

Workplace Literacy

Larry Mikulecky, Professor
Indiana University

SIL International
2004

Contents

Abstract

1. Overview
2. Current Literacy Demands in Industrialized Nations
 - 2.1. Increases in the demand for literacy
 - 2.2. Significant amount of reading on the job
 - 2.3. Increased difficulty level
 - 2.4. Most jobs in developed nations require high literacy skills
3. Workplace Examples from America, Canada, and Australia
 - 3.1. Shipping foreman
 - 3.2. Quality-One ratings
 - 3.3. Food processing industry
 - 3.4. Quality assurance groups
 - 3.5. Banking industry
 - 3.6. Furniture manufacturing
 - 3.7. The challenges for literacy in the workplace
4. Literacy Abilities: Who Can Do What?
 - 4.1. Simple literacy
 - 4.2. Pockets of lower literacy
 - 4.3. Gaps increase with more complex tasks
 - 4.4. Ranges of literacy abilities
5. Problems Caused by Gaps between Demands and Abilities
 - 5.1. Industry examples
 - 5.2. Comparison between top workers and adequate workers
6. Research and Policy Issues
 - 6.1. Connecting schooling to the real world
 - 6.2. Practice
 - 6.3. Retention
 - 6.4. Multi-level programs
 - 6.5. Funding
 - 6.6. Economic implications for nations and individuals
7. Concluding Remarks

References

Abstract

This paper was presented at the International Literacy Year Colloquium in October 1990, in Washington, D.C. The information is drawn from a number of sources, including job training and community development and from National Assessment research. It examines the literacy demands in the workplace in the United States, such as shipping, food processing, banking and furniture manufacture. It also shows how literacy needs are changing. Workers are limited by their lack of ability to handle literacy demands on the job. Top workers, compared to adequate workers, show a different approach to handling literacy matters. Literacy education needs to change in order to be more in step with the needs of the workplace.

1. Overview

The information I share with you is drawn from a variety of sources. Some is from research on job training and community development in the United States. Other information is from National Assessment research addressing the spread of who can do what—what literacy abilities are inherent in the work population? I also share examples of changing literacy demands in the workplace. Some examples are from research and some are from experiences I've had while working with several corporations in the United States, Canada, and Australia. I conclude by addressing workplace literacy issues not yet addressed sufficiently by government, educators, or corporations.*

2. Current Literacy Demands in Industrialized Nations

2.1. Increases in the demand for literacy

Literacy changes have been ongoing in the developed nations for a long time. Literacy demands have increased. During World War II, in the U.S. and Canadian armies, the minimum literacy level for draftees was about a fourth grade level. A fourth grade level is roughly the ability to interpret a brief sentence or a simple headline.

By the '80s, you could not enter the military in the U.S. or Canada, and increasingly in Australia, without the equivalent of a high school diploma. A young lady is suing the U.S. Air Force for not accepting her high school equivalency degree. The reason for increased entrance requirements is partly the product of increased literacy demands in the military. The cost of somebody unable to handle technological print material is great. Inability to read at a sufficient level can cost lives and equipment.

2.2. Significant amount of reading on the job

Research done in developed nations by William Diehl, Tom Stitch, others, and me, repeatedly shows that over 90 percent of jobs require a significant amount of reading daily. Early research revealed that when people were asked how much they read on the job, they mistakenly thought, "Do I read a book?" They underreported what they were doing when simple self-reporting instruments were used to collect data. But the amount of reported time increased when people were probed to remember actual periods of time or were tracked on the job. Observers made note of books, memos, charts, and forms—thirty seconds here, a minute and a half there, throughout an average day. It turns out that the average worker in the United States reads from two to three hours daily. Blue-collar jobs average slightly less reading time—about ninety-seven minutes a day.

2.3. Increased difficulty level

The difficulty level of reading material on the job is fairly high. Seventy percent of job-related reading material is at high school difficulty levels—between ninth and twelfth grade levels. An additional 15 percent is above that level.

*Professor Mikulecky is the chair of the Language Education Department of Indiana University's School of Education. He is internationally recognized for his research in the area of workplace literacy. His research examines basic literacy requirements in the workplace, the gaps between traditional education and workplace literacy demands, and the relationships between literacy and workplace performance. Mikulecky has served as principal investigator on over a dozen research projects, has been Director of Indiana University's Learning Skills Center, and served as a research consultant to Fortune 500 corporations, government agencies, and collaborative education/labor literacy projects. He is currently developing a workplace literacy impact evaluation model for the United States National Center on Adult Literacy.

To compare difficulty, wire service stories in most U.S. newspapers average about eleventh or twelfth grade difficulty level. Most newspapers are about the difficulty level of manuals, memos, charts, and safety information found in the workplace. Another 15 percent of workplace material is above that difficulty level—more technical, more complex.

An eighth grade level of difficulty is roughly equivalent to a story in *USA Today*. Sentences are usually brief and visual information supports verbal information. This does not mean that you have an eighth grade intellect if you read such material. We often read materials less challenging than our top abilities. But, it does mean that comprehending *USA Today* requires a level of ability of an average thirteen year old. The ability of an average seventeen year old is needed to make sense of wire service stories.

This high school difficulty level is an increase from forty years ago when newspaper stories in local papers averaged elementary school difficulty levels. In the early 1980s, I studied the reading performed by high school students and by workers. The study compared the daily reading times and the difficulty levels of material for high school students and workers in a representative sample of occupations. We used the census breakdown of occupation categories to sample jobs from the *Dictionary of Occupational Titles*. We found a goodly amount of reading across jobs. It averaged two to three hours daily. Reading for students, including homework, averaged barely one and a half hours daily. For most students, the day they leave school is when reading increases. Some people accurately say, “If you want to hide from reading and writing, school is not a bad place to do it.”

What mostly occurs in schools is conversation. Sometimes it is good conversation, educational conversation, but it provides little practice of literacy. John Goodlad examined over one thousand U.S. classrooms to find that 70 to 75 percent of school time is teacher talk. The figures are comparable for Australia and Canada. Some talk is wonderful, some is directed, and some involves enlightening discussions. But literacy practice for the average student is less in school than elsewhere.

2.4. Most jobs in developed nations require high literacy skills

In the developed nations, the places where people can hide from literacy on the job are disappearing. Jobs in farm labor, logging, housekeeping, and home child-care—places where traditionally one needs less literacy—are declining. People who remain in those jobs now need more literacy. Farmers, for example, need to read to know when to deliver crops to market, what the cost is for resources used, and which crops to plant. Farmers examine prices almost as much as someone who works on Wall Street.

According to the U.S. Department of Labor, the work areas growing in developed nations are service workers, psychiatric aides, dental assistants, claims clerks, secretaries, and sales clerks. These are not high-tech jobs, but jobs that call for two to three hours of reading each day. Often they are the jobs that in developed nations go to the bottom 30 to 40 percent of a high school class. These jobs are not going to college graduates, but to people formerly not in the work force or those formerly doing muscle jobs. What changed is that the lower 40 percent of the population is encountering situations where literacy demands are higher than high school demands. Even more literacy is called for in jobs with the largest projected growth rates. These include industrial robots—manufacturing them, servicing them, marketing them, and working with them—as well as geriatrics social workers, energy technicians, those who work with industrial laser processing, and emergency medical workers. These jobs require some training beyond high school. It is becoming difficult for someone who just has a high school diploma to be in more than a dead-end job. Dropouts face even less desirable choices.

3. Workplace Examples from America, Canada, and Australia

3.1. Shipping foreman

Most businesses in developed nations have loading dock foremen. When the truck comes up, they load the truck and send the product to its destination. No matter whether it is popcorn in Indiana, transmissions in Detroit, or electronic switches for major automakers from parts plants in Marks, Mississippi, the loading dock job is traditionally held by somebody who either dropped out of high school or who just made it through high school in the last two decades. A person who was in the college-bound track rarely holds it.

The following is a memo to a loading dock foreman. Roughly, it says,

Joe,

Please take care of this order for me. There are just a couple of things you should know before you start. The order calls for nine full units of 48805. We have only eight and a half units. Send what we have and make the adjustments on the bill-of-lading. The order also calls for only ten units of 48814. We have eleven and a half units in stock. I would like you to ship the entire eleven and a half units. Make the changes in the bill-of-lading. Take the shipments for units 48805 from V-76JL skids number one fifty and two fifty. Take the shipments for 48814 from V-76JL skids between two forty-five and three forty-five. Be sure to record all of this on the bill-of-lading. Let me know with a note how this all works.

One of the ten students who were in the bottom third of a U.S. high school homeroom is reading the memo. This memo might have come in by FAX from another building or even another plant. Joe needs to check the bill-of-lading and find a chart that has complex listings of numbers for different skids cross-referenced by part numbers. The charts often contain other data, such as what a skid or carton weighs. Joe's job is to cross-check this information and the bill-of-lading. He has a computer printout on which somebody computed a truckload as full as it could be without violating federal guidelines. Because these delivery changes happen regularly, there is never a day when the computer printout is completely right. A change in stock inventory or something happens. An emergency comes up for a quick shipment somewhere. Joe has to fill out the bill-of-lading, while monitoring to make sure that he does not incur a ten thousand dollar fine by overloading the truck or waste productivity by under loading the truck. Joe can usually manage, however.

The problem is, when two trucks are at the dock, who else does it? Or if Joe is sick, who else does it? If mistakes happen too often, this business fails. It is a literacy/economic issue, a productivity issue.

3.2. Quality-One ratings

Quality-One ratings embrace the idea of literacy for productivity. In Mississippi, a plant makes switches for the automotive industry. Mississippi took jobs away from the Northeast and the Midwest by being able to pay lower salaries. Now those jobs are being taken from Mississippi by plants in Mexico, where workers work for still lower salaries. The Mississippi plant can only compete by achieving a Quality-One rating. A Quality-One rating often means that you produce fewer than one mistake for twenty thousand parts. A plant must manage this for six months in a row. If the Mississippi plant achieves a Quality-One rating, it can ship parts directly to wherever the automobiles are assembled. They do not have to send them to Dearborn, Michigan, where pieces are randomly sampled for errors. If more than one mistake is indicated for twenty thousand parts in the shipment, the shipment gets sent back and has to be re-inspected. The plant sending the defective parts has to pay for the shipping, throw away damaged parts, and bring the rest up to standard. This can cost a lot of money. If it happens regularly, they lose the Quality-One rating and the contract.

If a plant has the Quality-One rating, it can afford to pay higher wages because it saves shipping, reinspection, and waste costs. The catch is, to have fewer than one mistake per twenty thousand parts, the plant must spot mistakes ninety minutes before they happen.

In almost every industry, the quality watchers come from the bottom third of the high school class. They monitor several production points involving measurements to hundredths of an inch to see when variations begin. They chart the changes, read and write out communications, and use high technology (computer or FAX) to send information. This is the democratization of the workplace. The worker who used to wait until the end of the week for the manager to decide to recalibrate the machine must say now, "Stop this! We have to stop before we waste parts or lose our Quality-One rating."

This level of demand on lower level workers is what I am seeing around the country. A developed national level of literacy is needed to earn developed nations' wages.

3.3. Food processing industry

Another example is the food processing industry. At one plant, they make macaroni and cheese in boiler bags. A machine called the mari-flex squirts macaroni into little boiler bags. The employer screens the high school graduates who apply and only hires one out of three. People doing this entry-level mari-flex job take five bags from each side of the line every fifteen minutes for testing. The worker looks at a chart to see how much the macaroni and cheese should weigh in tenths of ounces. He or she records the weights, computes a total, an average, and a range of variation. The worker graphs this to see how much it fluctuates from bag to bag and sample to sample. At the end of

each day, he or she writes a report on how often the machine stopped, for how long, whether it was fixed, and what happened. Paperwork goes in from dozens of mari-flex machines to a manager who decides, “Do we shut down this machine and recalibrate, or do we run it through two or three shifts?” Management is trying to cut out the middle-level manager. They want a qualified worker to decide when to shut down the machine.

For promotion, a worker’s next job is on the second shift where the he cleans the machine. The worker measures acids and bases and must read a forty-eight point set of directions on how to clean this machine so consumers do not get salmonella or other sicknesses. Finding employees for this position is difficult. The employer has a hard time promoting capable people from the noncollege, high school graduates they hire. The consumer does not want people guessing about food preparation directions.

3.4. Quality assurance groups

Industries move toward democratization of the workplace with quality assurance groups. A group of workers without a manager regularly present brainstormed ideas of what could be done to decrease mistakes and improve productivity. The group problem-solves about half an hour a day, maybe three days a week. They jot down ideas in notes, then consolidate them in one place, where a management pattern is developed. But 20 to 30 percent of the groups at a major technology company had no one capable of taking notes that could be understood by a person not part of the group.

That productivity strategy is endangered at this technology company, which mainly hires high school graduates. Interviews with workers indicated that many had never been in a small group in school. The remainder said the college-bound fellow students took the notes. The bottom third were not expected to do the literacy activities. Their cooperation in school was limited to listening and occasionally talking, but never writing. When these people later need to listen, take notes, read, and write, they often lack the skills.

A similar quality assurance example comes from an international electronics switch-making company in Illinois. They just introduced a Quality Assurance Program they call CEDAC (Cause-Effect Diagrams and Cards). The company has committed to have its entire work force, in a democratic fashion, share quality assurance meeting roles. This involves rotating note-taking tasks and writing on the newsprint tasks. Teams of eight to ten workers involved in producing micro-switches develop diagrams of what would cause this defect or would cause that slowdown. They outline the steps and procedures of production and then draw arrows that show the different causes and effects of what might be involved in productivity problems. As people meet in these regular half-hour meetings a couple of days a week, they keep these diagrams posted in the room. Everybody is expected to write suggestions of what they think might be happening on four-by-six cards and put them up on the diagram. Other people look at those suggestions and draw arrows. It is a democratic, group, problem-solving process. Many workers cannot participate because they cannot write a complete sentence, cannot read to follow the patterns, or are too embarrassed to write on the board. The employer is trying to decide if they can increase profitability and productivity enough to keep the jobs in Illinois. Their window for this sort of decision-making is never longer than a few years.

3.5. Banking industry

The banking industry spent \$32,000,000 on basic skills instruction in the United States in 1988. The amount had doubled since 1985. The American Bankers Association (ABA) reports that 23 percent of employees in entry-level jobs experience basic skills problems. Nearly 30 percent of those in training have low basic skills that interfere with training. This is a problem because the banking industry spends \$4,200 to train a teller before he or she goes to a window. That \$4,200 is the same as we spend to educate a child for a year, kindergarten through twelfth grade. When trained tellers, customer services representatives, bookkeepers, loan clerks, or secretary-receptionists derive little benefit from a \$4,200 investment in training, the industry faces a financial hemorrhage. This is why the banking industry has invested in the development of a basic skills series customized for banking.

The ABA and Simon and Schuster have available twelve strategic skills booklets based on literacy task-analyses of the kinds of tasks that entry-level bank employees do. The materials are designed to train employees, as well as teach parallel life-skills tasks. For example, filling out a mail-order catalogue form and checking the computations on it is very similar to checking a deposit slip for a mistake. The banking industry developed other similar tasks for its literacy training.

These booklets are based on research conducted by Jorie Philippi and me. Basic skills problems were often imbedded in daily problem-solving tasks. A good example is in dealing with an angry customer who calls up wanting to know why the bill on her home equity loan is not right. Susan, a bank teller from the bottom third of the high school class, answers the phone. The customer is rambling, is unhappy, and it is early in the morning. The customer is not getting to the point. Susan must figure out what the customer is saying and make some notes. She has to interrupt the customer to make sure she has the correct account number and middle initial because *Jones* is a common name. Maybe she even has to get the street address. Susan has to make these notes and then use a computer.

It has been a while since Susan has even looked at home equity loans. She does not remember exactly which function keys to punch on the computer, so she looks on the side of the machine at a little cheat-sheet, technically called a *job aid*. This sheet, which she made earlier, lists the keys to punch. She has to read it and figure out which keys to punch to pull up the appropriate screen. Now she has to skim the screen quickly because the customer is anxious because she has to get to work and is already a little late. Susan cannot take a lot of time to ask coworkers for help. She has to skim over the figures and decide whether she has the correct customer to match with the notes, and whether the home equity loan is there. She checks to see what the monthly charge should be, which may involve a calculator, and then summarizes the information in a way that does not make the customer angry.

Probably Susan takes so long that the customer hangs up or says, "Well, send me a note explaining this." This often happens when employees take longer than ninety seconds. If the customer hangs up, Susan must summarize what is going on in a written note to the customer so it does not anger her so much that she goes to a different bank.

These examples represent current literacy demands in the workplace. Other literacy skills are proofing a letter for mistakes or knowing how to modify a form letter written by someone else for a new situation. Tasks range from reading transaction tickets, to spotting errors in billing, to balancing a teller drawer. These tasks involve reading several different forms, estimating, and cross-checking work. All this is asked of people who did not necessarily go to college.

3.6. Furniture manufacturing

Another example comes from a wood products treating plant. It is the major employer in a small town and hires a broad range of people, including high school dropouts. A few years ago, the plant faced going out of business. It could not compete with Indonesia and Latin American countries that inexpensively produce wooden drawer guides and doors for kitchen cabinets. As an attempt to improve productivity, the CEO brought new technology into the plant. The new machines run drawer guides ten times faster than the old machinery, but the increased speed produces new problems. Wood moves rapidly through the new machines and must be monitored more carefully than before. If the wood is too dry, it chips; if the wood is too wet, the saw blades break. This did not matter as much with the older, slower machines. With the new equipment, mistakes cause the machine to break down or ruin tons of wood. A measurement problem can create thousands of dollars of waste in a very short time.

A high school dropout must be able to identify the type of wood, know the moisture content it should have by looking at a chart, and weigh the wood. He records the weight and dries that piece in a microwave oven after checking another chart for microwave times. Then he weighs the dried wood again. He uses the new figure to compute the percentage of water in the wood. Next, he goes to another chart to estimate the humidity in July. He uses this information to estimate how long the wood should stay in a series of drying rooms before it gets to the kiln. If it gets to the kiln too wet, \$30,000 worth of lumber is wasted. Shipments of wood are constantly monitored, mostly by people who did not have to do this before. Workers do similarly complex tasks up and down the line. The workers are now also in quality assurance groups.

The CEO set up a day-care center because he knows children are crucial to community survival. If the business survives, they will likely be employees in a decade or so. He gives wage increases as employees improve in literacy ability. More high school equivalency degrees came out of this plant than from the entire county. He tried several adult basic education teachers before he found one from three counties away who could custom design instruction. He probably will succeed, but he is investing a lot of time educating and training people.

3.7. The challenges for literacy in the workplace

These examples reflect what I see in many workplaces. Some dead-end jobs are still out there and some industries gamble on technology being able to create deskilled, low paying jobs for the undereducated. Such jobs are often in

grocery stores where machines read prices or in fast food restaurants with pictures of French fries and machines that calculate the bill. Some foundries and laundries look for undereducated workers who cannot escape the low pay and dangerous conditions. In most places of employment, however, technology makes it possible for a worker to do several different jobs over the course of a month. Some of these jobs are simpler, but the overall result is higher skill demands on the worker.

4. Literacy Abilities: Who Can Do What?

It is not enough to know that literacy demands in the workplace are increasing. It is also important to have a sense of who meets those demands, who almost meets them, and who is far from meeting them. In the past ten years, we have learned much about adult literacy abilities. We have also learned that some of our assumptions about these abilities are incorrect.

4.1. Simple literacy

In 1986, the National Assessment of Educational Progress surveyed the literacy abilities of young adults from ages twenty-one to twenty-five. This survey found that nearly all young adults in the United States have attained a very basic sort of literacy. Nineteen out of twenty can sign their names, locate expiration dates on driver's licenses, locate times on meeting forms, find a caller's number in a phone list, and spot a movie in *TV Guide*. Mostly, in the United States, we have attained basic literacy as it was understood one hundred years ago. Only a low percentage of people cannot use basic literacy, as reflected by the simpler tasks in the National Assessment survey.

4.2. Pockets of lower literacy

Pockets of low literacy levels remain. For example, to enter simple information on a job form is a simple task that 95 percent of the young adult population can manage. The 5 percent who have difficulty doing this task is not divided equally among subpopulations. About 2 percent of young adult whites have difficulty with the job form task. The percentages are higher for young adults in minority groups. Eight percent of Hispanic young adults cannot fill out simple forms and 18 percent of young black adults cannot successfully complete the task. The same relative percentages hold for dozens of comparably difficult items on the assessment. As the tasks increase in difficulty, the gaps between ethnic groups increase.

Almost the same assessment survey was given in Canada and Australia. These nations display similar patterns, not so much in ethnic groups as in socioeconomic status. In Canada, pockets of low performance are found among French speakers, even when the survey uses French language forms. Canadians in the less prosperous Atlantic provinces in Canada also perform lower. In Australia, a variety of language groups do not have English as a first language. Many groups of second and third generation speakers of nonEnglish languages still identify themselves with the country of origin. These groups all score below the norms. Aboriginal populations were excluded from the Australian national assessment.

4.3. Gaps increase with more complex tasks

The workplace has few simple literacy tasks. Mostly, however, we use literacy to solve increasingly complex problems. On the National Assessment of Educational Progress survey, two tasks used to represent workplace complexity were writing a letter to acknowledge an error in billing and using a simple road map to locate a delivery destination. Responses to these items show that about a fifth of white young adults cannot perform adequately. The gaps in performance increase in low performance subgroups. About 60 percent of blacks and 40 percent of Hispanics were unable to do these and other tasks of comparable difficulty. The low performance on assessment items with moderate to high levels of difficulty is cause for concern.

What literacy means in developed nations is different from what it meant thirty years ago. Now it means problem-solving and the complex integration of basic skills. It often involves several different modes—reading, writing, speaking, listening, and using computers. In a banking industry survey of entry level jobs, 79 percent of tasks involved three or more modes (reading, writing, speaking, listening, or computation). Adequate job performance involves integrating skills to do something right the first time, usually unassisted. In the past, people worked in a subculture where a support group helped out and answered questions. A decade ago, Shirley Brice Heath found that sort of group help in the textile industry, but many of those types of industries have closed. In developed nations, jobs increasingly involve a person and a machine performing the work that an entire group once did.

4.4. Ranges of literacy abilities

The National Assessment survey provides a sense of the range of adult reading abilities in the United States. About 94 percent of adults read at or above the fourth grade level (the difficulty of a newspaper headline). The fourth grade level is achieved by 96 percent of whites and 82 percent of blacks. At the eighth grade level (the difficulty level of *USA Today*), about 80 percent pass, with 40 percent of black American adults having difficulty at this level. About 40 percent of adult Americans had difficulty locating information in a typical news article and more than 60 percent could not state in writing the argument in a lengthy newspaper column (eleventh to twelfth grade level). Performance levels by minority populations were worse than national averages.

By way of a cautionary note, I do not intend for this National Assessment data to be taken in a racist fashion—except to the extent that it reflects a society that is to some degree racist. Comparison of literacy assessment data internationally suggests that performance has more to do with economic divisions than race. Literacy performance has much to do with who the society allows to go to school, what the quality of that experience is, and what level of support is available in the home. In each of the nations with national literacy assessments, groups on the low end of the economic continuum tend to do poorly.

5. Problems Caused by Gaps between Demands and Abilities

What does this mean in the workplace? To quote percentages from test data is different from imagining how these things influence the lives of those with low literacy levels and our own lives. Information on this level is hard to find. Industries do not want to reveal internal problems. In some cases, litigation is involved. Still, people who do research in this area encounter many literacy-related incidents and anecdotes. A few of these stories come from my work and from that of Maurice Taylor in Canada. I will try to paint a verbal picture of what low literacy means in the workplace.

5.1. Industry examples

Hospital kitchen staffs often have problems. The kitchen staff typically deals with regular menu orders using easily memorized check off forms. Someone once made a health-endangering mistake on a special menu order for a patient whose condition required a special diet. The worker made the mistake because he could not read the doctor's orders.

A major insurance company reported major clerical errors. About 70 percent of correspondence for the insurance company needed to be redone a second time because of writing, typing, editing, and proof-reading mistakes. We know what the average overhead cost is for an office in a major urban area, and the cost of the average letter is between \$12.00 and \$18.00. When 70 percent of letters need to be redone, the cost is major.

A hotel chambermaid with repeated health problems took necessary time off. The problems were traced to the woman's allergic reaction. She misapplied disinfectant because she could not read the warnings and application instructions on the bottle label and had forgotten the full details of the original oral instructions. Most directions on the job have traditionally been given orally. The problem is that, as the worker moves from task to task, oral directions from the week before are insufficient. The human memory is limited, and the likelihood of functioning well and independently without sufficient literacy is doubtful.

A cafeteria worker received a promotion to cafeteria supervisor because of her dedicated work, though she lacked literacy skills. She regularly needs to hold off on ordering food and supplies until someone else can check over the order forms for accuracy. Such promotability problems are increasingly an issue for employers—not just concerns about entry level hiring.

A shipping and receiving employee received a promotion to lead worker. He can direct shipments to proper locations, if the names and room numbers are the only information needed to direct orders. These parts of the job are fairly routine and can be memorized. When special requests are written on the orders, they must wait until this foreman can discreetly get help in deciphering the instructions. If a department expected something and it had not arrived, they might find it pushed to the back of the room because the directions are too difficult for someone to read.

5.2. Comparison between top workers and adequate workers

Most of the previous examples come from the low ability end of the continuum. In 1986, Jean Ehlinger and I studied electronic technicians to examine literacy demands among higher end workers (i.e., supervisors, experienced people, and trainees). We went through extensive rating procedures to divide top job performers from adequate job performers. Then we examined differences in their literacy use. In ability to read as measured by a cloze test or other standard literacy measure, no significant difference existed between the two groups. When we started interviewing people to examine how they used and conceived of literacy, we found several differences. Our study showed that 60 percent of the superior-rated workers had developed focusing techniques for when they read on the job. They repeatedly used metacognitive strategies to direct their literacy use, and they built the use of print information into their planning. A superior technician told us of such a strategy,

When I encounter a new board I'm not familiar with, then I have to really study drawings, schematics, to see how they match, then look at the board and follow what the schematic shows. I measure at points to follow along, to get the right readings. Some of the new test equipment readings must be used with a sheet which details tested proper readings.

For comparison purposes, a worker rated as adequate said,

“Well, I look at it and if it's familiar, then I kind of do something. Other times I guess.”

Dorothy Winchester and I did a similar study in the nursing profession. We examined the literacy strategies of top performing and adequately performing registered nurses, licensed practical nurses, and student nurses. As the measured literacy abilities of nurses increased (no matter what level of experience), so did the use of self-developed filing systems (note card systems, highlighting, underlining, and other ways to retrieve or emphasize information). Superior performers used literacy to extend their ability to handle information and do the job. We found interview comments similar to those of the electronics profession's distinguished top performers as opposed to merely adequate performers.

6. Research and Policy Issues

6.1. Connecting schooling to the real world

Several studies show that not much reading goes on in schools. About 70 percent of most classroom time is talking time, not reading time. When reading does occur, it is reading to answer questions at the end of chapters or worksheets. This is fact-level reading, the lowest level of skill, reading to locate information for a previously written question. Little of this sort of reading is needed anywhere but school. To be better connected to the real world, teachers need to talk less, and students need to read more and for more complex tasks. Thus, schools need to catch up to the demands that students will face the day they leave school.

The little reading done in schools is nearly always separated for the administrative convenience of educators. Only in schools do we separate reading from writing, or either from mathematics, speaking, listening, or complex problem-solving. Outside of schools, most people integrate these skills to solve problems and perform tasks. One rarely just does a set of math problems or grammar exercises in the real world. Recent research data suggests that this is important. For many people, there is little transfer from learning an isolated skill to being able to apply that skill in a new situation. We know that it is necessary to learn the skill, but this is far from sufficient. Unless there is sufficient practice for using skills integrated with other skills in complex situations, there is little transfer for many people.

Not everything about schooling is bleak. There are some promising trends in this area. For example, Michigan has a new test for reading that calls for students to comprehend the material read in more sophisticated and realistic ways. Longer passages are used for reading materials, and students are expected to make judgments and use the information they have read.

Several groups of professional educators are trying to point educators in useful directions. The International Reading Association uses its publications and conventions to show teachers how to develop more effective ways to encourage students to think about what they read while they are reading. This resembles the metacognitive skills demonstrated by superior performers in the workplace. Similarly, educators are piloting techniques to show students how to work effectively in groups, as they will have to do in the workplace.

Though these trends are promising, actual classroom application is all too rare. The vast majority of students in schools spend most of their time listening to teachers and have minimal, and overly simplistic, reading practice. This needs to change.

6.2. Practice

Another related issue is that of sufficient practice. When people cannot transfer what they learn to real world situations, they are unable to continue practicing what they have learned. This is important because new knowledge must be used or it is lost. Tom Stinch's reports of military studies shows that enlisted men improve in literacy abilities while in general literacy classes, but within eight weeks, 80 percent of the gains are lost. The only exception to this finding was when job-related materials were used to teach literacy abilities. In this case, learning gains held up. This is most likely because learners could see transfer and continued to practice the abilities they had mastered.

6.3. Retention

Retention of learners in adult literacy programs, especially in the United States, is another major challenge. Most adult literacy programs in the United States are voluntary. A typical pattern is for learners to come two evenings a week for one to two hours per visit. In the United States, 80 percent of learners quit programs before a hundred hours of instruction. According to George Diekoff's analysis of several adult literacy program studies, only about 12 percent of people who enter an adult basic education program ever improve to where they can comprehend newspaper stories. It is largely a dropout problem because it takes a long time to improve in literacy. In school, to move from a third grade level to a fourth grade level takes a school year. This amounts to seven hours a day times one hundred eighty days. Though not all the time is spent on literacy, we can assume that successful students spend several hundred hours on practice. Most adult literacy programs in the United States report learners need about one hundred hours of practice to make a year level gain. The best programs, those that win awards, can make that average grade level gain in about fifty-five hours. These figures are unreliable because the range is so wide, and the people at the lowest end take five or six times longer to make gains as do those at the top. Even taking this low reliability into account, we know learners will need a good deal of time and effort to move from *cannot read* to *headline reading* to *being able to read a newspaper*. With two hours of training a week in voluntary drop-in programs, a reasonable estimate is close to a decade for an average learner to move from illiterate to reading manuals. It is not surprising that most drop out long before they reach functional literacy levels.

As low as the success levels of drop-in adult literacy centers are, they are all that is available for many adults. Teachers and learners find themselves in inadequate situations. The 12 percent of learners who get to the newspaper reading level might not get there without the programs. To help the majority will require much more than drop-in programs for low level literates.

6.4. Multi-level programs

Another issue relates to the propensity to focus on very low level literates. There are several literacy problems in most situations, not just one. The person who cannot read requires different support than does the high school graduate who cannot meet the new reading demands of his job. Providing the same services and programs to such different clients makes no sense, and yet it often occurs. Now educators are trying to deliver multi-level programs. For example, Donald O'Keefe and Valerie Myer examined 114 Adult Basic Education students and found that close to 90 percent of the group below third grade level had visual problems, and over two-thirds had diagnosed learning disabilities. These learners needed special services and special help. The one-on-one tutoring needed for this group is inappropriate for another group trying to learn the basic skills needed for passing a Commercial Driver's Test, or for a group trying to return to technical training after several decades away from school. Programs that cannot deal with such multi-level problems often drive people away when they see that their needs are not being met.

6.5. Funding

Another major policy issue related to workplace literacy training is, "Who pays?" Does business, government, or the individual pay? In many cases, the business and worker share the expense of doing literacy in the workplace. In the United States, a mixture of government, unions, and businesses pay for workplace literacy training, but nobody is clear on the limits of responsibility. In Australia, a 2 percent tax of corporate profits is allocated for training.

Similar programs are in effect in many European countries. In Canada, the government currently funds most workplace literacy programs.

We have had little information or public discussion on the questions related to “Who pays?” For example, will business only train those worth training? To what extent does the learner have a say in what he or she learns? What role should government have in training the unemployed, supporting business or union efforts, or providing a safety net? How much education does a society owe its members? Can a society require individuals to improve in literacy before receiving benefits like unemployment support?

6.6. Economic implications for nations and individuals

Information is the currency of the 1990s, and information may be distributed even less equitably than traditional forms of wealth. It is easier to give money to a person than to make sure he has access to, and can use, information.

New trends of the global information economy are becoming apparent. For example, it is said: “In a global economy, an individual does not automatically receive a developed nation standard of living simply because he or she lives in a developed nation.” A more stark version of this observation says: “If you have third world basic skills, you may be condemned to a third world life-style.” Anyone who notices the similarities between third world living and enclaves of the homeless and unemployed in major U.S. cities can appreciate the frightening reality of this statement. In a global economy, it is possible to have more contact and more in common with a colleague in another country than with a citizen ten miles away in an inner city. Shared knowledge and culture are rapidly becoming products of access to information more than products of one’s chance residence in a nation.

7. Concluding Remarks

Australia, Canada, and the United States, in their own ways, try to deal with the implications of these economic observations. Each is trying to determine the obligations of a nation to its citizens. Each is also speculating on what proportion of its citizens can be carried, and at what quality of life. Discussions of these issues are beginning, but they need to be more widespread, and less filled with rhetoric. What is possible to accomplish in many areas is a direct outgrowth of the proportion of our populations’ ability to be productive.

The average literacy ability level for productive functioning in developed nations is tenth to twelfth grade level. Though some people with outstanding strengths have done well with lower literacy levels, demands have increased and such individuals are increasingly rare. In developed nations, higher level literacy is almost a prerequisite to succeeding in the workplace. The percentage of people in a society who are productive is directly related to the percentage of people a society can carry. It is likely that some individuals may never reach fully functional levels, such as children with brain damage, fetal alcohol syndrome, or crack addiction. If we are to carry even the problems of our own making, we must do everything we can to make sure that each person with the potential to be productive can achieve that potential. Workplace literacy training is more than a business tool; it is a social imperative in developed nations.

References

- Diekhoff, G. 1988. An appraisal of adult literacy programs: Reading between the lines. *Journal of Reading* 31(7):624–630.
- Drew, R. A. and Larry J. Mikulecky. 1988. *How to gather and develop job-specific literacy for basic skills instruction*. Bloomington, IN: Office of Education and Training Resources, School of Education, Indiana University.
- Kirsch, I. and A. Jungeblut. 1986. *Literacy: Profiles of America’s Young Adults*. Princeton, NJ: Educational Testing Service.
- Mikulecky, Larry J. and W. A. Diehl. 1980. *Job literacy: A study of literacy demands, attitudes, and strategies in a cross-section of occupations*. Bloomington, IN: Indiana University School of Education, Reading Research Center.
- Mikulecky, Larry J. 1982. The relationship between school preparation and workplace actuality. *Reading Research Quarterly* 17:400–420.

- Mikulecky, Larry J. and D. Winchester. 1983. Job literacy and job performance among nurses at varying employment levels. *Adult Education Quarterly* 34:1–15.
- Mikulecky, Larry J. and J. Ehlinger. 1986. The influence of metacognitive aspects of literacy on job performance of electronic technicians. *Journal of Reading Behavior* 18(1):41–62.
- Mikulecky, Larry J. and R. Strange. 1986. Effective literacy training programs for adults in business and municipal employment. In J. Orasanu (ed.), *Reading Comprehension: From Research to Practice*, 319–334. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Mikulecky, Larry J. 1990. Stopping summer learning loss among at-risk youth. *Journal of Reading* 33(7):516–521.
- Sticht, T. G. 1982. *Basic skills in defense*. Alexandria, VA: HumRRO.