” group based on the demographic and company predictor variables?

The outcome of the logistic regression analysis was that two of the ten predictor variables yielded significant results. The same uniformity of the respondents discussed for Research Question 2 may have affected the outcome of the logistic regression by eliminating statistically significant variation within the group. Due to the lack of diversity among the participants, few of the intended predictor variables emerged as significant.

Or it could mean that the predictor variables selected for the study were not the essential determinants of the criterion variable. If this were the case, then the question becomes what are the appropriate determinants? The variables for this study were chosen based on the literature of similar workplace studies. For whatever reason, the instrument did not extract the desired explanatory detail.

For the results of the two variables that were significant in the analysis, the interpretation is that Educational Level is the most influential, accounting for an

increased likelihood 4.401 for a 1-unit change (in this case from having a high school degree to having education beyond high school). The Programs criterion variable accounted for a 2.560 increased likelihood for each unit change. This is credible since company-sponsored continuous improvement efforts are likely to include employee training in non-job-specific subjects.

Discussion of Research Question 4

What additional training have employees received other than those categories listed in the study survey?

This question did not provoke much response; only 39 (16%) out of 237 participants provided answers. The responses listed 69 individual training topics which were coded into ten categories. The coding was derived following Creswell's (2000) five-step procedure.

As Dillman (1978) observes, open-ended questions can pose a distinct disadvantage in non-interview situations. The low response rate could mean that the majority of people have not had additional training, or it could mean that they were not motivated to answer the question. Since the participants were conscientious about completing other sections of the survey, the lack of response to this section may have been for a reason other than indifference to the question. In any event, the responses to this issue did not provide much data for analysis.

The responses that were provided suggest that the additional training they have received other than the topics included in the survey involved job-specific topics

(technical, safety, maintenance, equipment operation, etc.). Only ten participants listed “soft skills” (team skills, customer relations, stress management, etc.) training topics. To the extent that this list is comprehensive, it indicates that the employees in the sample have not received much training during their careers. See Appendix F for responses.

This conclusion is supported in a study by Curley (2001) of the fifty largest employers in a county adjoining the State College Standard Metropolitan Area that the most common types of formal training activities provided were occupational safety training, professional and technical skills training, orientation training, computer programming, awareness training, and quality/team training. The study emphasizes the limited scope of training activities, most were highly job and establishment specific.

As Lynch and Black (1998) found, there is a much lower incident of training programs having components that are likely to be portable to other employers. They found that only half the companies in their study provided general computer training or teamwork training.

Discussion of Research Question 5

What additional training would employees like to receive other than those categories listed in the study survey?

The typical response to this question was a request for more job-specific training. Considering the content and context of the survey, this is reasonable. In particular, additional training on computers was the most common request, 47 of the

74 respondents emphasized this need. This supports the finding in Research Question 1b that Advanced Computer skills were the least common of the fifteen Level 3 Skills.

People did not request more “soft” skills training (such as workplace communications, interpersonal skills, time management, team building, etc.). Lynch and Black, 1998, refer to these as general skills, those that can be transported between firms or industries. They further note these are the very skills associated with high-performance work systems. Finally, they cite standard human capital theory as an argument that firms will not normally provide this general training. This lack of perceived need for general skills may imply that such skills are not considered relevant in their workplaces. This possibility ties in with the theme of this study by emphasizing that neither management in general nor the workforce in general understands the vision of the new work order. There may not be a demand for these skills because there is no perceived need for the skills. As Cappelli and Rogovsky (1994) note, the most common skills required in the new work settings are behavioral ones, such as working in teams; workers may not readily identify such practices with “work skills.” Cappelli and Rogovsky suggest that it may be time to broaden our understanding of what is a “skill” in a contemporary work setting.

Discussion of Research Question 6

How useful to the employees has the training they have received been in terms of (1) improving their productivity, (2) improving their work quality, (3) improving their job satisfaction, (4) preparing them for opportunities for advancement, (5)

improving the teamwork within their work area? In addition, this section of the survey asked for concluding comments about the workplace training they had received.

The responses to the five parts of this question provide an endorsement of the value of workplace training. For the 218 respondents (92% of the total) who completed this section, a total of 83.8% (871 of 1,040) of the responses were in the *Fairly Useful* or *Very Useful* columns. Only the influence of training on opportunities for advancement had a low rating, with 37% saying that it had little use. This could be due to the lack of advancement opportunities within the companies and not a direct reflection on the value of training efforts. Effective training should be viewed as an investment in future productivity and continuous improvement, not merely a current expense.

The response to the teamwork issue supports Godard's (2001) claim that team based work appears to have highly positive implications for employees (2001). Godard extends the possibility that some of his negative findings concerning the effects of alternative work practices may result from the companies in his study failing to adopt the necessary HRM practices needed to support the changes.

There is a contradiction in the responses within Research Question 6. While the check boxes indicate that employees do value training for the effect that it has on their work life, almost half of the written comments that accompanied this question reveal a cynicism about how training is allocated and administered. Of the 68 comments received, 32 were negative. Representative statements were "There is no

training in our company at my level,” “Opportunities for advancement - pretty much non-existent,” “Not enough [training] to even mention.” (See Appendix G for the complete list of comments.)

It appears that the need for training is acknowledged by production workers. It may be management, as Cappelli and Rogovsky (1994) suggest, who are reluctant to accept and implement the new techniques. They are the ones who hesitate to experiment with unproved practices. Lynch and Black (1998) concur with this sentiment, investments in non-portable, firm specific training are more attractive than in general training since the firms feel they can capture a return on it. Neal and Tromley (1995) stress the need to focus on two managerial tendencies that threaten high-performance efforts. The first is the tendency for managers to look for quick fixes instead of taking a long-term view; the second is the tendency to implement solutions in a piecemeal fashion rather than taking a systems approach.

General Conclusions

A major finding of this research was the extent to which the workers surveyed expressed their confidence in possessing and being able to use the Level 3 Skills. The employee's confidence level was expressed by the self-reported extent of their combined training and experience with the 15 indicator skills. The four response categories (0 = no training and/or experience with the skill; 1 = a little training and/or experience, but not enough to feel confident in using the skill; 2 = sufficient training and/or experience to feel confident in applying the skill in the workplace; 3 =

extensive training and/or experience with the skill, enough to be confident in teaching the skill to other employees) thus combined the degree of training and experience as a proxy for confidence. The more training and experience the respondents had with each of the 15 criterion skills, the greater was the likelihood that they would perceive their confidence in applying that skill in the workplace.

This high degree of confidence was pervasive in the sample, and this confidence was uniformly distributed across the variables examined for both the individual workers and the companies. The results of this study indicate the skills that were strongly represented among the production workers, along with the degree of confidence the workers have in using the skills, and the skills that were lightly represented. Further analysis revealed how the skills were dispersed across ten individual and company variables.

In addition, the study applied logistic regression to the survey data to determine if the cases could be assigned to membership to one of two groups (those equipped primarily with only the Level 1 and 2 Skills required in a traditional workplace or those additionally in possession of the Level 3 Skills needed in a high-performance workplace). This procedure required the creation a high-performance skills and practices matrix based on a meta-analysis of the literature.

An additional four open-response items in the study permitted the respondents to comment on training they have received, training they would like to receive, and the value of the workforce training they have experienced.

The finding concerning the prevalence of the Level 3 Skills is noteworthy because it offers evidence that the workforce may be better prepared to move to more flexible, innovative work arrangements, such as the high-performance workplace, than is generally considered as feasible. The results of surveys conducted by National Association of Manufacturers (1997) and the National Center for Education Statistics (1999) present a skeptical perception on the part of management of the ability of American workers even at the basic skills level.

The results of this study raise the question of the accuracy of that perception. This could allow for a beneficial blending of an organization's social (human) system with the technological component (Appelbaum & Batt, 1993) that would realize the goal of management-labor collaboration and mutual reward. It may be, as Lawler, Mohrman, and Benson (2001) speculate, that the employees are much better equipped to participate in the responsibilities of decision making, problem solving, process control, and the like than generally believed by managers, and can thus be better utilized as a powerful competitive advantage

Cappelli and Rogovsky (1994) make two points worth noting pertaining to this line of reasoning. The first is that not all workers necessarily need all the skills in any particular work environment, as long as the skills are adequately represented within the team. Further, they note that the changes in skill content for workers in companies who adopt the innovative practices may be relatively modest and, therefore, workers may already have or can easily obtain the skills.

This could indicate a justifiable confidence with the skills or it could be that the participants are defining the skills in terms relative to their work environment, but not in such a way that acknowledges the true extent and complexity of the skills. This could be checked by further research which actually tests the employee's knowledge and ability to apply the skill. The subjects in this study may be assessing their competency of the skill against a narrow understanding of what the skill actually implies. This absence of a widely accepted understanding of high-performance practices makes it difficult to compare findings across studies (Delaney & Huselid, 1996). They cite a critical need for consensus concerning the measurement of such practices.

Handel and Gittleman (1999) encountered a similar problem in their study measuring the effect of high-performance work practices. They note that differences in results among studies raise the possibility that these practices are intrinsically difficult to measure; survey respondents may have different ideas as to what qualifies as a "team," for example, or "job rotation." They suggest that the perceived effects of the high-performance skills are distorted when "coarse measures group them with more nominal programs" (p. 8). Thus, it may be that the process of standardizing terminology for a generally-applied survey may conflict with site-specific meanings of words. Employees will interpret the item in the language of their own work environment; Handel and Gittleman refer to this as "differential selection."

Ichniowski et al. (1996) concur, their phrase for this individual interpretation of terms is "idiosyncratic opinions." They comment that there is a high degree of

subjective judgment when working with “such difficult-to measure-constructs as employee involvement” (p. 308).

Another finding was that the distribution of skills was not significantly affected by the variables of gender, age, education level or workforce experience. This raises the question of what are the distinguishing characteristics that determine who does and who does not possess these skills. This is an important issue since the understanding of which variables are at work determines the ability of workforce preparation providers to influence those variables. It would be extremely useful to have a model that contained the proper variables to permit assignment of workers to the two groups identified in this study.

It may turn out, though, that the lack of definitive results from the regression analysis is not the fault of the model but is a consequence of the study population. It may be that another sample drawn from another population, perhaps in a more urban area, would yield statistically significant results.

Consistent with the findings of Lynch and Black (1998), this study supports the conclusion that the traditional educational process is no longer adequate to meet the needs of employers or employees as a response to the need for skills upgrading.

Recommendations

Employers and employees. The following recommendations are made to employers and employees.

- Manufacturers should objectively assess the skills that the employees possess. They may find that they are sub-optimizing the contribution that the employees are making to the organization.
- Employers should structure the workplace in such a way as to take advantage of these talents (which is the essence of this study). They should include these skills in their job descriptions and take them into consideration during the hiring process. Part of this process is ensuring that the complementary human resources practices are in place to support the work floor practices. This would include appropriate compensation packages and evaluation systems.
- Employers should consider installing the new work practices in clusters (also known as bundles). Many authors emphasize the importance of complementarities, synergies among practices that yield better results than implementing practices individually.
- Employees should audit their own skill sets to (1) promote the use of the skills that they do have and (2) address deficiencies. This is an age of “free agency” in the labor market; those with the strongest skills are the most marketable. Special consideration should be given to the concepts of portable and non-portable skills.

This approach would require a rethinking of the structure of the manufacturing workplace and the relationships between “management” and “labor” (quotation marks used to emphasize that this is old thinking), but the evidence is that it is time for that reconsideration. There must be a new management philosophy to accompany and support the new workplace theories.

Workforce preparation providers. The following recommendations are suggested to those involved in workforce preparation:

- Those involved in workforce preparation need to examine articulations of skills development between the many stages of the worker's total career development. If these fifteen skills are essential to successful participation in an innovative workplace, then where within a person's career development chain are they being offered? Are there opportunities for linkages of the skills between the education process and work experience? Can these linkages and transfers of learning be more strongly reinforced?
- Education and training providers should encourage and join the quest to define the Level 3 Skills. The clarification of what constitutes these skills is essential for the design and development of training delivery.
- It is further recommended that the education providers continue the process of both understanding and influencing the changes that are occurring in the workplace. This means working closely with policy makers and manufacturers. The barriers to participation are embedded in social, economic, and political paradigms that are resistant to change.

Further research. The following recommendations for further research are offered.

Since this study was limited to one county in Pennsylvania, it is not possible to generalize the findings to other geographic areas. As discussed previously, this

limitation may have affected the outcome of the logistic regression. It is recommended that the same study be conducted in areas that have predictably more diversity in order to test the efficacy of the instrument. It may be that both the subscale criterion variables (the 15 HPWP skills) and the ten predictor variables in the survey are appropriate to performing the desired assignment of cases using logistic regression if a more diverse population were sampled.

This study relied on self-reporting on the part of the employees. As Dillman (1978) observes, such responses are subject to misrepresentation for many reasons. If an employee asserts that they are competent in, for instance, decision making, then it would be of interest to actually test her or his knowledge of decision-making techniques and strategies. It may be that the employee has a narrow view of what is involved in these complex skills and is assessing her or his ability based on this limited perspective.

An intriguing question associated with the results of this study is how did the workers who professed an ability in the Level 3 Skills acquire those skills? What are the linkages between the sources? Further research on the options is warranted. Knowing the answer to this question would assist employers in their recruitment efforts and would assist workers in planning for skills acquisition.

A final recommendation is for further study of the extent to which workers are actually using the skills in the workplace. What opportunities does the workplace provide them for such application? This and the other recommendations will add to our ability to create high-performance/high-involvement workplaces.

The problem introduced in this paper is but a microcosm of a larger situation. In a national context, the problem is that since the workplace of the future will value brain over brawn, the emphasis of development should be on intellectual capital. Therefore, the overarching problem is that America may be entering a new age of industrialism with a workforce that is lacking in the foundation abilities to make the transition (Pearn, 1994). The need for the nation is to invest in the development of the appropriate skills for our human capital.

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Appendix A
The Survey Instrument

Work Skills Training and Experience Survey (WFED PSU)

Dear Participant:

By completing this questionnaire, you are participating in a study that will help determine whether or not Centre County manufacturing workers possess certain work-related skills.

The questionnaire is **anonymous**. Your participation is voluntary, and you may decline to answer any question. Although I do encourage you to fill out both the questionnaire and the information sheet completely since all the information is important to the study.

Instructions: For each of the following workplace skills indicate the amount of the combined training and/or experience (**from any source**, including present and past employment) you feel you have received during your total work career by circling the appropriate number.

Here's what the numbers mean.

0 = you **do not** have any training and/or experience in that skill

1 = you have had **a little** training and/or experience in that skill but not enough to make you confident about actually using the skill

2 = you have had **a fair amount** of training and/or experience in that skill, enough to make you **confident** about using the skill in the workplace

3 = you have had **a lot** of training and/or experience in that skill and feel **very confident** in your understanding of the skill (you could even **teach** it to others)

#	Skill	Amount of Combined Training and/or Experience (circle one)
1.	I have the training and/or experience needed to work in a team with other production workers	0 1 2 3
2.	I have the training and/or experience needed to <i>lead</i> a team made up of other workers	0 1 2 3
3.	I have the training and/or experience on how to keep my work area organized	0 1 2 3
4.	I have the training and/or experience in <u>basic</u> computer skills needed in the workplace	0 1 2 3
5.	I have the training and/or experience in <u>advanced</u> computer skills needed in the workplace	0 1 2 3
6.	I have the training and/or experience needed to work in a team of employees <i>without direct management supervision.</i>	0 1 2 3
7.	I have the training and/or experience needed to plan the flow of work, materials, and equipment usage in the workplace (Continued on Page 2)	0 1 2 3

0 = you **do not** have any training and/or experience in that skill

1 = you have had **a little** training and/or experience in that skill but not enough to make you confident about actually using the skill

2 = you have had a **fair amount** of training and/or experience in that skill, enough to make you confident about using the skill in the workplace

3 = you have had **a lot** of training and/or experience in that skill and feel **very confident** in your understanding of the skill (you could even **teach** it to others)

8.	I have the training and/or experience on how to communicate with all levels of an organization (for example, making a presentation to management about a team project)	0	1	2	3
9.	I have training and/or experience in methods for problem solving in the workplace	0	1	2	3
10.	I have training and/or experience on how to perform set-ups and make-readies on my department's equipment	0	1	2	3
11.	I have the training and/or experience on how to read and understand production reports (such as schedules, material requirements, special instructions, etc.)	0	1	2	3
12.	I have the training and/or experience on how to understand the way the various production areas support one another	0	1	2	3
13.	I have the training and/or experience on quality requirements and ways to meet those requirements	0	1	2	3
14.	I have the training and/or experience to keep the equipment I use well maintained	0	1	2	3
15.	I have the training and/or experience to learn what I need to learn in order to do my job without being told by supervision	0	1	2	3
16.	I have the training and/or experience to understand the customers' requirements	0	1	2	3
17.	I have training and/or experience on how to share ideas with other workers and reach an agreement about what needs to be done	0	1	2	3
18.	I have training and/or experience on how to work safely	0	1	2	3
19.	I have training and/or experience on how to deal with problem work materials and situations that don't allow me to do my job properly	0	1	2	3
20.	I have training and/or experience on how to properly calibrate the equipment that I work on	0	1	2	3

Written Responses

A.) Please list any other workplace skills for which you have received training that are not included in the survey.

- a. _____ b. _____
 c. _____ d. _____

B.) What workplace training would you like to receive that you have not received? (This could apply to either your current job and/or as preparation for a future position.)

- a. _____ b. _____
 c. _____ d. _____

C.) Check the box that indicates how useful the training you have received has been for improving the following.:

	<u>Little Use</u>	<u>Fairly Useful</u>	<u>Very</u>
<u>Useful</u>			
Your Productivity -----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your Work Quality -----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your Job Satisfaction -----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your Opportunities for Advancement ----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Teamwork within Your Area -----	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

D. What else would you like to say about the workplace training you have received?

Information from Survey Participants

Please provide the following information about yourself. This information is needed for the study. This information is confidential and anonymous. **Do not sign this form.**

What is your gender? (check one) FEMALE MALE

What is your age? (check one)

25 years and/or younger more than 25 years, less than 31 years
 31 years to 40 years more than 40 years

What is your highest level of education? (check **only the one** that indicates your highest level of education)

not a high school graduate
 high school graduate and/or GED
 beyond high school (trade/business school/college, etc.)
 graduated trade/business school/2-year college
 graduated 4-year college

How long have you worked for your present employer? (check one)

less than 1 year
 1 year to less than 6 years
 6 years to less than 10 years
 10 years to less than 20 years
 20 years or more

How many years have you worked for both your present employer and other employers? In other words, how many years have you been working full time? (check one)

less than 1 year
 1 year to less than 6 years
 6 years to less than 10 years
 10 years to less than 20 years
 20 years or more

That's what I need to know. Thanks!

Ron Shafer, Department of Workforce Education and Development
The Pennsylvania State University
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Appendix B
Letter to Expert Panel

<<NAME>>
<<ADDRESS>>
<<CITY>><<STATE>><<ZIP>>

Dear <<NAME>>:

This is a request for your assistance as an expert resource in a study on high-performance workplace (HPWP) practices and skills. I am familiar with your work from my literature review. This assistance involves completing and returning the enclosed 1-page survey.

I am a former manufacturing supervisor and manager who is now a doctoral student in Workforce Education and Development at Penn State. For my dissertation, I am researching the occurrence and distribution of Level 3 skills (those required for participation in a high-performance workplace) within an existing industrial workforce. The Abstract of my study is enclosed.

As part of the research design, I need an expert panel to validate my operationalized list of Level 3 skills. A review of the literature has provided me with tables (attached) of the skills and organizational characteristics associated with HPWPs.

I am attempting something subtle in this study. I want to establish a threshold point at which an employee moves from being a traditionally-skilled worker to being a viable candidate for a high-performance setting. Think of it this way: You're hiring a person to work in an established high-performance environment. All the applicants have similar employability skills (Level 1) and technical skills (Level 2). You'll make your selection based on how well the applicants fit into your high-performance environment without preliminary "soft skills" training. What are the minimum levels of essential H-P skills that you look for? (Assume that they will receive continuing training in the more sophisticated skills as their careers progress.)

Also, might you recommend other experts who you feel are qualified to assist me in this quest?

Thank you for considering this. I will be in contact with you to discuss your possible participation and to answer your questions. You are certainly welcome to contact me.

Sincerely,
Ron Shafer
<<e-mail address>><<phone number>>

Appendix C

Questionnaire: Profile of High-performance Worker

Survey: Idealized Profile of a Minimally-Qualified HP Worker

Rating (circle the appropriate rating for the HPWP skills):

0 = no preliminary knowledge and/or experience of this skill is needed at the entry-level

1 = a minimum understanding of and/or experience with this skill is required at the entry level

2 = a moderate understanding of and/or experience with this skill is required at the entry level

3 = extensive understanding and/or experience with this skill is required even at the entry level

NOTE: For the study, 0 and 1 = Non-essential 2 and 3 = Essential

Ability to work in a team with other employees; understand group dynamics	0	1	2	3
Ability to lead a team made up of other workers	0	1	2	3
Competency in methods for problem solving in the workplace	0	1	2	3
Ability to contribute as a member of a self-directed work team	0	1	2	3
Ability to plan the flow of work, materials, and equipment usage in a workplace	0	1	2	3
Ability to communicate with all levels of an organization (for example, making a presentation to management about a team project)	0	1	2	3
Ability to read and understand production reports (such as schedules, material requirements, special instructions, etc.)	0	1	2	3
Ability to understand the way the various production areas support one another	0	1	2	3
Ability to understand quality requirements and the ways to meet those requirements	0	1	2	3
Ability to learn what needs to be learned in order to do the job without being told by supervision	0	1	2	3
Ability to understand the customers' requirements	0	1	2	3
Ability to share ideas with other workers and reach an agreement about what needs to be done	0	1	2	3
Ability to resolve problems with work materials and situations that interfere with the proper performance of the job without supervisory intervention	0	1	2	3
Ability to apply decision-making techniques and strategies	0	1	2	3
(suggestion)	0	1	2	3
(suggestion)	0	1	2	3

Thank you. Return this survey to Ron Shafer in the envelope provided.

Appendix D
Cover Letter to Companies

<<NAME>>
<<ADDRESS>>
<<CITY>><<STATE>><<ZIP>>

Dear <<NAME>>:

Might I discuss with you the possible participation of <<COMPANY>> in a workforce development survey? A copy of the survey is enclosed.

The intent of the study is to determine the occurrence of selected work skills within the Centre County manufacturing workforce. The survey is completed by non-supervisory/non-managerial personnel.

Four key points about the survey:

- It is totally **anonymous** (the employee's company will be known).
- It is **voluntary**.
- It is completed on the employee's own time (it takes about 15 minutes).
- It is benign. The topics of the survey are not intrusive.

In return for its participation, <<COMPANY>> will receive a summary of both its data and the aggregate county-wide data. We will be pleased to discuss the value of this information with you.

The results of this study will help in the design of more effective worker preparation programs. As such, it will benefit employers, employees, and the community; we think it treats many interesting issues.

I will contact you for a response to this request, or you are welcome to contact me. I thank you for considering this request and I look forward to talking with you.

Regards,
Ron Shafer
<<e-mail address>>

Appendix E
Cover Letter to Employees

Department of Workforce Education and Development, The Pennsylvania State University

Dear Participant:

I am a Penn State graduate student studying the occurrence of selected skills within the Centre County workforce. This information will help in providing better workforce preparation programs.

Here's some information about me. I entered graduate school after 16 years in local industry as a supervisor and trainer. I know what it's like working in manufacturing. My goal with my research and my career is to explore ways to make the system work better for everyone. The study I'm asking you to help me with is part of that process.

I'm asking you to fill out a survey about workplace skills. Three important points about this survey:

- 1.) It's **voluntary**. It takes about 15 minutes of your time.
- 2.) The information is **totally anonymous**. You don't sign it. You return it directly to me. I don't show it to anybody else. It is necessary for this study that I match up your responses with the company that you work for so I will know which company a response comes from.
- 3.) If you do return it, you have my **sincere thanks**. Without responses, I don't get the information I need to complete my study.

Read the instructions then respond to the statements as best you can. There are two parts to this, the survey itself and the Employee Information form, Page 4, (which I really need).

For information and answers about your rights as a research participant in this study, contact the PSU Office for Research Protections at (814) 865-1775.

Thanks in advance for doing this. When you're done, place the survey in the envelope and mail it to me. Your completion and return of the survey says you have agreed to participate in this effort. Keep this cover letter for your files.

Regards,
Ron Shafer
<<phone number>>

June 2004

Appendix F

Written Responses to Survey Items A & B

Survey Responses to Items A and B

Item A asked: *Please list any other workplace skills for which you have received training that are not included in the survey.*

Item B asked: *What workplace training would you like to receive that you have not received? (This could apply to either your current job and/or as preparation for a future position.)*

NOTE: The number in the left-hand column is the case ID.

	Item A	Item B
2	forklift operator, painting	
3	roofing jobs, drywall jobs, mechanics	
5	operate machinery	
8	safety and compliance, sales	
10		computer knowledge
14	first aid, tow motor	computer (advanced), S.O.P.
15	supervisor classes I and II	
19		office experience
20		office procedures, shipping procedures
23		how are equipment is used, where our equipment is used
25	time management, anger management, character building	heavy equipment operator
28		advanced computer skills
32	Pro E, AutoCad, Feature Cam, Window XP	AutoCad
33		advanced computer skills
36	safety	
38		computer
41	electrical	CAD, computer skills, CNC programming
42	SPC, work flow, TQC	computer training
43	charting, meet and exceed the customer's expectations	more computer training
44		the processes that our equipment is used for
45		computer skills, calibration skills
46	fork lift, 6 sigma, OHSA[sic?]	

		195
49		CPR, computer programming, precision machining, electrical troubleshooting
52	MRP, TQP/TQM, project management	supply chain management
54	kanban	project features
56	pallet jack operator, forklift operator, blueprint reading	more computer training
59	MSDS, lockout/tagout	more advanced computer skills
61		management position, advanced computer
68		computer skills
69	prepress, customer service	
76		technical training
78		copy center machines, mail service machines
85		computer
88	payroll taxes	computer skills pertaining to job
91		computer
93		computer skills
95		heavy equipment, electrician
96		computer skills
97		computer skills
99	mastercam, CNC programming	
101		more computer training
103		computer skills
106		CNC training, more computer training
107	CNC training, CAD-CAM training, CNC programming	training in another trade
110		more extra-advanced computer training in graphic programs
113		computer skills
125		safety, updates on materials, updates on production
132	lean manufacturing, sexual harassment, quality, how to manage difficult people	preparation for retirement
134		more computer training
139		office software use
148	fundamentals of lean, kaizen	web creation
155		managerial

		196
156		quality assessment
160		additional computer training
161	kaizen, quality improvement	computer skills, digital imaging
166		electrical side of product
167		cross training
168		computer training
169		computer program, testing/QC, management/production planning, problem solving
170		advanced SPC
171	problem solving between employees	more computer skills, more involvement in set ups
174	industrial mechanics, welding	industrial electrical
182	food services, plastic factory	computer, retail selling, machine operator
184		on job training in other areas
185	electrical	speaking in public
190	hazardous materials	
192		more computer skills
195		computer troubleshooting skills
198		cross training in other areas of the plant
199		more computer related courses
202	communication	
204	IPC610, ESD, J Standards, sexual harassment	
205	RF Theory, standards training, sex harassment	
207	ESC, IPC-610, J-Standards, fire safety	some technical training
211		computer skills
212		Plexiglas fabrication
215		more computer skills (advanced)
216	thinking outside the lines, sexual harassment awareness	more computer skills, more electronics training (advanced)
217		computer skills
218		computer
222	safety, materials safety data sheet	more computer training
223	safety training, audit, regulatory	
225	proper use of support equipment	more computer training
226		more set up training, operator fork truck
228	tool making, machine repairs, forklift truck operator	welding
233	programming, machine operator training	

Appendix G

Written Responses to Survey Items C & D

Survey Comments for items C and D

Item C asked about the degree of satisfaction the employee had with the training that they had received and its impact on their productivity, work quality, job satisfaction, opportunities for advancement, and teamwork within their area.

Item D asked: *What else would you like to say about the workplace training that you have received?*

NOTE: The number in the left-hand column refers to the case ID.

2	D. need for opportunities for advancement to employees who are the true backbone of the company!!
3	D. nothing really, it's the same everyday
6	D. the skills I received can only be used here
7	D. the nature of the prepress end of printing is constantly changing with software/hardware advancements so training is ongoing daily- changing constantly. Because of this a lot of my training is self taught or acquired as a group with co-workers or supervisors
9	C. I think people are like ingredients in a recipe- good ingredients make the best dish; preparation is important but ineffective for bad ingredients. D. Training has not been extremely important to me. It gives me time to concentrate on one issue, but experience is more valuable to me and I'm sure to my employer. I think the most important criteria to choose or retain an employee is the employee's attitude and natural ability.
10	D. haven't received any training with current workplace. picked stuff up on my own.
12	D. you can't take it away from me
13	D. the training that I have received here have [sic] helped me a lot. I have learned a grate [sic] deal on what go's [sic] into a printer work.
14	D. not enough to [sic] even mention
18	D. I feel that the traing [sic] the company has provided makes me able to perform any task that the company may assign me.
27	D. a lot of the training is useful for home life
29	C. opportunities for advancement- pretty much non existent
41	D. 90% of the training I had came from hands on while a certain few were sent out to train
43	C. actual work performed is not reconized [sic] D. its [sic] been a good mind set tool
45	D. we need to take time to train
53	D. throughout my 30 years of workplace employment, especially in the last 20 years when my experience brought me into the manufacturing arena, I have heard and do agree with the importance of workplace training. Unfortunately, many former employees are no longer with us even though they did everything asked of them in training. I'm sure the same is true for employees at Corning, Murata, etc., etc., etc. The need for improvement in workplace training rings hollow when employees see what's happening to American manufacturing these days.
54	D. great in years past. Could be better today.

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56	D. could be more comprehensive
60	D. needs more improvement
65	D. training is excellent for all employees. But received in different ways. Must be concise when training and must be followed by management.
88	D. I haven't been trained in years; I've been doing the same type of work for over 20 years.
90	D. I want to be out of the production end of manufacturing. It has been my goal to get into training, development, QC more of an office setting. I was able to achieve this at one time, however the plant that I was a group leader, head of an audit team, and trainer is now shut down so I became a dislocated worker starting over again. Sometimes you have to be more motivated and you have to show your commitment and drive to get extra training. I have worked with many people who don't want to be trained or learn anything more than the minimal necessary skills.
91	D. learned most of it by doing the work with a little supervision [sic]
92	D. the training never ends. There is always new products coming from engineering that you may need to be trained on. Engineering is always there for the techs when we need them.
105	C. not much opportunity to use my skills on different machines and in different ways D. I learned more at Penn College than on the job
114	D. lots of times it is not enough
116	C. workplace would run a lot better if employees were encouraged not to instigate problems, but instead concentrated on doing the best job they can. This does not promote teamwork. D. have received little training over the years. Mostly learned hands on and reading.
122	D. I have been given a lot of opportunities to take classes (company paid) on my own time to advance my working knowledge.
125	D. in the pressroom there is very little communication between the supervisor and his employees (examples: production meeting, safety concerns, paper spoilage and etc.) There is every little information shared with employees in group meetings.
128	D. it should be conducted at an earlier (?) stage instead of either late in the season or as an after thought. We need to be asked what training we feel we need or what else we would like to learn.
130	D. need more shown as Jostens do [sic] it. Not just how a program works.
132	D. we have had a lot of the same training it just had another name. Jostens does a great job supplying training to their employees to create a better adjusted workplace.
133	D. a little better than nothing
139	D. it's been good, and is constantly continuing- a change from my past employer
142	D. there has been minimal training in various departments, most is on the job
144	D. not allowed to use some training we have been able to receive
149	D. training over the years has gotten a lot better
159	D. my employer is very pro-active with training needs
162	C. I've had much training with my previous employer. Blatek has yet to provide any type of training as far as teamwork or opportunities for advancement or personal growth. D. my current employer has not provided me with much training, only the skills I need to do my job. Most of my training has come from my previous employers.
163	D. most of the training I received has been ISO training

	200
165	D. clear instructions for new people coming in. Like: call-ins, time clock and breaks
166	C. there is no training in our company at my level
172	C. after learning all this I have advanced as far as the company will let me because they can bring in people who have never worked in this industry to do the office jobs and keep me on the production floor and so raises have greatly diminished. D. most of it was not really [sic] training it was figure it out on your own then train the rest of the people that the company hires to do it so they could get people in the plant that have no experience so they didn't have to pay them much
173	D. no real training programs. Learn by doing. other employees reluctant to help or share "tricks of the trade"
174	C. my skills are not being put to full use at my current job
182	C. there has to be better communication [sic] between the shifts and training on new production. We are left in the dark sometimes. D. sometimes I feel we need more
202	D. good training, that I do use everyday
205	C. training is generally ignored and not applied to our processes [sic]. The training is/was very good but management doesn't want to support implementation of methods we learned about in training D. it is <u>not</u> use [sic] in our workplace!
207	D. very thorough training
216	D. I feel that as workers, in the workplace, we are all trying to climb the ladder of success. However, I also feel that we are losing our people [sic] skills, like respect, kindness, and the important one communication
217	C. my company has frequently, 3 times per week for production, info, 1 per month production meeting and awards are given at each. A lot of incentive and motivation goals. D. the Dale Carnegie course they sent me to was an asset to team work and speaking in front of people.
218	D. all of our training is done by other coworkers like myself, not management, very little of them know any hands on work
220	C. some departments are so busy you don't get the time or opportunity to cross train D. I've had a lot of training to be in shipping or sales to advance in the company and get off the production line, but unfortunately things happen like the sales division gets sold or you get transferred due to cuts and that training is lost.
222	D. the workplace training we are given is just enough to do what we have to do with nothing more
226	D. I think the training we received in the ISO program gave us a more serious frame of mind as to how important quality and productivity means to our jobs to keep our company in operation and keep a good rating and relationship with our customers.
228	D. our training is not formal. It's just what we need to know to get to the next hot spot.
233	D. it was useful in realizing the teamwork is helpful.
237	D. most of the training I have received is OJT hands on. Very little in a classroom or seminar. We are now working on training parameters and skills sign off sheets.

VITA

Ronald J. Shafer

Education:

Ph.D., Workforce Education and Development
The Pennsylvania State University

M.S., Training and Development
The Pennsylvania State University

B.A., English Literature
Juniata College

Experience:

Organization Development Consultant
J. R. Rodgers & Associates

Human Resources Development Manager
Jostens Printing & Publishing

Editor and Publisher
The Pennsylvania Naturalist magazine

Staff Writer
The Daily News

Personal:

Spouse – Dehra W. Shafer