What's in a Label? : Complicating Notions of the Skills-Poor Worker

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This article reports qualitative research on a perceived literacy problem in an electronics factory in the Silicon Valley of Northern California. Guided by a sociocultural framework, Hull investigates an instance of frontline workers' apparent failure to read, understand, and/or follow important manufacturing process instructions. Interviewing all parties involved, from engineers and managers to workers, Hull explores the significance of the mistake and a range of explanations for why it occurred. In so doing, she moves beyond explanations that center on deficiency in individuals and groups, and toward broader based accounts that consider institutional, social, and cultural arrangements and the relationships and practices they foster. She offers an expansive definition of what it means to be a literate, skills-rich worker, and she urges vigilance against the tendency in both schools and workplaces to label and mislabel, and thereby to miss human potential.

What's in a Label?

Complicating Notions of the Skills-Poor Worker

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The popular literature on workers' abilities and the demands of work (see Hull, 1993, for a review) often provides accounts of the "skills poor" worker: the carpenter who cannot read a ruler and hence makes mistakes in calculations, the machine operator who cannot decipher warnings posted about the factory and therefore gets involved in serious accidents, the recent immigrant who is still learning English and thus miscommunicates in the pass-downs he must write for the next shift. The moral of these stories is usually that employers need to be aware that their workers have skills deficits and to assume responsibility for the literacy, language, and other instruction these workers did not receive in school. Workers likewise are advised to retool, retrain, and remediate their deficiencies lest they lose their current jobs and find themselves unable, in our current cold economic climate, to acquire new or comparable ones. (See America's choice, 1990;
The bottom line, 1988; Carnevale, Gainer, & Meltzer, 1988; Lund & McGuire, 1990; The Secretary’s Commission on Achieving Necessary Skills [SCANS], 1992.)

This article also addresses literacy problems in a workplace, focusing specifically on a documented instance of workers who apparently failed to read or follow instructions and thereby only narrowly avoided a production mistake that would have had serious repercussions for an important customer. However, the moral of this story will not simply reiterate standard warnings about a skills-poor workforce and the necessity of basic skills instruction for an ever-increasing number of people. Although it is, of course, true that some workers want and need to improve their language and literacy capabilities, this is not the issue at hand. Rather, I suggest that to be truly literate, sufficiently skilled, and knowledgeable—especially in changing, high-tech, high-performance workplaces—employees need access to a wider range of information about companies and their work than we typically have assumed, and they need the opportunity to exercise their literate capabilities as well. That is, work must be organized to allow, and even require, workers to take responsibility for reading and writing on the job. I also argue that one barrier that stands in the way of allowing and requiring frontline workers to be literate at work is an erroneous notion that certain people are incapable, a deficit way of thinking that also has been the bane of remedial programs in the schools (Hull, Rose, Fraser, & Castellano, 1991).1

I begin this article with a discussion of the theoretical perspectives that undergird the research reported here, using a sociocultural analysis to show how researchers’, educators’, and employers’ perspectives on literacy in the workplace are influenced deeply by the ways they look at this issue. I also explain the benefits of a multilayered examination of context, suggesting that this kind of examination is useful for understanding both the literacy requirements of work and the literate abilities of workers. Working from a sociocultural point of view, I then describe one factory floor in detail, focusing on the literacy problem that unfolded there during a period of about 1 week through various texts, conversations, and activities. I also examine how various players characterized this problem and the workers who were involved. At the end of the essay, I revisit notions of ability, literacy, and literacy problems to offer another vantage point for thinking about the literate abilities needed for work. Again, the point is not to claim that some working people do not need literacy instruction or other support to realize their potential (we all could use such
support). Instead, I argue for that potential and against those ideologies and institutional and pedagogical policies and practices that tend to limit what people can become.

FRAMEWORKS FOR STUDYING LITERACY AND LITERATE PERFORMANCE AT WORK

One of the most troublesome aspects of current discussions concerning the skill requirements of work and the skill deficits of workers is that they are rarely grounded in observational field research. Instead, they are based on anecdotal reports, interviews with managers, and—more rarely—frontline workers or the expert opinions of various stakeholders (Baba, 1991; Darrah, 1992; SCANS, 1992). The results of such discussions are apt to be decontextualized lists of skills and accompanying standards, and these may distort our view of what people need to know and be able to do at work (Darrah, 1997).

There are comparable problems with the scant research on literacy in the context of work. One approach to studying reading and work has been to determine the reading difficulty level of job-related materials through the application of readability formulas or the counting of text features such as word and sentence length to estimate the school grade levels in which equivalent texts would be found (Diehl & Mikulecky, 1980; Duffy, 1985; Mikulecky, 1982; Rush, Moe, & Storlie, 1986). This work has been useful in calling attention to the amount of reading done at work as well as for providing very broad descriptors of the difficulty levels of work-related texts. The problem, however (as even those who have conducted such research have pointed out), is that it treats reading as a decontextualized, unitary process. More specifically, it transposes notions of reading in schools to the workplace without taking into account the differences between school and work contexts and between child and adult readers (Joliffe, 1997; Sticht, 1988). Used as the sole measure of the literacy requirements of work and the literate abilities and needs of workers, such an approach most likely underestimates the challenges of literate activities in the workplace.

A second approach has sought to create a new category of literacy similar to functional literacy called occupational literacy (Kirsch & Jungeblut, 1986; Rush et al., 1986; Sticht, 1988). By distinguishing between the functions of reading at work and reading at school, this
line of research has offered a more complex and contextually based view of literacy and work (Diehl & Mikulecky, 1980; Mikulecky, 1982; Rush et al., 1986; Sticht, 1979, 1988; Sticht, Armstrong, Hickey, &aylor, 1987; Sticht & Hickey, 1987). It also has spurred the development of functional context curricula, one paradigm currently guiding the development of workplace literacy programs (see Gowan, 1992; Schultz, 1997). The limitation of the approach, however, is that it defines context as narrowly as the texts that are found at work (Grubb, Kalman, Castellano, Brown, & Bradby, 1991). In doing so, it does not consider the broader context of the social organization of work or, for that matter, people’s lives outside of work. Thus, we cannot always trust such an approach to reveal to us the function of texts in the workplace or the nature of workers’ rights, responsibilities, and practices in creating and using such texts.

A sociocognitive theory of learning provides a third way of investigating literacy and work. For a number of years, Scribner and her colleagues (Jacob, 1986; Martin & Scribner, 1988; Scribner, 1985, 1987; Scribner & Sachs, 1991; see also Scribner & Cole, 1981) studied knowledge acquisition by focusing on the relationship between knowing and doing in human activities. For instance, Scribner (1985, 1987) and Jacob (1986) uncovered unexpected uses of reading and writing in the context of daily work at a dairy as well as documenting specific social networks that supported literacy practices (cf. Fingeret, 1983; Heath, 1983; Reder, 1987). They found, for example, that coworkers were a crucial source of information on how to fill out forms using the special vocabulary of the workplace. In this research, then, context encompasses not only the texts that workers read and write but also the social relationships and activities that guide and influence the use of texts in the work environment.

The approach that I take in this essay and in the larger project of which it is part draws on Scribner and her colleagues’ work. But it is also useful, I think, to extend Scribner’s framework, situating a study of literacy not only within the immediate work environment but also within the larger cultural, social, and historical milieu. Such a framework combines sociocognitive analyses with sociocultural and historical perspectives and in so doing alters the way we look at literacy at work and at school (see Dyson & Freedman, 1990; Hull & Rose, 1989; see also Cook-Gumperz, 1986; Lankshear, 1987; Street, 1984).

As illustrated below, in addition to focusing on an immediate work environment, it is helpful to understand how the tasks performed in that environment are influenced by the more global organization of
work on the shop floor. One might want to inquire further about how particular tasks have evolved historically within a company and within a trade, as well as how they have been influenced by specific social and cultural developments. The particular texts that are valued in a workplace, the ways in which they are valued, and the literate practices that people engage in around those texts—all necessary knowledge if workers are to be truly literate—are all likely to affect how a company does its business. Thus, by adopting a sociocultural perspective, we will be able to construct a more comprehensive and accurate picture of the literate capabilities that are required in particular work situations.

Another benefit—and I think an equally important one—is that this approach allows us to better assess the nature and sources of the difficulties that often accompany changes stemming from work reorganization or the introduction of new technology. That is, we will be able to interpret more accurately what appear to be deficiencies on the part of workers and to provide the support that employees need to meet the challenges of changing work environments and increasing skills requirements. In school settings, research from a similar perspective has been helpful in understanding what appear to be careless, failed, or simply baffling reading and writing performances. For example, Hull and Rose (1989, 1990; see also Hull et al., 1991) provided case studies of students in remedial programs whose reading and writing performances appeared unconventional and even seriously flawed. They were able to uncover the history and logic behind these students’ reading and writing practices and thus to suggest alternative pedagogies that would not otherwise have been viewed as appropriate or helpful. Hull and Rose did so by taking into account various sociocultural and sociocognitive domains that may influence how students read or write in given situations: the nature of instruction and assessment; the influence of family, community, and church attitudes on reading and writing; social attitudes and policies affecting race, class, and gender; the distribution of political power; access to schooling; and the perceived relation of educational achievement to job opportunity. As will be illustrated below, a similar framework can be applied in a workplace setting to analyze those moments when work seems to go awry due to perceived problems with literate (and other) ability and inability. Such a perspective leads one to ask, “What accounts for this poor reading or writing performance?” and to move beyond simple assumptions of deficiency in individuals and groups toward broader based explanations that take into account
institutional, social, and cultural contexts and that suggest alternative solutions.

Questions and Methods

As mentioned above, this essay is part of a larger project aimed toward delineating the literacy requirements of changing workplaces. The questions the larger project sought to answer include: How is work organized in particular factories, and what role does literacy play in how work gets done? What are the literacies required in the workplace? What are the literacy requirements for entry-level employment in these workplaces? What are the criteria for advancement within the workplace? To answer these questions, my colleagues and I observed the work being done in selected factories, and we participated in that work whenever possible by "shadowing" employees or working alongside them. We also interviewed employees about their jobs, the role of literacy in that work, and their educational and work histories. In the course of these observations, we collected relevant documents such as manufacturing process instructions and unofficial texts such as personal "to do" lists, sketches, and notes. Finally, we observed and/or participated in any training the companies provided for their employees. Observations and interviews were recorded in detailed field notes, and interviews and meetings were audiotaped. In addition to this work in the field, we also researched the history and development of the industries we were studying—in this case, circuit board assembly and contract manufacturing—including the role of technology in this industry over time, as well as the industry’s responses to increased national and international competition and its policies regarding credentials and retraining.

To organize our qualitative data, we developed a unit of analysis that we call a work event (for another example of a work event, see Ziv, 1997). This unit of analysis builds on Heath’s (1988; cf. Anderson, Teale, & Estrada, 1980) construct of a literacy event, or all the interactions and activities surrounding the use of print for a particular purpose in a particular situation. Because we wanted to understand literacy in the context of work and to let this context shape our understanding of literacy, we felt that the notion of a literacy event, although useful, was too constraining. Instead, we began to focus on the interactions and activities that contribute to accomplishing a task or goal in a workplace. From there, we identified moments (especially
in the particular industry we were studying) when the flow of work is interrupted and problems have to be solved to set it in motion again. Such moments—composed of texts, social interactions, and the rules and strategies governing these interactions—can be designated as work events. Work events may last only a few minutes or may extend over a period of days, weeks, or months, depending on the nature of the problems. Whatever the length, such events typically have significant literacy components.

To analyze work events, we drew on a variety of methodological tools, including conversational analysis (Hull, Jury, Ziv, & Katz, 1996), pragmatics (Ziv, 1997), and qualitative thematic analyses (Hull et al., 1996). For each work event, we paid special attention to the functions served by writing and reading and to patterns of language used within them—participant structures, choices of language, and speech registers. We also tried to characterize workers' literacy and language practices and to identify the strategies and rules that they employ to accomplish literacy-related tasks in the workplace. We did this by situating people's current literate practices in the workplace in relation to what we can learn about their previous education, training, and experience on the job and within the culture, organization, and history of the particular factory. In other words, we applied the sociocultural framework described above to the analysis and interpretation of our data.

The Setting

The Silicon Valley factory we studied is part of a successful Fortune 500 company with annual revenues in excess of $1 billion and a worldwide workforce of more than 10,000. This particular plant employs about 350 people. The company, which we call EMCO (electronics manufacturing company), is in the business of circuit board assembly, or the mounting of electronic components (increasingly via robots but also by hand); it also carries out quality checks, testing, and packaging, as well as some circuit board design.

One of the significant aspects of the circuit board assembly industry is that it is an example of contract manufacturing, which is of course a growing trend in the United States. Whereas big computer companies such as Apple and IBM used to put together their own circuit boards for their own products, it is now customary to farm this labor out to companies such as EMCO. One account of the history of
this shift focuses on recent technological developments. The way in which circuit board assembly is carried out has changed dramatically in recent years, moving from handwork to robot-controlled surfacemounting techniques (although both techniques still exist in the same factory). Thus, the story goes, as the technical sophistication required to build printed circuit boards increased, it became more cost-effective to transfer this part of the work to specialized manufacturers who could invest in the machinery because of their large volume (Sturgeon, 1991).

Another account of the history of contract manufacturing in circuit board assembly (and other industries) emphasizes that by relying on contractors such as EMCO, electronics companies no longer had to make commitments to a significant portion of their former workforce for job security, health plans, or decent wages (Siegel, 1993). It is customary among circuit board assembly plants in the Valley to rely heavily on a temporary workforce (indeed, temporary workers are increasing everywhere in the United States). Wages are fairly low—from $8 to $10 an hour—and layoffs and enforced overtime, depending on the vagaries of customer demand, are the norm. None of the Silicon Valley factories is unionized.

Being a contract manufacturer has particular implications for doing business and, as we shall see, particular implications for literacy. A customer chooses one contract manufacturer over another because of lower costs, higher quality, and higher productivity, so there is much ado in these companies about minimizing defects and speeding up production. Because technology changes so quickly these days, a contract manufacturer’s customers can be expected to be especially demanding, calling for changes in boards that are already in production and regularly returning old boards to be reworked and updated on short notice. Record keeping on these occasions is paramount; customers want to know what changes were made on which boards on what dates and by whom. Paper trails are thick. Customers also want to be assured of a certain level of competence before they offer their business; thus, circuit board assemblers, such as a growing number of other U.S. and European firms, vie to be certified by international standards agencies (Fortune Magazine, June 28, 1993). These agencies enforce stringent procedures concerning documentation, and factories are practically afloat in a sea of paper. It is customary for every single procedure that takes place within such a certified factory to be written down or otherwise documented. Workers’ activities and
work practices are expected to match the printed account and are regularly audited to ensure that they do so (see also Jolliffe, 1997).

EMCO's frontline workers are mostly immigrants from Korea, Vietnam, and the Philippines—indeed, the factory used to be Korean owned—whereas the current factory manager, his top management team, and their middle-level helpers are all White, native-born U.S. citizens, as are most of the supervisors. The plant accepts entry-level employees (although most workers have experience in other Silicon Valley companies), and there are some—albeit very few—opportunities for advancement for the entry-level workers within the firm. The first step up from assembler or machine operator is the lead of a line or an area (although at EMCO, leads do not get a salary boost). Above leads are shift supervisors, and above supervisors are engineers and a raft of midlevel managers. We heard of employees who had worked their way up to become supervisors and a few who had become engineers (without 4-year degrees), but there the progression seems to stop. Although supervisors and engineers interface with frontline workers on a daily basis, there is quite a gulf—as is customary in industrial America—between most workers and management (and to a lesser extent between workers and engineers), one often exacerbated by differences in language, culture, and social class.

A Work Event: The Label Problem

The work event that I will consider next and that will be the fulcrum for our rethinking of notions of the literate abilities needed for work began one evening on second shift while I was shadowing a process engineer named Wade (see Figure 1 for the chronology of this event). This engineer, who usually worked during the day, was on special assignment to second shift that evening. I followed Wade about as he made his rounds in the plant, stopping to check with the leads in each department to see if all was well. "Right now, I'm just being available," he told me, "I'm going around . . . just to see how things are going." (Wade understood the notion of shadowing as a way of learning what a person does at his or her job and by then had become accustomed to having me around, letting me observe, and explaining his activities.) We stopped to chat with various workers, and Wade, White and native born, made it a point to greet each person in his or her native language. Our last stop was with Ely, the lead in the surface mount area, with whom we discussed the end of an
September 22, 1994
The task: Wade, a process engineer, sorts a box full of 35 or so printed circuit boards that have been returned from a customer for modifications or rework to bring them up to current specifications.

September 24, 1994
The process: Rework begins. The line workers solder and so forth, create new labels, affix the labels, and eventually send the completed boards to testing.

September 28, 1994
The problem: Wade discovers the boards have been labeled improperly. He investigates, talking to the supervisor, the line workers, his boss, and other managers. He then issues a corrective action report (CAR) to the appropriate supervisor and puts the other boards on hold.

September 29, 1994
The solution: The supervisor meets with the workers who did the rework to retrain them. Wade releases the remaining boards to the floor. New labels are made and Wade himself puts them on the boards. The boards are released to the testing department.

Figure 1. Chronology of the board problem

assembly project for the plant: Because the process was going smoothly, the manufacture of that board was being transferred to a plant in Singapore. "How 'bout the American people, how 'bout who lives over here, you know?" Ely complained, wishing that EMCO would continue to manufacture the board whose assembly process he had had a part in perfecting. Wade explained to me as we walked away that it was customary for EMCO to shift its high-volume work to its plants in other countries.

Rounds completed, Wade showed me his main project for the evening. One of EMCO's major customers had returned a batch of boards that EMCO had already assembled; these boards were to be upgraded according to the customer's current specifications and the relevant paperwork updated, approved, and appropriately distributed and filed. As explained earlier, this kind of rework task is common in circuit board assembly because computer companies continually improve the design of boards that already are in production. The challenge for a contract manufacturer such as EMCO then is to simultaneously maintain production and update the old boards that already have been assembled—and to do so quickly and accurately.
Second operation

For serial number 032 only, remove diode at location Z3.
For all assemblies, perform the following rework:

- Remove IC at location U16 (74BCT2440).
- Hand solder part number 1820-6307 (74HCT244) at location U16.
- Lift pin 19 of U17.
- Lift pin 11 of U34

Connect the following pins using #30 AWG green jumper wire. Insulate lifted pins with sleeving.

U24 pin 1 to U34 pin 11
U34 pin 10 to U17 pin 19

Tack pac wires every 1/2 inch.

Hand clean reworked area.

Remove M8 revision of the BIOS IC at location U22.
Install M9 revision of the BIOS IC at location U22.
Make new datecode label (A-3337).
Apply new datecode label over old datecode on serial number label. Do not cover old serial number or assembly number of the label.

Send assemblies to test.

Test

Perform ICT if possible and functional. Record debug time spent and any rework performed on data sheets.

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Figure 2. Excerpt from the rework instructions

The boards the engineer showed me that evening, which arrived in a batch of 35 in one big box, each board worth about $600, were not all alike; they represented five or six different versions of the same board, each version manufactured at a different point in the design process. Wade therefore had to examine every board individually and sort each into appropriate categories. He made handwritten notes to himself listing individual boards by their serial numbers, notes he would later convert into instructions for the workers (see Figure 2). He explained to me, “The operators [employees who perform the rework on the boards] won’t have to look at it [each board] and try to decide what, which board. Just look at the number and know what (it takes). Checklist.” Having completed his sorting and note taking, he remarked that the rework would probably be done by several operators and stretched out over several shifts. He said he would check the first couple of boards for workmanship but would leave the main inspection for the testing and quality departments.

During the next week, my colleagues and I observed the rework done on a subset of the 35 boards, 3 especially complex mother boards that were designated “hot” or high priority. These were the oldest
boards in the batch and the ones the customer wanted returned immediately. We observed the addition of a green wire, as directed in the instructions (see Figure 2), by one worker. Another worker—who characterized the rework as "straightforward"—added that all that remained before sending the boards to the testing department was a datecode label (also as mentioned in the directions). Finally, we observed a third worker setting off to make these labels.

We saw nothing that struck us as unusual during this process, but when Wade checked on the progress of the boards a few days later, as he had said he would, the fur flew. "See the little jumper wires I referred to on the instructions," he had started to say approvingly as he showed me one of the completed boards. Then he paused and noted quietly, "We got a problem here though. The instruction says to make a datecode label of A, 33, 37 . . . . Need to reject these." Jamal, the lead in the test area, seemed to be taken aback by Wade’s consternation, pointing to the rework instructions and noting, "I think this is your instructions." "I know," Wade replied, "and they didn’t follow them."

It was not that the workers had done the actual repair of the boards incorrectly. In fact, as Wade would later point out, their handwork was so superb that the three boards were virtually identical, just as they should be. Rather, the problem was with the datecode label, the tiny identification tag that is affixed to every printed circuit board (see Figure 3 for the actual label and Figure 4 for an enlargement). The parts of the label include the datecode (which indicates the version of the board—in this case, B—and the week and year it was manufactured—in this case, the 37th week of Year 33, meaning 1993) and the unique serial number for that particular board. Wade’s instructions had directed the workers to first "Make new datecode label (A-3337)," and then "Apply new datecode label over old datecode on serial number label." He further directed, "Do not cover old serial number or assembly number of the label" (see Figure 2). The workers’ mistake was threefold: They had removed and discarded the original label; they had generated a whole new datecode label with a new serial
number; and they had changed the version number on this new label from A to B.

Upon discovering the mistake, the engineer hurried down to the shop floor to find out what had happened. He called to the lead in the second operations area:

Wade: “Marisa!” (pause) “RSD madre?”
Marisa: “Yes.”
Wade: “RMA’s?”
Marisa: “Right.”
Wade: “Did you make the stickers?”
Marisa: “The sti–yes.”
Wade: “Day shift? ¿Porque no A? How come there’s no ( ) serial number? (What did you do with the old) serial number? (Did you just) put new serial number for everything? Why did you—”
Marisa: “—I don’t touch those. Who was the person?”

At this point visibly alarmed, Marisa went to seek reinforcements from among the operators who worked on the three boards, and they spoke together in Spanish for a moment, but nothing seemed to be resolved. Wade then instructed Marisa:

“You’re getting 30 more RMA boards out here. We have to know what serial number it is... Looks like somebody took the old serial numbers off them. Now we can’t tell what serial numbers they are. Now we got problems. They’re gonna be on hold until I have time to check ‘em out. Make sure this doesn’t happen on the rest of them, okay? I need to go talk to Celia [Marisa’s supervisor]. . . . Gracias.”
With this, Wade strode off to break the bad news elsewhere.

At that point, I was still somewhat mystified by the degree of consternation that accompanied the label problem, for surely, I thought, the labels could simply be reproduced and the error corrected. But this was not the case. As Wade explained several times over the course of the next half hour,

(to the researcher) "Now we've lost traceability on these boards. (pause)
Basic ally, I don't know how I can identify them now."

","This is kind of serious because it's an irretrievable thing that you can't really fix."

(to the quality engineer) "This is, this is kind of serious because the traceability is important and now we've lost it."

The concept of traceability is central to EMCO's successful dealings with its customers. As a contract manufacturer, the company must keep exact records on all its products, including recurring updates and modifications, and the record keeping applies to individual boards as well as to types of products. In this case, the three motherboards had been taken out of particular systems, and the customer expected to replace each board accordingly. (The program administrator in charge of this particular customer toyed only briefly and fleetingly with the idea of a cover up: "So now what do we do? We could fake it, we could fake it, but that would come back to haunt us.")

It is significant, and I will return to this point later, that traceability is inexorably linked to literacy: It is a literate practice that some employees at EMCO share and understand and that others do not, despite the fact that it has implications for the work of almost all.

In addition to trying to understand the significance of the mistake, I was interested in why it had happened, especially because the error was apparently connected to workers' failure to read, understand, or follow written instructions. "I would like to know how it happened exactly," I said to Wade, and he responded:

Wade: "Probably related to another acronym we have here, OBD."
Researcher: "I hesitate to ask."
Wade: "It stands for 'operator brain-dead.'"
Researcher: "Uhh-oh."
Wade: "Occasionally, we run into that, not too often."
Researcher: "Yeah, yeah."
When he described the problem to Frank, a fellow engineer, Frank observed that the operators must not be reading the instructions. Wade replied, “Well, they may be reading them, but they’re definitely not following them.” Later in the conversation, Wade complained, “We’ve got to make them [the workers] understand that maybe they should read these things and follow them. I don’t do them [write the instructions] just to justify my existence.” “You don’t?” Frank asked teasingly. “I’d be in big trouble if that’s all that justified my existence,” Wade shot back. Apparently, Wade was not sure whether workers had failed to read the instructions or had read them and failed to follow them; but it was six of one and half a dozen of another to him, and in any case, an example of the malady he referred to several times as OBD.

Having broken the news to the shift supervisor (who would need to speak to Marisa and the other workers about the problem) and the program administrator (who would need to inform the customer), Wade spent the next hour dealing with the label problem. His concerns were several: the remaining 30 boards yet to be reworked, which he feared were destined for the same labeling error; the detective work he might have to do to distinguish the three mislabeled boards; and the paperwork required as a disciplinary action.

Wade began to consider early on whether, how, and to whom to write a Corrective Action Request (CAR). He explained that CARs had been instituted a couple of years earlier at EMCO, and at the outset, so many of them had been issued that people joked about having “CAR Wars.” However, CARS were intended for serious and/or recurring problems. He thought aloud about the problem of issuing this admonishment:

“Now when I talk to Celia [the day shift supervisor], I’ve got to verify which shift this happened [on] if I want to do a Corrective Action Request (to know who to address it to). If I can’t determine which shift it happened on, I have to go to the next higher level, Ed Fancher [the production manager]. Address it to him so that he can (deal with it). Thing is, Ed Fancher’s on vacation, so my boss is Bill Johnston ( ). Have to be careful when you give your superiors Corrective Action Requests; they don’t like to receive them.”

He also sought advice from Frank, his fellow engineer: “I think that’s [the label mistake] CAR material. What do you think? It’s serious, it’s irretrievable. Now I got these boards, I don’t know which one’s
which.” Frank advised Wade to send the CAR to the supervisor but, before doing so, to have the required discussion: “Procedures says you’re supposed to talk to them before you issue the CAR, supposed to discuss it.” Thus, Wade called the supervisor, explained what happened, and told her he would have to issue a CAR directed to her. Then, before he left for the day, Wade wrote the CAR to Celia, the supervisor (see Figure 5), making it short and sweet. Pointing to what he had written, he explained:

“This is gonna state that the motherboards that came in, the RMA boards, were improperly labeled, and they didn’t follow our instructions. That’s basically what the defect was, they didn’t follow instructions. I don’t think I really need to expound, ‘Because of this we lost traceability’ and do a description of the defect. They were improperly labeled.”

It is interesting that after expounding a great deal to several people about losing traceability, Wade made the decision not to identify the significance of the mistake in the CAR.

Before leaving for the day, Wade examined the three motherboards again and came up with a way of distinguishing them (through a separate date stamp and then by process of elimination). This meant that the customer would not have to be notified and the mistake could be corrected the next day with no harm done. The next morning, Celia met with the workers on her shift to discuss the mistake and figure out how to prevent it; she then responded in writing to Wade’s CAR (see Figure 5). Wade directed the workers to reproduce the old labels and to generate the new labels. “Bonito?” Marisa asked, as she presented the new labels to Wade. “Perfect! Muy bonito,” he answered as he pasted the labels on the boards himself and released the remaining boards to the floor.

Beyond Deficit Thinking: Why Didn’t the Workers Read?

In many accounts of literacy problems in the workplace, the story would end here, perhaps with reinforced warnings about an increasingly immigrant workforce and their limited English abilities or the failure of schools to prepare tomorrow’s workers with suggestions about organizing workplace education efforts, or with enthusiastic or hopeful references to the success of such efforts elsewhere. In many accounts, it is, unfortunately, enough to play the immigrant card, or as
Wade did, to joke about workers who fail to think, to attend, to be present with their minds as well as their bodies. Most stories about literacy problems in the workplace end, that is, without any sustained questioning about why it was that highly reliable workers failed in a particular instance to read and/or to follow instructions.

To move beyond simple assumptions about deficiency in individuals and groups and toward broader based explanations that take into account institutional, social, and cultural contexts and that offer different solutions—a habit of mind and theoretical orientation that I
would promote for workplace educators and researchers—my colleagues and I explored a range of explanations as to why workers did not read or follow the written instructions concerning the datecode label. We did so by interviewing employees up and down the plant hierarchy, including the operator who actually applied the incorrect labels.

We have already heard from Wade, the engineer, an explanation that the workers were “brain-dead,” or just not paying attention at the moment. I’ll return to this explanation later, but for now, suffice it to say that this view was inconsistent with Wade’s overall characterization of the workers as competent, even too competent. For instance, when trying to distinguish the three boards from one another, he noted that the rework was so finely done that he could not tell the boards apart through physical evidence. Such comments were more consistent with the examples of workers’ expertise that Wade offered us at other times.

Another possible explanation, one that perhaps would occur most quickly to literacy specialists, is that the text that workers were expected to read was unclear, ambiguous, or vague. And in fact, the program administrator offered this explanation when he first heard about the label problem, albeit jokingly:

Rod: “So this must reflect on the instructions provided by the, uh, the engineer, I guess the cognizant engineer.”
Wade: “I keep telling you I’m not cognizant. [more quickly] You’ve got the instruction that says in there—”
Rod: “—Yeah, yeah, don’t cover up the old number. So now what do we do?”

Because Wade was responsible for writing the rework instructions, Rod could not resist the chance to tease him about his (to my thinking) less-than-elegant prose. And surely, the instructions (see Figure 2) could have been worded more clearly (cf. Joliffe, 1997). It is also important to note that the frontline workers were not allowed to construct or alter manufacturing process instructions themselves—those most important of factory documents—so they were continually at the mercy of Wade’s prose as well as of that of the other engineers. Incomplete or inaccurate instructions were something about which we heard many complaints, although the workers grew accustomed to deciphering or working around the inadequacies of such instructions.
Another interpretation that relates to language has to do with the fact that this was a largely immigrant (in fact, largely Korean) workforce. The perception was that most of the Korean workers and many of the other immigrants could not speak, understand, read, or write English and furthermore that they were not all that interested in learning English. "What could help us here," said one manager, "is an intense ESL [English as a second language] program. The Koreans would resist that—my impression—none of 'em ever said that. I just have this feeling they wouldn't be receptive. The women were going to ESL class and for some reason they just discontinued that."

In fact, some of the Korean women were so interested in learning English that they were attending a literacy program especially for Asian immigrant women after work in a different city some miles away. Here is what Sook Yoo, one of those women, had to say to me (through an interpreter) about not speaking English well:

"I think there is a reason why we don't speak English that well. When we started working at EMCO, our starting pay was so little. But since we didn't speak much English, we just took the starting pay. We started working and stayed for a while, but since the pay was so little, there was no time for us to study, realistically, because the pay was so minimal... And we were so busy trying to survive. Since we came up that way, even now, we don't have a lot of money, and we are leading a hard life."

Sook Yoo and the other women in the literacy class went on to explain to me that in their community, Koreans do not like to get help from the government and that they want to earn the little that they get. This, plus the value they place on higher education for their children, often necessitates taking two jobs. The result is too little money and too little time to learn English. Not being able to speak English, they pointed out, means not being able to defend yourself in the workplace when you are accused of a mistake and most important, it means a greatly reduced chance of promotion, even when you do your current job very well. There are no Korean supervisors, they observed, in this high-tech workplace where international certification standards require that manufacturing process instructions be written, read, and communicated in English. They wished that the company had continued to provide English classes onsite, but these classes had suddenly been discontinued. Sook Yoo concluded, "So we lost the chance to learn English, and now we are too old."
The manager was right that there certainly were some workers (mostly Korean) who did not speak much English, but he was way off base in assuming that they did not want to learn. I should also point out that it is not necessarily the case that workers who do not speak much English do not understand much. Over and over, we have found that workers in factories such as EMCO understand much more than is apparent. As one employee put it, many workers "cannot speak nice, but understand." Furthermore, in our fieldwork at EMCO and other multilingual factories, my colleagues and I regularly have observed workers translating for each other; indeed, leads for the various areas and lines at EMCO are chosen in part because they are bilingual and can serve as literacy and language brokers. At this factory and at countless others in the Silicon Valley, immigrants with limited English skills meet their companies' quality and productivity goals everyday despite the fact that not all of them speak, read, or write English well. I am not arguing that things would not be easier if everyone in a plant spoke and was literate in the same language. Rather, I am pointing out that work generally gets done quite competently even when this is not the case, especially in traditional forms of work organization, as was the case at EMCO. We should not, then, automatically assume that limited English was the reason the three boards were mislabeled.

Let us turn now to explanations provided by employees who worked on the shop floor. The first shift supervisor, Celia, on whose watch the label problem occurred, believed her workers read the instructions too quickly to notice what was salient and that they did so because they were mistakenly in a rush to finish the boards so that they could be moved to another department.

"They know that they have to read. Each RMA [rework instructions] is usually always different. In this case, they read it, but read it so fast that they didn’t comprehend everything that was needed to do, so they missed it."

"..."

"They feel like it’s a shift type of thing. They need to produce enough assemblies. Whatever they touch and work on, they need to move it on to test. It’s a quota type thing. It isn’t."

Thus, this supervisor attributed the label error to another error, the workers’ belief that if any boards were waiting for them on their shift, they should be moved on to the next step in the manufacturing
process, to the next department, as quickly as possible. (See also Figure 5, Celia’s response to the engineer’s CAR.) Although this supervisor made a point of insisting to us that quality was most important and that the workers were wrong in thinking that there was some kind of quota they needed to reach on a given day, my research team observed plenty of instances in which workers felt pulled in two directions—high quality versus high productivity. “Push, push, push,” one worker said of another supervisor’s modus operandi. At other circuit board assembly factories where we have conducted fieldwork, the complaint is similar: How can I keep my quality high if I must work faster and faster? This tension is a fact of life with which workers must cope even when it remains unacknowledged, and conceivably, it could have had something to do with the label problem. But let us ask the workers themselves.

Marisa, the lead in the hardware department, is the person who made the incorrect labels and passed them to another worker, Tran, to be affixed to the boards. She commented first, “It’s too bad that you [the researcher] have to find out about these boards. We are not supposed to make mistakes like that.” Marisa had several explanations for the problem. The first explanation resembled the supervisor’s analysis in that it also focused on time, emphasizing how hectic the work that day had been: “It was so busy that day . . . and besides they tell me, ‘Oh, we have these three boards’ and they said ‘we need to ship these three boards.’” Clearly, Marisa thought the boards were hot—that they had to be shipped immediately—so she may have given the written instructions short shrift. She also pointed out that the worker who actually pasted the labels on the boards, Tran, was new and that she had not had time to train him sufficiently. Next time, she predicted, she would have an experienced person work on the special boards.

Marisa’s second explanation had to with how work was organized on the floor, especially the literacy requirements of work. It seems that one worker in Marisa’s department, Mrs. Kim, always read the entire set of instructions for each board and let people know if anything special was required. On the day the three motherboards were reworked, Mrs. Kim was absent, and the person who took over her job did not act as the literacy broker for the rest of the workers. “She just read her part,” Marisa complained. “Mrs. Kim always reads the whole thing and then she tells you.” Not alerted to the special directions, Marisa made new labels according to the customary process.
Interestingly, if Marisa had read the instructions herself, she certainly would have known what to do in a procedural sense: to leave the old datecode label on the board; to prepare a new, smaller label with a new month and year; and to paste it on top of the old one. Marisa also would have understood that the process was done this way because that was how the customer wanted it done. However, she would not have understood the important role of such documentation in the same way as would the engineers; in other words, she would not have thought of it in terms of maintaining traceability:

Researcher: “Do you have to understand what the numbers [on the label] mean?”
Marisa: “Yes, this is the datecode. We’re supposed to leave old label. Customer wants to change new datecode. I make small label with datecode and cut it and put it on top of the other one.”
Researcher: “Why is that so important to the customer?”
Marisa: “We’re not supposed to remove the old label. That one, we’re supposed to leave it on there.”
Researcher: “Do you understand why they care that much about whether the old label’s there?”
Marisa: “Uhhmm, not really, but we just have to follow what the customer wants if he, they say ‘I want you guys to remove that label, we just want to leave it alone, just change datecode.’”
Researcher: “Do you understand why it’s such a big deal?”
Marisa: “I not really understand that.”

It is quite significant, I would argue, that workers such as Marisa were expected to read and follow directions but not to understand their significance. This suggests another reason for the error: It occurred because workers did not have access to global knowledge about the manufacturing process that would have made their tasks understandable and meaningful. If Marisa had understood the relationship between labels and traceability and if she had understood the role of traceability in contract manufacturing, she might have paid more attention to instructions to make particular datecode labels.

The last worker we interviewed about the board problem was Tran, the person who had pasted Marisa’s incorrect labels on the boards. His explanation for his part in the mistake was simple—reading directions was not part of his job.

Tran: “Only the lead take care.”
Researcher: “Only the lead takes care?”
Tran: "When I'm not lead, I'm not looking."
Researcher: "Not looking at the MPI [manufacturing process instructions]?"
Tran: "Yeah. Only the lead take care."
Researcher: "Did anybody ever show you how to read the MPI?"
Tran: "No, they didn't show."

Even as a new employee, Tran recognized what we had learned from the managers early on in our study: EMCO's policy is that only the leads for each line or area are responsible for reading written instructions. These leads then are supposed to spread the word orally. As we saw with Marisa, sometimes the people in an area work out a system whereby someone besides the lead is the literacy broker. But the official policy, which originated no doubt as an attempt to compensate for what were perceived to be ESL problems, especially among the Korean workers who supposedly were not keen on learning English, was that only the leads were required to read. Thus, Tran, who could read English and who could have read Wade's rework instructions, did not feel compelled to do so—and could not be blamed for his choice, given EMCO's policy on literacy responsibilities.

RETHINKING NOTIONS OF LITERATE ABILITY IN THE WORKPLACE

The work event on mistaken labels and my subsequent analysis of possible reasons for this mistake can serve as a lens for reexamining common notions of ability and inability in the workplace as well as how these notions play out in workplace education (especially in work-related literacy programs). Let us first revisit Wade's joking comment that the label mistake occurred because the operators were braindead. I do not want to make too much of his comment as an indicator of his personal views of workers' abilities. As mentioned earlier in this essay, Wade did try to relate to frontline workers, making his rounds to speak to all of the leads (not a required practice at EMCO) and offering greetings in Tagalog, Spanish, or Korean. And more important, he made a point of telling me on several occasions how expert the workers at EMCO were and how he even helped to secure recognition for them on occasion. For example, Wade told me that he once observed a customer bring a complex board to the floor to have a component removed and replaced. A woman in the second
operations area—probably the lowest prestige work area in the plant—did this process by hand. According to Wade, after the worker completed the task, the customer examined the board under a microscope and then commented that "if he hadn't seen it with his own eyes, he would have sworn it was done by a machine because it was so consistent and good quality." (Although some of us might wince at this positive comparison of a person to a machine, we should remember that circuit board assembly factories are fast being taken over by machines—robots that can accurately mount components far too tiny to be attached by hand. Thus, to be compared to a machine in such an environment is actually a compliment.) Wade subsequently wrote a letter to the plant manager of EMCO telling this story and singling out the woman who had made the repair. The result of the letter was that the worker was named employee of the month. Also, Wade mentioned proudly that the plant manager had "walked down and found the lady on the floor and went over and shook her hand." This kind of recognition is fairly infrequent, and it speaks well of Wade that he took the trouble to arrange it.

Thus, I do not want to claim that Wade was typically skeptical of workers' abilities. However, I do think it noteworthy that on one of those rare occasions when workers made a mistake, he slipped very quickly into a type of pejorative labeling that was apparently a shared practice among engineers and managers at EMCO, a part of the plant's culture. As Wade walked about the plant after he had discovered the label error to break the news to his boss and colleagues, he used the term OBD to explain what had happened; everyone responded with smiles and laughs. Rather than simply reflecting unfavorably on individuals such as Wade, then, the OBD incident may also reflect a common tendency in our companies and our culture to disparage the abilities of blue-collar workers.

Others at EMCO also had pejorative comments to make about frontline workers' abilities and aspirations, comments that certainly were influenced by race, class, and even gender prejudice. In fact, although deficit thinking cut across all of these comments, including the OBD label, Wade's comment was almost benign in comparison to many of the other characterizations. We have already heard one manager's opinion that the Korean workers mysteriously resisted ESL instruction. Another personnel manager blatantly stated that such workers are different and lesser by comparing the largely Korean, immigrant, female workforce to the factory's largely White, male management:
Yeah, well see, most of those people are, have only been in this country less than 10 years. So most of those people are your craft kind of people, your general assembly labor, and that’s about all that they want to be. . . . ’Cuz you figure, you, ‘cuz you know, we have like two classes. We have our worker/assembly people and then we have like our supervisor/manager/engineering kind of people, and it’s, it’s, there’s really like two ends of the scale. We’ve got people that almost can’t communicate and you have people on the other end with like degrees.

Such dichotomies separating labor and management (aided by the absence of respect on either side) is no doubt familiar to anyone who has spent much time in industrial America. Feeding this Marxian division is a long-standing tendency on the part of many both in contemporary society and throughout history to view skeptically the abilities of people who labor physically or who work “sentiently” rather than “intellectively” (Zuboff, 1988). Perhaps the premier example of this prejudice can be found in the work of Frederick Taylor (1911) and others around the turn of the century. Such writers believed that ordinary workers were incapable of understanding the science underlying the organization of work processes; therefore, they set out to divide workplace tasks into small, routine, masterable parts. Such skepticism was also played out early on in the growth of the U.S. educational system, when vocational tracks and a differentiated curriculum were created to meet the desires of the working classes for their children to attend not only elementary school but high school as well (Oakes, 1985).

Our own historical moment also tends to scrutinize workers’ abilities and judge them as lacking. The comments by Wade and the managers at EMCO represent a familiar kind of talk sometimes offered by employers casting about for explanations of (and solutions to) declining profit shares in the face of fierce national and international competition (see Hull, 1993). Such comments also are offered by companies who believe that the only way to hold on to their present competitive advantage is to upgrade workers’ skills, preparing against the day when a ubiquitous information age finally arrives. Blaming workers’ skill deficits, carelessness, and failure to think seems to be a comforting response because it carries an obvious solution: workplace education.

Considering working Americans—those people EMCO’s personnel manager designated “your craft kind of people”—as somehow lesser in ability and potential is wrongheaded in many ways. I have argued elsewhere that focusing on the skills deficits of workers
underestimates and devalues human potential and mischaracterizes literacy and other skills as curatives for problems originating in larger arenas that skills cannot solve (Hull, 1993). Here, I would like to consider the danger of such notions for how we conceive of workplace education, especially workplace literacy programs and other work-related efforts that require high levels of reading and writing.

In recent years, there has been, of course, great interest in providing language and literacy training in connection with work (see D’Amico & Schnee, 1997; Gowen & Barlett, 1997; Kalman & Losey, 1997; Schultz, 1997). In addition, as more and more companies reorganize in ways that ostensibly give frontline workers more responsibility for problem solving and participation in self-directed work teams, language and literacy requirements most likely will change and increase. However, based on her review of descriptions of numerous workplace literacy programs, Schultz (1997) has argued that most efforts to conceive of new instruction have been stymied by limiting notions of literacy, teaching, and learning—notions that amount to what Schultz calls a new orthodoxy. Similarly, in their survey and site visits to a range of literacy programs across the country, Grubb et al. (1991) found most programs were hampered by an approach to teaching they labeled skills and drill. In this approach, activities such as reading and writing are broken down into small, meaningless components and offered via traditional teacher-centered or workbook-driven instructional techniques. Other surveys (Hiles, 1993; Wright, 1993) also have concluded that workplace literacy programs generally operate from narrow notions of literacy and primarily offer basic skills instruction. Similarly, in recent fieldwork at a high-performance workplace where every frontline employee must undergo training on how to participate in self-directed work teams, my colleagues and I found the curriculum to be workbook based, skill driven, teacher centered, and deficit oriented. That is, the workers who were expected to act on the shop floor like independent, analytical problem solvers were met inside corporate classrooms by materials, methods, participant structures, and assessment techniques that would ill serve the children for whom they originally were designed (Gee, Hull, & Lankshear, 1996).

There are, of course, many reasons for poorly designed and implemented work-related literacy programs: inadequate conceptions of literacy and skill and teaching and learning, poor or no training for adult educators who themselves lack professional recognition, inadequate resources and insufficient time for curriculum planning, the failure of policy makers to attend to issues of pedagogy, and so forth.
To this array of factors I want to add another that I often see in contemporary workplaces (and one that is embedded in the history of industrial America and other countries as well): The failure to respect the potential of working people. By sliding too quickly to labels such as OBD as explanations for literacy-related errors or by forming stereotypes based on the intersection of ethnicity, class, and gender, we obscure explanations that may be closer to the mark and that may improve a company’s functioning (as well as more justly represent the ability and potential of workers). To resort to such labeling also mischaracterizes the kind of support that workers need to improve their performance and to eliminate the errors that so vex their supervisors, engineers, and managers.

By examining Wade’s labeling problem from a sociocultural perspective, we are able to infer that carelessness or a simple lack of attention was far from an adequate explanation for why the workers failed to read. Rather, a complex web of contextual factors combined to create the conditions under which such a mistake could happen. There was, at root, the mistrust that permeated managers’ thinking concerning their largely Korean workforce’s perceived ESL problems and resistance to learning English. The managers’ erroneous assessment influenced the very organization of work. According to company policy, only leads or one designated person per area needed to read the important manufacturing process instructions, despite the preponderance and importance of documentation to the company’s relationships with its customers and international certification agencies. Implicitly but just as significantly, then, frontline workers were not expected to have certain kinds of knowledge about the company’s functioning as a contract manufacturer. For instance, although talk about traceability (and shared understandings about literacy practices involved with traceability, such as affixing datecode labels) was common among higher-ups in the company, frontline workers such as Marisa did not share in this knowledge, and the company almost suffered for it. Thus, I would suggest that the company’s mistrust of its immigrant workers’ language and literacy abilities, coupled with the conflicting pressures of a contract manufacturer to produce high-quality and high-volume products, resulted in policies and practices that took away from most frontline workers the responsibility to read manufacturing process instructions as well as the felt need, opportunity, and desire to do so. Being literate in English and being an English-speaking employee were not part of the work identity of most Koreans and many other employees.
Another contrastive view of the difference between the literate practices of frontline workers and that of engineers (and by extrapolation, managers) comes from a closer analysis of the literate activities that comprised the label event. In Figure 6, I have listed the literate activities along with the functions they served in that particular event. Note the wide range of literate activities engaged in by Wade. He and his colleagues were engaged in the creation and negotiation of a range of texts, including manufacturing process instructions and corrective action reports, for which they needed a range of knowledge. In contrast, note the very narrow and limited set engaged in by Marisa—receiving instruction, keyboarding, and copying. None of those literate activities demand any but the most rudimentary knowledge of EMCO or contract manufacturing, as befits workers thought to be deficient in English language skills, motivation, and attentiveness.

Companies might do well to rethink their notions of workers’ literate abilities and their understanding of what workers need to know. For a long time, it has been sufficient for companies to relegate their frontline employees to simple, mindless tasks—to give them checklist work, as Wade called it. EMCO certainly has adopted this practice and has even organized work to lessen literacy requirements. But if we can believe today’s corporate rhetoric and the examples of a small but growing percentage of companies across the United States (Appelbaum & Batt, 1993), even frontline workers increasingly will be given a voice in improving their factories’ competitiveness (Katzenbach & Smith, 1994; Reich, 1987). There are strong indications that workers want such a voice (Freedman & Rogers, 1994; Hull, 1995). This means constructing different notions of what counts as being a literate employee. Being literate will (and already is beginning to) go beyond the basic ability to decode instructions on how to apply datecode labels. It will include, to make a start:

- global knowledge of the industry (such as understanding the important practice of traceability),
- cultural knowledge of the particular workplace (such as knowing when it is permissible to follow verbal versus written instructions),
- organizational knowledge (such as knowing how to respond to a CAR to protect yourself and your coworkers or shift),
- technical knowledge (such as why to use a Dremel tool instead of an exacto knife when written instructions say “Cut a trace”),
- linguistic and cultural knowledge (such as deciding which language to use),
<table>
<thead>
<tr>
<th>Literate Activities</th>
<th>Functions</th>
<th>Documents</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading cover sheets and boards, categorizing boards, and making notes</td>
<td>Interpretation, categorization, and recording</td>
<td>Cover sheet from customer, handwritten notes</td>
<td>Wade</td>
</tr>
<tr>
<td>Writing rework instructions</td>
<td>Giving instructions</td>
<td>Rework instructions</td>
<td>Wade</td>
</tr>
<tr>
<td>Reading boards and labels on boards</td>
<td>Verification assessment</td>
<td>Boards and datecode labels</td>
<td>Wade, Jamal</td>
</tr>
<tr>
<td>Confronting the lead about incorrect labels</td>
<td>Clarification</td>
<td>None</td>
<td>Wade, Marisa</td>
</tr>
<tr>
<td>Explaining label problem to quality engineer</td>
<td>Explanation</td>
<td>None</td>
<td>Wade, Frank</td>
</tr>
<tr>
<td>Explaining label problem to program administrator</td>
<td>Explanation</td>
<td>None</td>
<td>Wade, Rod</td>
</tr>
<tr>
<td>Conferring with the quality engineer about who should receive the corrective action report (CAR)</td>
<td>Clarification, interpretation</td>
<td>None</td>
<td>Wade, Frank</td>
</tr>
<tr>
<td>Examining boards in the test department in an attempt to distinguish them</td>
<td>Interpretation, identification</td>
<td>Rework instructions</td>
<td>Wade</td>
</tr>
<tr>
<td>Talking to supervisor by phone about label mistake and CAR</td>
<td>Explanation, direction</td>
<td>Rework instructions</td>
<td>Wade, Celia</td>
</tr>
<tr>
<td>Writing CAR</td>
<td>Representation, reprimand</td>
<td>CAR, rework instructions</td>
<td>Wade</td>
</tr>
<tr>
<td>Creating old and new datecode labels</td>
<td>Keyboarding, copying</td>
<td>Labels</td>
<td>Marisa</td>
</tr>
<tr>
<td>Supervising creation of labels</td>
<td>Verification</td>
<td>Labels</td>
<td>Wade</td>
</tr>
</tbody>
</table>

Figure 6. Literacy activities in label event

- and interpersonal knowledge (such as knowing how to read one engineer’s MPI versus another’s).

The challenge for literacy educators and workplace researchers is to continue searching out what constitutes the literate or skills-rich worker, perhaps by using an approach similar to the sociocultural
framework employed in this essay. We will also want to find ways to promote the development of workers' literate potential through the reorganization of work as well as through workplace education. We will also need to be forever alert to the ever-present tendency to label and mislabel and thereby to ignore human potential.

NOTES

1. Portions of this article have appeared in Hull (1997, 1999).
2. Changing Work, Changing Literacy? A Study of Skill Requirements and Development in a Traditional and Restructured Workplace (1996) was supported by the National Center for Research in Vocational Education and the National Center for the Study of Writing and Literacy. The research team for this project included Meg Gebhard, Mark Jury, Mira Katz, Katherine Schultz, and Oren Ziv. Many thanks to them, as well as to the workers in Silicon Valley factories who were unfailingly gracious in opening to us the world of the shop floor.
3. The transcription notation used in this article includes the following:
   
   . . . = omission of less than one sentence
   . . . . = omission of more than one sentence
   — = latching speech
   ( ) = unintelligible speech
   (yes) = best guess
   [quickly] = researcher's explanation

4. A recent analysis at RAND (Sturm, 1993) reaches a complementary conclusion: "The economic data do not support widely repeated claims of deindustrialization or productivity loss—nor do they necessarily suggest a need for dramatic and instantaneous changes in education and training" (p. xi).

REFERENCES


Hull, G. (1997). Manufacturing the new worker: Literate activities and working identities in a “high performance” versus a traditionally organized workplace. In A. Lesgold,


