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ABSTRACT

The "rhetoric of skill requirements" is a way of describing work by decomposing the human contribution into distinct components. Three important characteristics of this rhetoric are especially germane to an understanding of work. The first characteristic is that jobs and their incumbents can be fully analyzed by breaking them down into skills. Three challenges to the adequacy of the concept of skill are as follows: (1) the rhetoric decomposes a job into skills but leaves unanswered how this bundle of skills is articulated into a skilled worker; (2) it seemingly removes the person as a concrete actor from the discussion of work; and (3) it explains outcomes in the workplace by explicating the skills people do or do not have. The second characteristic is that skills are "required" in some obvious way. Three lessons may be drawn from workplace examples: (1) skills are labeled as important or required by people for specific reasons; (2) the sense in which a skill is required can be unclear; and (3) skill "requirements" are not derived in any simple way from asking people about their jobs or observing them at work. The third characteristic is that context is peripheral to skill. Workplace experience shows that context affects the opportunities that workers have to exercise skills and their motivations to do so and context need not be a simple backdrop to action. Context should be incorporated into the rhetoric of skill requirements to provide a clearer understanding of what is involved in 'work." (17 references) (YLB)

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THE RHETORIC OF SKILL REQUIREMENTS

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THE RHETORIC OF SKILL REQUIREMENTS

I. INTRODUCTION

The past decade has seen an unrelenting and polemical discussion about the capabilities of American workers as they confront jobs being transformed by technology, work organization, and global economic restructuring. The discussion has been conducted primarily through various public and private reports which differ in their emphases on workplace or educational issues, and their utilization of empirical evidence versus expert opinion [1]. Although these reports are diverse, collectively they paint a distressing picture in which American workers are unqualified for present and future jobs due to the changing skill requirements of work and the deficiencies of schools.

These reports express the changing nature of work in terms of the skills jobs require, and accordingly, that people must have. Thus, although reports and commentators may differ as to whether skill requirements are increasing, decreasing, or changing, either globally or in specific jobs, they agree that the situation can be cogently described and analyzed through the commonsense notion of "skill." Debate then proceeds regarding the existence and nature of any gap between the skills required by the job and the skills brought by people to the workplace.

This paper explores the consequences of this "rhetoric of skill requirements" for how we conceptualize work, and its

implications for education. Specifically, the rhetoric contains assumptions about the nature of people and jobs, how tasks are performed, and how work is shaped by the context within which it occurs. I explore each of these characteristics by reviewing ethnographic fieldwork undertaken in two manufacturing sites, and briefer case studies conducted in two other workplaces. The intent of the paper is to both challenge the usefulness of the concept of skill in discussions of changing jobs, and to argue for the incorporation of context into those discussions. The reader should be forewarned that the conclusions drawn are necessarily speculative, for the ultimate goal is to challenge some common assumptions about how we think about work, not to establish substantive generalizations about what is really required in America's workplaces.

II. THE RHETORIC OF SKILL REQUIREMENTS

The "rhetoric of skill requirements" refers to a way of describing work by decomposing the human contribution into distinct components. Although the rhetoric may be used to describe jobs, skill requirements are clearly the result of an analytic endeavor that may take several forms (Wise et al. 1990). It may proceed by explicating the tasks performed by the worker, although this approach typically omits exploration of just how those tasks are performed. Alternatively, job activity approaches focus on the activities the worker actually engages

in, and they address how the worker performs those activities. Finally, ability requirement approaches explicate the human abilities presumed to be required in order for someone to perform a job [2]. Despite the differences in these approaches, each proceeds by decomposing work into the constituent skills required to perform it. Together, they imply that the performance of tasks will be improved if individuals can be provided with the requisite skills that follow from an analysis of the job.

The rhetoric of skill requirements is so pervasive and seemingly obvious that it seldom warrants attention in its own right. It is typically used by people to describe the work of others, as well as their own jobs. The academic and policy reports concerning work and education, too, typically include taxonomies of the skills workers presumably need in order to perform their jobs effectively. In fact, considerable resources have been devoted to specifying precisely which skills are critical for rejuvenating the American economy and redirecting American schools. One sometimes senses that if only everyone had this or that set of required skills, the nation's economic woes would disappear: thus, the exhortations for educators to find ways to develop them in students.

That work can be described by the rhetoric of skill requirements is granted, but a rhetoric does more than simply describe an objective world of facts. From an anthropological

perspective, the concept of skill requirements can be seen as the culturally specific means used to comprehend work in this and other industrialized nations, and as such, it constructs the world that we "natives" then discover around us. It is necessarily selective, pointing us in some directions and diverting us from others. Here, the rhetoric of skill requirements directs our attention toward jobs and people, and away from technology and work organization. It allows its users to construct models of a complex workplace reality and to posit educational responses that seem reasonable and logical, while other responses are not even entertained.

Three important characteristics of the rhetoric of skill requirements are especially germane to our understanding of work. First, the rhetoric of skill requirements decomposes workers or jobs into bundles of "skills." The approach of the influential 1991 SCANS Report ("What Work Requires of Schools") is illustrative. First, a set of "functional" and "enabling" skills were developed through literature review and expert opinion. Next, job incumbents or supervisors were interviewed and asked to describe the five to ten primary duties of the job and the five most important skills, knowledge or abilities for performing the job. Finally, the interviewees were asked to rate the importance of each SCANS skill for the job against a scale of "criticality."

This exercise in effect describes the human contribution to

work in terms of the relative importance a list of skills defined a priori. These skills are in principle mutually exclusive, and collectively they form a complete and exhaustive description of the job. The result is a sort of composite worker who "typically" utilizes a particular profile of SCANS skills, although no actual worker need do so.

Second, the rhetoric of skill requirements suggests that the skills identified are required in some sort of obvious way. The implication is that if they were lacking, the work would not get done. Clearly, this suggests that workers holding the same jobs or performing the same work must be in command of the same required skills. There is an individualism implicit here: the proper unit of analysis is the individual job, and individual incumbents must in principle be identically skilled. All this implies a clarity and certainty of what is needed in order to perform on the job.

Third, the rhetoric of skill requirements largely separates workers from the contexts in which they work by treating the workplace as a backdrop to individual-level action. The workplace as a context for skilled performance is treated as a given: it is simply there as a constraint upon the human actions that are performed. The specific contours of context are seemingly inevitable, shaped by exogenous and inexorable factors such as technological innovation or market competition. The idea

that a workplace is shaped by human choice and by actions taken by those who work there is generally absent. In the extreme, the skilled worker is one who can move freely between backdrops, transferring his or her skills effortlessly into new contexts.

Context is not, however, entirely removed from the action. Over the past decade, the idea that skills are generated in specific work contexts has become increasingly accepted. Based on several "activity approaches" toward understanding the structure of human action, the work of researchers such as Jean Lave (1988,1991) and Sylvia Scribner (1984,1986) has explored the relationship between context and skill. In fact, educators today are often exhorted to make school more like the workplace in order to "contextualize learning." This line of reasoning assumes that we currently know how the workplace shapes learning, and that the proper function of schools is to duplicate work settings. The first claim is an overly optimistic assessment of current knowledge, and the second reflects a limited conceptualization of the role of schools in society.

The point raised in this paper is a somewhat different one. If in fact skills are learned "in context," then we may fruitfully analyze the structure of that context for how it shapes learning. Thus, here we direct our attention away from skills <u>per se</u> and look instead to the characteristics of workplaces that structure the learning that occurs there.

I argue that the characteristics of the rhetoric of skill requirements steer us toward some lines of inquiry and away from others. The result is a discourse about work that replaces actual workers with typical ones. This simultaneously exaggerates our certainty about assumed skill deficiencies and their consequences, while conceptualizing the challenge to educators as much simpler and more manageable than it is. What is suggested here is a shift in focus to workplace practices and the incorporation of context into our analyses, and ultimately, into our policy debates.

The discussion below is based on ethnographic fieldwork conducted by the author with production workers in two manufacturing sites over a tenth month period during 1987-88 [3]. Kramden Computers (all names are fictitious) manufactures multi-user computer work stations in its Northern California facility. The jobs studied included assembly workers, test operators, repair technicians, and printed circuit board (PCB) technicians. Calhoun Wire manufactures "high-tech" wire products for specialized applications and fieldwork focused on the operators who ran the variety of machines used to make wire and cable. In addition, three other sites were visited for six week periods by other field workers, two of which are discussed here. These included Micro, Inc. (administrative support work in a semiconductor manufacturer), and Belton Computers (production

jobs in a manufacturer of personal computers). In all sites, the emphasis was on describing work in situ and in comparing descriptions of work with observations of it.

III. CRITIQUE OF CHARACTERISTICS

In the following sections, I discuss each of the three characteristics cited above by presenting illustrative materials from both the ethnographies and the briefer case studies. Presenting such qualitative materials in a limited space always raises difficult questions regarding selectivity. My intention here, however, is not to provide exhaustive descriptions of the sites, but rather to use these materials to pose challenges to our thinking about work. The goal is concept building, not empirical generalization, a task far beyond the scope of this paper. Instead, I wish to explore the limitations of each of the three characteristics by reference to descriptions of work in situ. More broadly, the intention is to establish the incompleteness of an analysis of work based on skills, and the need to incorporate context into any analysis.

Characteristic #1: Jobs and their incumbents can be fully analyzed by decomposing them into skills.

The rhetoric of skills is used to analyze work, and we may inquire into the nature of those analyses. Three themes are especially germane to educators. First, the rhetoric decomposes a job into discrete tasks and ultimately, separable skills,

although it leaves unanswered how this bundle of skills is articulated into a skilled worker. Put differently, is the job or the skilled worker merely the sum of a set of skills? We explore this theme by discussing the challenge confronting workers as they simultaneously perform multiple tasks.

Second, the rhetoric of skill requirements seemingly removes the person as a concrete actor from the discussion of work. It presumes that the job requires skills that the person "has," and accordingly, the discussion of person and self is outside of the discussion of education and work. Here we present materials suggesting that many organizations, especially those with "strong cultures," increasingly demand the engagement of the person in the company's fortunes. In such workplaces, the worker not only must have certain skills, but must also present themselves as a certain kind of person. I argue that this extent of penetration of the person by the organization renders the focus on skills incomplete.

Third, the rhetoric is typically used to explain outcomes in the workplace by explicating the skills people do or do not have. Thus, it situates causality in the job incumbent and largely omits the context within which the job is formed. We explore this theme by discussing the concerns of management in Kramden Computers that their workers lacked skills to "see the big picture," a category of skill similar to the "systems competency"

cited in the SCANS Report.

Regarding the first theme, much of the discussion of needed workplace skills emphasizes the new, presumably higher-order skills required when new technology or participatory forms of work organization are introduced. Yet one very traditional feature of many jobs figured prominently in the sites we studied studied: workers simultaneously performed multiple tasks. Workers frequently noted the ability to handle tasks thrust upon them suddenly as an important skill. While the managers of these companies frequently described this as "flexibility," workers indicated that it minimized the value of planning--another valued skill--and reduced the opportunities they had to demonstrate initiative (also valued) since they spent considerable time managing a work load that was imposed upon them. Workers often explained that while their isolated, individual tasks were manageable, in actuality they were performing several of them simultaneously, and that posed the challenge.

The case of Kramden Computers is illustrative. The company's computer assemblers faced ubiquitous shortages of parts which required that they frequently re-allocate their labor. Although the assembly line ideally presented a smooth, lineal flow of product, a worker might be forced to return to units several times over a few hours or days as needed parts arrived. Workers concurred that the tasks of assembly work <u>per se</u> were relatively

simple and routine, but they claimed that those tasks did not fully capture the nature of their work. One commented, "remembering where you are" in assembling the computers could be overwhelming, and workers occasionally forgot to complete some assembly steps due to the repeated interruptions. Many units were subsequently rejected at quality assurance inspections, a condition the workers attributed to the interruptions.

Repair technicians, too, worked on several defective units simultaneously. Their work entailed using automated tests to locate faulty parts, "swapping" them for new ones, and then re-testing the unit. Engineers and managers claimed the work was relatively simple because diagnosing the cause of failure within a modularized component was unnecessary, and in fact, prohibited. Although workers generally agreed with that assessment, they explained that it missed the point: the challenge was to systematically juggle swapping parts in several units, while awaiting the automated tests to cycle through a sequence. A veteran system repair technician, for example, was observed over an eight hour shift troubleshooting computers. Because some tests took thirty minutes or more to cycle, he worked on up to six units simultaneously, "swapping" modules between them, in order to efficiently localize the fault. When the shift ended he walked to the cafeteria where he sat quietly alone for thirty minutes, explaining that he usually "unwound" with a cigarette

before going home.

These examples suggest that while work can surely be decomposed into skills, something very important is left out: the temporal dimension of tasks and their overlapping nature. How the worker actually manages this complexity is typically omitted, since the job is described as an atemporal set of tasks, not a shifting, interdependent flow of activities.

Another challenge to the adequacy of skill for analysis work comes from managerial attempts to achieve control in the workplace via "strong corporate cultures" (Deal & Kennedy 1982; Peters & Waterman 1982). Hochschild (1983) and Kunda (1992) note that such strategies seek to internalize corporate values and norms in workers by manipulating public rituals and symbols. Regardless of their ultimate success as a managerial tool, these strategies are associated with "deep acting" (Kunda 1992: 156) by workers who are compelled to present convincing performances as particular kinds of people as a basis for continued employment. What the worker <u>feels</u> ceases to be private, and workers may eventually become the people that they initially only appeared to be. Working in such workplaces may well require interpretive and presentational skills, but it requires much more as well: the engagement of the whole person.

The administrative workers studied in Micro Inc., for example, worked within a well-defined and articulated

organizational culture that emphasized "autonomy" and "openness." Like managers in many "strong" culture companies, Micro's management are cultural relativists who allow that their corporate culture is only one of many and it may not be suitable for everyone. Other employment, of course, is not always available and for those who stay, there is little choice: to work there you must somehow adapt to a culture which may require performances that make demands upon the person's sense of self. In this sense, Micro Inc. employs people and makes demands upon them as whole people; it does not simply purchase their bundle of skills. Insofar as employers increasingly use strategies to obtain deeply internalized commitment by workers, the use of skills to describe what is required for jobs will be significantly incomplete.

As a final challenge to the validity of skills as an adequate means to analyze work, we explore the ability to "see the big picture" that was desired by management in Kramden Computers. We examine this skill because of its striking similarity to the "systems competency" identified in the SCANS report. Identifying this as a skill situates it in jobs or persons, and allows us to hold the worker responsible for "seeing" or "not seeing" "the system." Yet whether workers "see the big picture" is partially a function of what is there to see, the access workers have to it, and their incentives to look.

In Kramden Computers, "seeing the big picture" took the form of work teams planning their daily production of computers. This involved taking a monthly production target and computing the number of units that had to be built each day in order to reach it. The task was complicated by the fact that the computers passed through automated tests that could take several days: thus, more computers had to be assembled early in the month in order to have sufficient "product in the pipeline" as the end of the month drew near. The teams resisted both taking the daily inventory of "their" computers, as well as performing the calculations needed to determine the next day's "build total."

Supervisors lamented the teams' inability to regulate their daily production of computers, but the workers saw it quite differently. From their perspective, learning to understand the entire manufacturing process and to perform the calculations to determine a daily production target were irrelevant. Production of PCBs was subcontracted to several vendors and shortages of needed parts was a daily occurrence that was beyond their control. Why, they asked, should they waste time on computations that were rendered superfluous when a vendor failed to deliver PCBs as promised? Likewise, re-configuring boxed computers to meet customer demand or to implement changes specified by engineering (Engineering Change Orders) rendered careful planning irrelevant. And, they argued, if they met production targets,

management simply brought out more "kits" of parts to assemble: there was no incentive to meet production targets.

Workers also complained that management had adopted a very self-serving definition of the "big picture." One group of workers, for example, had requested and been granted a tour of the customer service department in an adjacent building. Because workers in that department performed many of the same tasks as the production workers, they were seeking ideas about performing their work more efficiently, and seeing first hand what sort of faults afflicted the products that customers had returned. Although this visit was reportedly useful to everyone involved, the production manager banned further trips because he feared his workers might use them to transfer to another department.

In addition, supervisors had long maintained control over the production floor by restricting the information available to workers. For example, system repair technicians were barred from having schematic drawings of the computers they repaired because, according to management, they were unnecessary. Supervisors assumed that any technician requesting such documentation was contemplating "board level" repairs (i.e. replacing parts on a specific PCB), rather than simply replacing a faulty PCB and leaving its repair to a PCB technician. Workers suggested that management generally allowed them only the information they thought was needed to perform the tasks, and prohibited any

documentation that would allow them to learn more and possibly advance their careers. One supervisor joked that they controlled the workers "through ignorance."

This wider historical context of production floor relations must be considered when we assess claims about the importance of "seeing the big picture." In Kramden Computers, there were always tacit limits which workers had to discover, for clearly they were not encouraged to inquire about <u>everything</u>, regardless of management's statements. Again, we see the importance of being able to interpret the often implicit constraints that guided the curious worker as he or she explored farther and farther away from their assigned tasks. Put simply, the systems workers are to "see" are not lying there awaiting discovery, but they are often concealed by the same supervisors and managers who lament their workers' inability to detect them.

These three challenges to the adequacy of the concept of skill suggest that what we observe when we study a workplace is produced by a system shaped by technology and organization, as well as the more obvious actions of workers. From this perspective, what we see people doing at work represents only a manifestation of this larger system of relationships, and we cannot fully comprehend the former without explicating the latter. This also suggests that the concept of skill may function to blame workers for breakdowns in much larger workplace

systems. In this sense, the concept of skill is value laden in that it directs our attention to the contributions of workers, but not to the historically conditioned relations within which they work.

Characteristic #2: Skills are "required" in some obvious way

The notion of skill requirements rests upon the idea that some skills are more critical or important if tasks are to be performed. Fieldwork demonstrated that importance itself is problematical when it is based upon the accounts people provided of jobs. First, workers and supervisors spoke of skills as important if they were central to the job. Kramden Computer's mechanical assemblers, for instance, demonstrated fine motor coordination in order to position and secure computer components in a chassis. More broadly, skills important in this sense must be exercised in order for a task to be completed.

Second, importance often referred to the level of a competency required by a worker. Competence in problem solving often fit this pattern. It might be infrequently required and not even central to the job, but when it was needed it was perceived to be needed at a high level. Less competent workers still worked effectively because there were relatively few instances when problem solving was required. Skills were also deemed important if they were used constantly, even if at a low level. Oral communication skills typically fit this pattern.

Skills assumed importance in two other ways. Sometimes a skill was an important factor in being hired for a job; alternatively, a skill could be important for career advancement. The importance of oral and written communication skills in Belton Computers is illustrative. Oral communication was important in order to pass the hiring test, and it was displayed constantly, albeit at low levels. Oral communication was used by workers to establish that they had accomplished something ("tooting your horn") or to demonstrate to their supervisors that they were ready to learn a new position on the assembly line. This signalling function of oral communication skill was especially important for those temporary workers who wanted to become permanent. Written communication was tested via a written test during hiring, but only rework technicians regularly used written material or received training that involves writing.

Oral communication here was used constantly, but at low levels of mastery, while it was also important infrequently at higher levels in order for workers to call attention to themselves. At the lower level it was used to participate in the network of colleagues needed to obtain information; at a slightly higher level, it was used to advance a career. But significantly, oral communication was required at higher levels in order to obtain and later exit from the job than it was to perform that job.

The general lesson here is that skills are labelled as important or required by people for specific reasons. While importance is an intuitively plausible property of skills, a fundamental task is to explicate the precise meanings "important" assumes in specific situations within the workplace. The different notions of importance clearly have different implications for educators.

The notion of skill requirements also assumes that incumbents of the same job confront a common set of tasks and employ identical ways of completing them. However, the ethnographic fieldwork indicated alternative ways of performing tasks that may entail different skills. This suggests that a set of objective characteristics of tasks does not require a single set of skills. For example, "troubleshooting" was a ubiquitous activity on Calhoun's production floor, one that was described as a single skill by supervisors and machine operators. In fact, operators differed in their use of memory, reasoning, cooperation, and playfulness in effecting solutions to problems they encountered with products or machines. Operators developed personal "styles" of performing nominally identical tasks, and some engineers could identify who had processed an order by closely examining products. This suggests that tasks, even if required of a job, may not determine a single set of skills needed to perform them.

The fieldwork also indicates that the sense in which a skill

is required, too, can be unclear. On the one hand, workers often failed to do things at work that were in some sense "required" of the job, although they remained valued employees in viable, thriving workplaces. In some cases, this reflected deficiencies in job descriptions which were not even based on analyses of work in the firm. In Kramden Computers, for example, production managers "borrowed" standard job descriptions from other local firms, reportedly a widespread industry practice. System repair technicians, for instance, were required to understand specific electronic principles such as Ohm's Law, although they and the production manager concurred that these were irrelevant to the job.

In other cases, workers did in fact lack competencies required by the job, but remained productive employees. Written communication skills were needed to compose unambiguous memos between shifts at all sites, but few if any workers possessed them. Miscommunication was endemic, and feuds between workers on different shifts could suddenly erupt. Management desired improved written communication skill, the lack of which had clear costs in the workplace; thus, the skill was somehow "required." Still, we must question the sense in which a competency is "required" if it is missing among most workers in a site.

Workers also performed many observable activities at work which were not necessarily required. Calhoun's machine operators

are exemplary. Confronted by aging, often difficult to control machinery, the operators developed repertoires of strategies for modifying and operating their machines. In fact, skill on the production floor was fundamentally based on managing ubiquitous variances in machine performance and raw materials, and on handling the variations between nominally identical machines.

In one sense, these variance handling strategies were required, and in order to "make product," virtuoso operators exercised considerable memory and reasoning, and worked within extensive networks of helpmates. The question arises, however, of whether eliminating the variances by modernizing the machinery was not a more efficient pathway, and in fact, the company had just launched such a modernization program. An immediate consequence was that workers were prohibited from modifying the new machinery, thereby making irrelevant many carefully nurtured strategies for managing variance. The point is a general one: workers may well exercise considerable skill to compensate for organizational or technological inefficiencies. In such cases, these skills are in some sense required in order to hold a job, but removing the inefficiencies is an alternative strategy.

The social nature of work also challenge an unexamined notion of required skills. Most discussion of workplace skills focuses on what is required of individuals, and how the latter relate to each other at work is addressed via the "social skills" needed by

a prototypical worker. The fieldwork suggests that this picture is incomplete. Workers did much more than "get along," for they typically participated in interpersonal networks that generated, retained and transmitted work-related knowledge. Working within such networks requires more than simply "getting along" with co-workers, with its individualistic focus.

In Calhoun Wire, the sharing of knowledge was supported both formally and informally. Supervisors sometimes sponsored "brainstorm" sessions or organized problem solving teams. Several of them actively encouraged their operators to wander from their machines in order to chat with others about mutual interests in order to widen communication networks that might be useful in the future. Less formally, operators reported that a crucial challenge for the newly hired operator was to develop a network of helpers who could be turned to for reliable aid when problems inevitably arose. Operators developed "tricks" to handle recalcitrant machines and products, and this knowledge could be exchanged with others for favors. Such networks were the principle means by which information was communicated. These networks were based largely on oral communication, and they permitted workers to adjust to current practices under conditions of rapid change.

An important consequence of the distribution of skill through a network is that workers can compensate for gaps in their

abilities, since no single worker need master all the knowledge to perform the work. Skill requirements are, however, postulated for individual incumbents of a job and this typically results in a single profile of skills required of a prototypical job incumbent. In reality, holders of identical jobs differed in skills and knowledge, and still remained valued employees. In fact, no single individual may have all the skills required of the workers collectively, resulting in a heterogeneous workplace held together by networks of assistance, with expertise distributed throughout. This simultaneously challenges the assumption that workers holding the same jobs need the same skills, and it points to the importance of various social skills and organizational structures to coordinate this distributed expertise.

The conception of a heterogeneously skilled mosaic of workers implies that efforts to compel workers to fit a single prototype may be misguided. Micro Inc.'s convenience center operators illustrates the difficulty faced by management. Two categories of operators could be distinguished, based on their attitudes about job rotation. Some operators wished to remain in "their" center, despite management's policy of rotating them through new sites every six months. They preferred to build ties with their customers, "own" their center, and tailor it to their style of operating. Other operators, however, became bored in one site

and wished to work in other facilities. These operators conformed to the corporate expectation, and in so doing, they enhanced their prospects for career advancement. From the corporate perspective, rotating operators between sites exposed them to new ways of working and alternative career paths within the firm. Convenience centers themselves became more standardized, ideas were diffused more rapidly, but many workers became dissatisfied with the constant change.

In this case, two very different sort of workers could be found, although they were constrained to fit into a single profile of skills. The idea that these differences could instead be tolerated and further, that there were advantages to having both sort of employees was absent, since uniform expectations were considered fundamental to sound job design.

The lesson to be drawn from these examples is that skill "requirements" are not derived in any simple way from asking people about their jobs (or the jobs of others), or observing them at work. Skill requirements are constructed through a social process, and we may legitimately ask how that construction proceeds.

Characteristic #3: Context is peripheral to skill

The final characteristic of the rhetoric of skill requirements is that it isolates skills from the actual contexts within which they are generated and exercised. We begin our

discussion by examining production work in Kramden Computers. Then we explore some of the properties of context that may affect learning in the workplace.

Kramden Computers built products from industry standard components; it held no patents. Its market advantage resulted from quickly developing products that efficiently utilized technological breakthroughs pioneered by other firms. It was subject to intense market pressure, and had weathered repeated cycles of layoffs and hirings. Manufacturing was of low status within the corporation since it had never been linked to any competitive advantage. Accordingly, training production workers in assembly or testing skills was not a high priority, although products were typically rushed to market before being fully tested and could not be assembled by referring to preexisting procedures. Few managers saw the paradox of denigrating production work as "basically simple" while simultaneously complaining about "workmanship problems," which after all, imply an absence of skills the workers were not supposed to need.

Different departments within Kramden affected production floor skills. For example, the company built its products for independent distributors who delayed purchases as they shopped for best buys. Only a quarter of the monthly production total was known at the start of a month, making it difficult to plan more than five days ahead. The delays in orders were exacerbated

by the distributors who were on a calendar month, rather than the fiscal month used by Kramden. Since the latter ended about the twentieth of each month, the distributors had another ten days before the end of their month to place orders. Thus, they attempted to delay ordering just when Kramden's salesmen were encouraging them to do so. Production Control Department anticipated demand, but workers were constantly removing completed units from the warehouse and "re-configuring" them for last minute orders. The lack of a lineal production flow also resulted in ubiquitous parts shortages, so that as one worker noted, "We always are starting to build one thing, and winding up with something else." He and other workers complained that the constant interruptions contributed to the workmanship problems.

The Design Engineering Department decision to build computers from modules that were installed in a chassis and secured with a few screws and connected by cables also shaped tasks and skills. These modules were fabricated by external vendors and shipped to Kramden, thereby limiting the variety of tasks (and skills) performed by its workers. Internally, such modules are miracles of technological complexity but workers were prohibited from penetrating their workings.

Modularization and contracting for assembly services created surfaces that made inner workings invisible and lessened the opportunities to explore and learn more than rudimentary

assembly, testing, and repair skills. It also indirectly affected the opportunities and incentives to give and receive feedback that could effect changes in both manufacturing processes and product, since vendors may be far removed or parts purchased in large quantities. Thus, while workers were encouraged to report problems that made their work difficult, many demurred since they had too often heard that "Nothing can be done about it," or "It's too much trouble."

This case indicates that context affects the opportunities that workers have to exercise skills and their motivations to do so. Clearly, it affects the information revealed to workers and thus, we may hypothesize that workplaces differ in "transparency," or the extent to which their workings are revealed to workers. This concept of contextual "transparency" is in principle critical to the kinds of models for action workers can construct. The presence of feedback loops so that workers can take actions and then accurately assess the results is also suggested here. In summary, our brief exploration of Kramden's production floor suggests that contexts may be differentially structured so as to inhibit, facilitate, and generally shape learning.

It would be a mistake, however, to assume that context comprises an integrated whole that moulds skills in consistent directions. Fieldwork showed how workers encounter

contradictions in their experiences at work that must be managed. Yet much of the educational literature represents work as changing in ways that require new or higher levels of skills, and accordingly, the worker simply needs to learn the requisite skills and apply them. A functional model of the workplace is implied, one in which a bundle of skills somehow fits together, and the relationships between the skills or between skills and a worker's broader experiences is unexplored. We return again to Kramden's workers as they confronted tensions that profoundly shaped what was required in order to perform their jobs.

Kramden's workers had been told they were the "vice presidents" of their own teams, but they noticed that management retained all its former prerogatives. Workers were unable to allocate their team's labor to perform even trivial tasks such as labelling bins of hardware: when they tried, supervisors told them to "get back to work." They were encouraged to cooperate freely on their team and to compete vigorously with other teams. Management in fact anticipated productivity gains resulting from both increased cooperation and competition. However, knowing when cooperation and when competition was appropriate proved confusing for the teams. In one dramatic incident, a team refused to "loan" a system repair technician to another team, arguing instead that it needed her expertise at the time. A supervisor decisively and permanently removed the system repair

technician from the team. News of the event spread rapidly and teams immediately began quietly removing themselves from choice opportunities.

Kramden's team members generally pointed out the contradictions between the behavior expected of them and of the behavior exhibited by management. They pointed out that they were being asked to communicate openly, while management operated in secrecy. They argued that the cooperation they were asked to demonstrate was simply not rewarded in the company, for they saw uncooperative people routinely promoted. They heard others boast of "getting" or "beating up" people in other departments through various stratagems, and concluded that cooperation was not rewarded in this firm. Still, they felt compelled to perform as if they were committed team members who communicated openly and cooperated with others. Again, workers confronted contradictory demands and expectations which had to be somehow managed, but could never be fully resolved due to these inconsistencies.

Finally, the fieldwork suggested that context need not be a simple backdrop to action, one that moulds skills but is not in turn moulded by the actions of workers. Calhoun's machine operators were encouraged to develop projects such as preparing procedures, conducting training classes, or designing machine modifications. These involved workers in identifying problems, collecting data, designing interventiors, calculating costs and

benefits of alternative solutions, negotiating for engineering and managerial support, and documenting outcomes of implementations. In effect, the operators were co-producing (along with engineers, supervisors, etc.) the very context within which they also produced wire and cable products. This sort of work entailed very different skills and attitudes than observed when workers performed the direct labor of "making product."

IV. CONCLUSION

This paper has critiqued three of the fundamental characteristics of the rhetoric of skill requirements. This critique should not be construed as a sleight of hand that magically dissolves the fact that jobs require that their incumbents do something, and that those "somethings" have implications for both the capabilities of individuals and the educational institutions of the nation. Instead, I suggest that it is the rhetoric of skill requirements that performs a sleight of hand by ignoring the richness of life in actual work settings and decomposing work into discrete units. In so doing, it creates a myth that over-simplifies the challenges facing both educators and employers. The task is to reassemble the person, task, and context as a larger system with fluid boundaries.

Minimally, the intention of my critique has been to demonstrate the incompleteness of the rhetoric of skill requirements, while acknowledging that it provides a useful and

established means to analyze work. The materials presented here, however, suggest that a rhetoric of context that complements that of skill requirements also be developed.

The critique has loftier goals as well. First, we have seen that skills are exercised in contexts that are necessarily local in nature. Although the rhetoric of skills facilitates comparison between workplaces, it does so at the price of classifying together different local practices that may entail different human abilities. In effect, it lacks the resolution of detail needed to assess just how people accomplish their work and what abilities they need to do so. A contextualized analysis draws out individuals more sharply as they actually work, and not as a set of myths about how they must work. It also suggests that we may fruitfully direct our attention to the often complex practices workers use to accomplish their work, rather than to skills. This, of course, has enormous implications for educators charged with preparing people for worlds of work.

Second, the workplace can be viewed as a curriculum that, from the perspective of the job incumbent, teaches lessons necessary to hold the job. In each site, we found that workers were especially observant of what was needed to keep a job or to advance a career. Sometimes the official proclamations of managers are consistent with what they see, but typically there was a gap between the official curriculum and the less formalized

"learner's curriculum." This suggests that we may view the organizational and technological contexts of work as important components of any analysis of skill requirements. If, for example, workers are exhorted to develop and apply "systems skills," how does the local context affect what they see? Do formal procedures and policies create blind spots in their vision? Are active learners punished or rewarded? Are their opportunities to do more than discover, but to effect meaningful change as well? These questions are critical, and they shift our focus from the job incumbent to the context within which learning occurs. Context allows us to expand our vision beyond the skills needed to work <u>in</u> workplaces as specific curricula to those needed to work <u>on</u> the very premises under which lessons are learned and actions are taken.

Finally, a rhetoric of context suggests that we focus not only inwardly on the workplace as a self-contained unit that shapes what is required of the people working there, but also outwardly on the workplace as an arena for action that is shaped by its place in a global economy. For example, workers may well develop the skills required to work in a factory, but this may have little affect upon a corporation's decision to relocate production to another state or nation. A look outward from the workplace thus supports a measured and modest assessment of the potential for skilled workers to resolve the nation's economic

woes.

In conclusion, attention to context should provide a clearer understanding of what is involved in "work." This knowledge, in turn, is critical for sound educational planning. Even more importantly, attention to context should provide ways to enhance the ways workplaces function as learning environments which structure attention in productive, generative ways which impart specific lessons. This, in turn, would allow us to address the larger educational issue of providing tools to improve workplaces as arenas for learning, rather than to accept them as they are.

FOOTNOTES

[1] Examples of this discourse include Education for Tomorrow's Jobs (1983); High Schools and the Changing Workplace: The Employer's View (1984); Investing in People (1989); Carnevale, Gainer and Meltzer (1988); and The Bottom Line: Basic Skills in the Workplace (1988); America's Choice: High Skills or Low Wages (1990); and What Work Requires of Schools (SCANS) (1991).

[2] A comprehensive review of various taxonomies of human skills and abilities is provided by Fleishman and Quaintance (1984).

[3] The research was a component of the Educational Requirements for New Technology and Work Organization Project conducted at the Stanford University School of Education and supported by the Spencer Foundation. Henry Levin and Russell Rumberger directed the project, and Michelle Deatrick, Christine Finnan, and Alison Work conducted the case studies in, respectively, RTC Corp., Micro, Inc., and Belton Computers.

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