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ABSTRACT

Employers find it increasingly difficult to hire competent workers in part because expectations are rising in the face of global competition. A single standard of literacy is an inadequate measure. The National Assessment of Educational Progress' profile of 3,600 young adults measured three types of literacy: prose (reading and interpretation), document (using tables and charts), and quantitative (performing numerical operations). The study concluded that, among entry workers, (1) relatively small proportions are proficient at moderate or relatively complex tasks; (2) minority groups' scores were generally lower; and (3) the longer the time in school, the higher the literacy proficiency. More information is needed about the literacy levels of occupations. In addition to literacy, employers are demanding employability, problem-solving, interpersonal, and other skills. Some claim that the future workplace may have even higher requirements. Clearly, present literacy levels are too low to meet even current needs. The following actions are recommended: (1) address information processing skills; (2) expand proficiency measures beyond classroom reading; (3) develop instructional approaches that simulate real experience; and (4) improve evaluation measures by developing employment readiness profiles, conducting longitudinal literacy studies, and analyzing the literacy needs of occupations. (23 references) (SK)

POLICY PERSPECTIVES

Workplace Competencies:

The Need to Improve Literacy and Employment Readiness

Information Services
Office of Educational Research and Improvement
U.S. Department of Education

POLICY PERSPECTIVES

Workplace Competencies: The Need to Improve Literacy and Employment Readiness

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July 1990

Policy Perspectives Series

Workplace Competencies: The Need to Improve Literacy and Employment Readiness

Excellence in Early Childhood Education: Defining Characteristics and Next-Decade Strategies

Increasing Achievement of At-Risk Students at Each Grade Level

Accountability: Implications for State and Local Policymakers

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Foreword

At all levels of government, education policymakers are confronting immense problems that cry out urgently for solutions. These men and women—legislators, governors, mayors, school officials, and even the President of the United States—generally agree that our schools cannot be left to operate unaltered and that the need for reform is widespread and immediate.

Policymakers know, for example, that the growing demand for early education is forcing a crisis in that field and that educators of young children now grapple with demands that are straining their resources and compelling them to redefine their mission. They listen as employers loudly lament the quality of our high school graduates, while investing millions of corporate dollars in programs that teach basic skills and workplace competencies to their newest workers. And they search diligently for programs and practices that can reverse our alarming failure to bolster the achievement levels of at-risk students.

But if the problems are numerous and compelling, there is no shortage of proposed solutions. Currently, one of the most favored reform strategies calls for implementing accountability measures that would more clearly define and assess who is responsible for student success and student failure. Thus, while the number of programs, suggestions, proposals, and techniques for dealing with such specific issues as literacy or achievement levels among at-risk youngsters is mind-boggling, many of these approaches now contain one or more strategies for holding schools accountable for student learning.

Given the intensity of the school reform debate and the abundance of ideas for remedying the Nation's educational ills, it is not surprising that many policymakers often find themselves adrift in a sea of uncollated and frequently conflicting information that does little to inform decision-making.

In an effort to alleviate this situation and to inform the education debate, the Office of Educational Research and Improvement (OERI) decided last year to commission a series of papers to address those topics that policymakers themselves told us were most pressing.

We began by surveying the major policymaking organizations and asking them to identify which school-related issues they viewed as compelling. There was remarkable agreement in the field, and it did not take very long to identify those areas most in need of illumination. We learned, for example, that policymakers are concerned about improving literacy levels and about graduating young people who are prepared to function effectively in the modern workplace. We discovered that they are seeking strategies to combat the growing crisis in early childhood education and to raise achievement levels among at-risk students. And we found that there is a genuine need to clarify the issues surrounding educational accountability, so that intelligent decisions can be made about how best to hold schools answerable for their performance.

Thus advised, we sought the most distinguished scholars we could find to address significant aspects of these issues, and we succeeded in assembling a roster of individuals whose expertise on these subjects is unchallengeable. Indeed, I am most grateful to Paul E. Barton, director of the Educational Testing Service's (ETS) Policy Information Center, and Irwin S. Kirsch, research director for ETS' Division of Cognitive and Assessment Research, who combined their considerable knowledge and skill to produce this paper on literacy and its relationship to workplace competencies.

I am also indebted to:

- Sharon L. Kagan, associate director of The Bush Center in Child Development and Social Policy at Yale University, for her paper on *Excellence in Early Childhood Education: Defining Characteristics and Next-Decade Strategies;*
- Michael W. Kirst, professor of education and business administration at Stanford University, for his paper on *Accountability: Implications for State and Local Policymakers;* and
- James M. McPartland, co-director of the Center for Research on Elementary and Middle Schools, Johns Hopkins University, and Robert E. Slavin, director of the Elementary School Program for the Center for Research on Elementary and Middle Schools, and co-director of the Early and Elementary School Program of the Center for Research on Effective Schooling of Disadvantaged Students, Johns Hopkins University, for their paper on *Increasing Achievement of At-Risk Students at Each Grade Level.*

We asked that all the authors approach the subjects within a common framework and bring to bear their distinctive perspectives on these important issues. Specifically, we requested that they do four things:

- Describe the issue or problem being addressed;
- Discuss briefly pertinent research on the topic;
- Describe what States and/or other concerned interest groups are doing about the issue; and
- Analyze the implications of current activity—and inactivity—for policymakers at the Federal, State, and/or local levels.

Then, to ensure that this paper—and the others in this "Policy Perspectives" series—would, in fact, be valuable to the community of policymakers, we invited all of the scholars to participate in a one-day meeting where they could present their draft findings at a public forum and then engage in small group discussions that provided a unique opportunity for face-to-face peer review sessions. Both authors and reviewers were overwhelmingly enthusiastic about this process, and all of the papers were revised to reflect the feedback offered.

I want to stress, in conclusion, that it is not the purpose of this series to supply easy answers or quick-fix solutions to the complex problems confronting American education today. We did not start out to develop a set of blueprints with step-by-step instructions for implementing reform. Rather, we are seeking to promote the dissemination of knowledge in a format we hope will provide policymakers everywhere with new insights and fresh ideas that will inform their decision making and translate into strategies that will revitalize the ways in which we run our schools and teach our students.

Christopher T. Cross
Assistant Secretary
Office of Educational Research
and Improvement

Acknowledgments

Information Services' Policy Perspectives series is one response to OERI's Congressionally mandated mission to "improve the dissemination and application of knowledge, obtained through educational research and data gathering, particularly to education professionals and policymakers." To launch the series, we invited some of the Nation's most renowned scholars to produce papers addressing those issues that policymakers told us were most pressing. This report is but one by-product of the undertaking.

Many people contributed to the success of this project. I would especially like to thank Paul E. Barton and Irwin S. Kirsch of the Educational Testing Service for consenting to produce this paper, *Workplace Competencies: The Need To Improve Literacy and Employment Readiness.* I am also grateful to those members of the policymaking community who agreed to review and comment on an early draft of this document. They are: Mary Harley Kruter, Office of Science and Technology Policy; Patricia McNeil, U.S. Department of Labor; Bernadette Toomey, National Academy Foundation; and Lisa Walker, Education Writers Association.

I am grateful to all of you.

Sharon Kinney Horn
Director
Information Services

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Preface

The issues of sufficient "workplace competencies" and of the need to improve literacy and employment readiness are no longer confined to research studies and academic treatises. These are national issues, discussed in conferences and board rooms, at education summits, and on the front pages of newspapers. Thus, our purpose in writing this paper has been primarily informational: to provide those who debate, recommend, and decide, with the most accurate information we have available.

Unfortunately, this important debate has often *not* been well informed; the written word in this area is often based on simplistic rhetoric rather than on a broader understanding of the complex nature of literacy in our society. As a Nation, we are now far beyond the quest for a simple, single number of "illiterates." It is time to move on to the harder tasks of describing what school leavers and adults know and can do in the daily tasks they confront, and then of better understanding what they *need* to know—for the workplace and for a full life that provides opportunity to develop their potential.

We believe good information is a prelude to constructive action. And we offer some views on the implications of the facts we present. For assistance in developing this paper, we are indebted to the panel assembled by the U.S. Department of Education's Office of Educational Research and Improvement (OERI) to review this document in draft. They are: Christina Dunn, Andrew Kolstad, Mary Harley Kruter, Patricia McNeil, Nevzer Stacey, Bernadette Toomey, and Lisa Walker. The manuscript was also reviewed by Norman Freeberg. We thank Joanne Antonoff for her word-processing skills. We are also indebted to Kathleen Price at OERI who worked with us in the publication of this manuscript, and did so with competence and good humor.

The views here expressed do not necessarily represent the views of Educational Testing Service or the Office of Educational Research and Improvement.

PAUL E. BARTON
IRWIN S. KIRSCH

Introduction

One of the most publicized problems of this decade is what many perceive to be a huge literacy deficiency. One author has proclaimed that we are "a Nation of illiterates."* Data used in the national media have been alarming, and the sources of these numbers elusive. The truth, meanwhile, is that few systematic measures have been taken of literacy, and none has been repeated. Thus, trends in literacy proficiency cannot be accurately estimated.

While the Nation's concern with literacy appropriately encompasses all areas of living, the glare of attention often focuses on the workplace. Many employers report that they find it increasingly difficult to identify and hire literate workers, and the American Society for Training and Development (ASTD) tells us that corporations are spending hundreds of millions of dollars on remedial education. Not surprisingly, these employers are not happy about the state of affairs: they see increasing school expenditures and think that the same thing is being paid for twice.

Obviously, in order to thrive, the Nation's employers must find workers they can train. But in the global economy, the concern extends far beyond the individual firm: to many we are "a Nation at risk." More and more, Americans are realizing that competitiveness of the economy turns on the quality of the country's work force, not just on its machines, technology, and management know-how. In fact, thinking in the modern corporation has gone far beyond the days of Taylorism when a job was broken into discrete steps on a production line and an uneducated worker was trained in days—or hours.

The requirements are likely upward, at least in many important sectors of the economy and in particular employers' needs. The present technological environment has enlarged some workers' responsibilities. The lines between workers and supervisors and managers blur as "work teams" or "quality circles" are used to raise creativity and productivity. The team members put their heads together and solve problems. The members can do each other's jobs. They must be flexible. And they have to deal with print, often in more complex forms than before. In short, the requirements are rising in some areas that are highly visible to employers and to observ-

*Kozol, Jonathan. *Illiterate America.* Garden City: Anchor Press, 1985.

ers of the economy in general, and it is against these growing demands and expectations that the adequacy of preparation for the entering work force must be viewed.

But while it is against these same rising expectations that we may be slipping, still we see no evidence that we are "a Nation of illiterates." To the contrary, we have made progress—this is a basis for optimism—and we can make more.

For example, a standard used just a century ago to judge whether or not Americans were literate was a person's ability to sign his or her name. Today, all young adults (ages 21-25) can do that.

The standard of 50 years ago, the era of World War II, was one of reading at about a fourth-grade level, a *huge* jump. Currently, 95 percent of all young adults meet this criteria.

And 25 years ago, the frequently used standard of the War on Poverty era was an eighth-grade reading level. Now, 80 percent of all young adults can read at that level.

We believe it is not useful in today's complex and varied economy and society to establish a single standard—a point we will elaborate on. But by all indices—educational achievement and school retention, for example—there has been progress in absolute terms. Meeting our needs *is* a problem we can deal with. But a proper definition of the problem and accurate information about the literacy condition are essential ingredients for success. Our purpose is to communicate knowledge and information (to the extent they exist) that can be used to inform the processes of policy-making and the judgments of policymakers.

We conclude that there is a need *now* for increased literacy skills, particularly among specific segments of the population. We also conclude that available projections of literacy and educational requirements for jobs of the future are not dependable enough to be the principal basis for action.

Profiling Young Adult Literacy

In this section we will be referring to the concept of literacy and the results of measurements based on it used for the Educational Testing Service's (ETS) 1986 report *Literacy: Profiles of America's Young Adults,* a publication of the U.S. Department of Education s National Assessment of Educational Progress (NAEP). While much of the rhetoric underlying the recent national discussion has focused on the number of "illiterates" in the population, we reject as simplistic the notion of a *single* standard for literacy, or a single point on a scale which is used to categorize individuals as either literate or illiterate. That report illustrates the point with a quote from the 1984 National Society for the Study of Education publication, *Becoming Readers in a Complex Society.*

> The often heard charge, "Johnny can't read," is a little like saying "Johnny can't cook." Johnny may be able to read the directions for constructing a radio kit, but not a Henry James novel, just as Johnny may be able to fry an egg but not cook a Peking duck. In discussing reading in the schools, we must recognize that reading involves as wide a range of different types of texts as there are types of food.

As we leave the concept of reading in the school and enter the workplace or society in general, literacy skills become even more diversified. There are different kinds of materials to read, and different levels of competencies required, depending on what life task—or workplace task—is applied to these materials. The literacy definition used for the 1986 assessment was "using printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential."

Simulation tasks were constructed for assessing literacy proficiency among a nationally representative sample of young adults and reported in terms of three important and relatively distinct areas:

- Reading and interpreting *prose,* as in newspaper articles, magazines, and books. This was designated *prose literacy.*
- Identifying and using information located in *documents* such as forms, tables, charts, and indexes. This was designated *document literacy.*

- Applying numerical operations to information contained in printed material such as a menu, a checkbook, or an advertisement. This was designated *quantitative literacy*.

All three types of literacy find their applications in various adult contexts including the workplace, and all three, although differing to varying degrees, are only moderately related to the reading comprehension exercises found in school classrooms. Document literacy represents the kinds of tasks frequently associated with the workplace, and found in instruction books, repair manuals, and tables which require the worker to move from a question or problem to an answer or solution. Indeed, several published studies, including some that one of the authors participated in, support this view.

The 1986 survey itself required contacting some 40,000 households to locate and assess approximately 3,600 young adults. Each assessment interview lasted about 90 minutes, and it included some 100 questions about personal characteristics, educational experiences, exposure to the labor market, and reading activities. The results were reported on three new literacy proficiency scales—prose, document, and quantitative—where proficiency was expressed along scales ranging from 0 to 500. Levels on the scales were illustrated by examples of actual tasks that respondents estimated to be proficient at that level were likely to be capable of performing.

The sample of young adults assessed included the full range of educational levels from high school dropouts to Ph.D.s, as well as representative samples of white, black, and Hispanic young adults. While this sample encompassed the full range of literacy proficiencies in the population, the current discussion of deficiencies in the workplace generally centers on the knowledge and skills entry-level workers need to perform even at a basic level, and on the expectation they will be able to benefit from the training employers offer to entry workers coming out of the Nation's high schools. Therefore, while we will summarize the results for the full population, we will then provide more detail for high school graduates, and also look closely at young adults in various occupations.

Included in the overall findings were the following:

While the overwhelming majority of young adults adequately perform tasks at the lower levels on each of the three literacy scales, sizable numbers do not do well on moderately complex tasks.

The earlier that young people terminated their education, the less likely they were to attain moderate or high levels of proficiency.

Black young adults perform considerably below white young adults; Hispanics perform about midway between.

Only about 2 percent of the young adult population were estimated to have such limited literacy skills that the interviewer judged that the simulation tasks would unduly frustrate or embarrass them. Approximately half of this 2 percent were judged to have limited proficiency in English.

Reading exercises were also given that were used in the regular in-school NAEP assessments. Ninety-five percent of young adults were estimated to read at or above the *average* level of fourth-grade students.

Two principal conclusions were:

That while "illiteracy" is not a *major* problem in the young adult population, the demonstrated levels of "literacy" are a problem. There are large percentages who perform only in the middle range on the literacy scales.

That while the overwhelming majority are able to perform routine or uncomplicated tasks, relatively small proportions can do moderately complex tasks. A great many of these young adults will not be prepared for the workplaces of the present economy, irrespective of what these workplaces may be like in the future.

For an examination of workplace literacy, it will be helpful to take a closer look at high school graduates. While employers may find deficiencies in young adults with postsecondary degrees, they are much more likely to be disturbed about the kind of low-level literacy that they find in entry-level workers coming from the high schools. One may assume that high school dropouts are, on average, headed for difficulty in the modern workplace, and we will also illustrate their literacy levels.

Literacy of High School Graduates

The prose, document, and quantitative literacy of 21- to 25-year-old high school graduates* is summarized in figures 1, 2, and 3. As in the case of young adults generally, practically all young adults who finished high school are able to use printed information to accomplish tasks that are routine or uncomplicated.

- For *prose literacy,* 97 percent performed at least at the *200 level* on a scale of 0–500. One task characteristic of performance at this level is writing a simple description of the type of job one would like to have (199) (See figure 1).**
- For *document literacy,* 97 percent performed at least at the *200 level.* One characteristic task directs the reader to match money-saving coupons to a shopping list of several items (211). Another task involves entering personal background information on a job application (196) (figure 2).
- For *quantitative literacy,* 93 percent performed at least at the *225 level.* A task that typifies this level requires totaling two entries on a bank deposit slip (233) (figure 3).

While there can be some solace in the finding that almost all high school graduates assessed perform at these basic levels, literacy skills seem to us distressingly limited: *relatively small proportions of young adult high school graduates were proficient at levels characterized by the moderate or relatively complex tasks.*

- For *prose literacy,* just 27 percent performed at or above the *325 level.* A representative task at this level required locating material on the basis of three bits of information that were repeated throughout a lengthy news article (313).

*Actually, these numbers include high school graduates who reported some form of post-secondary education but who did not obtain either a 2- or 4-year degree. These results, therefore, somewhat overestimate the average literacy levels of high school graduates only.

**Tasks used to illustrate these levels are those the respondents had a high probability of being able to perform (80 percent); they are chosen to be characteristic of the kinds of tasks associated with these levels.

Figure 1.—Percentage of high school graduates scoring at or above selected levels of proficiency in prose literacy, with tasks illustrative of various levels: 1986

Proficiency scale	Percent at or above selected levels	Example tasks at various proficiency levels
500		
400		
375	3.2 (0.8)	371—Orally interpret distinctions between types of employee benefits
350	12.2 (1.3)	340—State in writing argument made in lengthy newspaper column
325	26.6 (1.8)	
300	48.4 (1.7)	313—Locate information in a lengthy news article
275	66.4 (1.4)	277—Write a letter to state that an error has been made in billing
250	81.4 (1.3)	262—Locate information in sports article
225	91.2 (0.9)	
200	96.7 (0.6)	199—Write about a job one would like
0		

NOTE: High School graduates include those who had some postsecondary experience, but no degree. Standard errors are shown in parentheses.

SOURCE: National Assessment of Educational Progress, *Literacy: Profiles of America's Young Adults, 1986.*

Figure 2.—Percentage of high school graduates scoring at or above selected levels of proficiency in document literacy, with tasks illustrative of various levels: 1986

Proficiency scale	Percent at or above selected levels	Example tasks at various proficiency levels
500		
400		
375	2.6 (0.5)	
350	10.9 (1.3)	
325	28.0 (1.7)	334–365—Use bus schedule to select appropriate bus for given departures and arrivals
300	50.2 (2.1)	300—Follow directions to travel from one location to another using a map
275	70.6 (1.5)	278—Use index from an almanac
250	83.4 (1.2)	249—Locate intersection on street map
225	91.8 (0.8)	221—Enter date on a deposit slip
200	96.9 (0.5)	196—Enter personal information on job application
175	99.2 (0.2)	181—Enter caller's number on phone message form
150	99.8 (0.1)	160—Locate expiration date on driver's license
0		

NOTE: High School graduates include those who had some postsecondary experience, but no degree. Standard errors are shown in parentheses.

SOURCE: National Assessment of Educational Progress, *Literacy: Profiles of America's Young Adults, 1986.*

Figure 3.—Percentage of high school graduates scoring at or above selected levels of proficiency in quantitative literacy, with tasks illustrative of various levels: 1986

Proficiency scale	Percent at or above selected levels	Example tasks at various proficiency levels
500		
400		
375	4.5 (0.7)	376—Estimate cost using grocery unit-price labels
350	13.4 (1.3)	356—Determine tip given percentage of bill 340—Plan travel arrangements for meeting using flight schedule
325	29.7 (2.0)	337—Determine correct change using menu
300	49.4 (1.9)	293—Enter and calculate checkbook balance 281—(two tasks)
275	68.8 (1.4)	
250	83.0 (1.1)	
225	93.1 (0.7)	233—Total bank deposit entry
200	97.2 (0.5)	
0		

NOTE: High School graduates include those who had some postsecondary experience, but no degree. Standard errors are shown in parentheses.

SOURCE: National Assessment of Educational Progress, *Literacy: Profiles of America's Young Adults, 1986.*

- For *document literacy*, only 11 percent were estimated to be at or above the *350 level*, where they were likely to be able to do tasks such as figuring out from a bus schedule the time on a Saturday morning when the second bus arrived at the downtown terminal (334).
- For *quantitative literacy*, just 30 percent were estimated to be at or above the *325 level*, where a typical task required the reader to examine a menu, to compute the cost of a specified meal, and to determine the correct change from a specified amount (337). (Only about 13 percent were at the 350 level where performance included figuring the exact amount of a 10 percent tip.)

Needless to say, high school dropouts performed much less well than graduates. On the prose scale, just 10 percent were able to find information in the news article, compared with 27 percent for graduates. On the quantitative scale, the results were similar. Just 10 percent were able to compute the cost of a meal from a menu, compared with 30 percent for graduates.

The above information is gleaned from examining just two levels on each of the three scales. Everyone can look at representative tasks at different proficiency levels and make judgments about what proportions of young adults are ill prepared for life's challenges. The levels of literacy needed by any individual depend on the demands he or she faces in the different life areas of work, home, and community. And within those areas, the questions become: What job? Doing what in the home? Doing what in the community? The NAEP study has measured what young adults can do; it has not measured what different settings require of them. For example, among high school graduates, fewer than 1 in 20 is estimated to be at or above the proficiency level (375) needed to estimate cost by using grocery store unit price labels. Is that acceptable in the present and future workplace?

These levels would seem to be disappointing and inadequate, if society requires a more competent labor force in an economy increasingly shaped by technology.

Not only are small proportions of young adults achieving advanced levels on the literacy scales, but, as pointed out above, proficiency levels vary considerably among different populations of young adults. (The differences described below are based on the entire sample of 21- to 25-year-olds, instead of only high school graduates.)

- Black young adults, on average, perform significantly below white young adults on the literacy scales, with Hispanic young adults

performing midway between. Among young adults, 86 percent of blacks, 94 percent of Hispanics, and 98 percent of whites perform at least at the *200 level* on the *prose literacy* scale. Eleven percent of black, 24 percent of Hispanic, and 43 percent of white young adults perform at or above the *325 level* on this scale.

- The longer the time spent in school, the higher the literacy proficiency. Again using the prose scale, registering at or above the *200 level* are 71 percent of those with 8 or fewer years of school, 88 percent of high school dropouts, and 97 percent of the young adults who have a high school diploma or some postsecondary education. At or above the *325 level* are 0 percent of those with 8 or fewer years of school, 10 percent of high school dropouts, 27 percent of those with a high school diploma or some postsecondary education, and 63 percent with a postsecondary degree.

While the use of simple print for routine tasks is within the grasp of most young adults, large numbers have clearly failed to develop an adequate level of literacy skills. The deficiency identified here is in young adults' skills at dealing with the more complex tasks embedded in print materials. Evidently, the printed word usually can be decoded, but the information obtained is not processed correctly to solve the problem. This is a key finding for programmatic efforts aimed at improvement, and one that is as significant for school curricula as it is for shaping adult literacy programs. It is also important in programs aimed at developing workplace literacy.

Occupations and Literacy

It would, of course, be desirable to know what level of literacy specific occupations require. This would involve some systematic approach to looking at occupations and determining where they belong on the NAEP literacy scales. One method would be to use panels of employers to make determinations on a judgmental basis. Another would be to use the established tools of job analysis to systematically examine an occupation and determine its literacy requirements.

So far, no research has been done that would permit confident statements about the literacy levels required for specific jobs; however ETS is currently conducting a feasibility study to determine how job analysis might be used to identify literacy requirements of five occupations. The results should be available this year.

Still, some perspective can be gained by looking at the demonstrated literacy proficiencies of people who are employed in a particular occupation. This, of course, begs the important question of what the occupation requires. Employers may have settled for less than they wanted; productivity might be greater, and training and remedial education costs might fall, if literacy levels were higher. But despite these caveats, the method offers an advantage not to be ignored: the people to be assessed for proficiency are actually employed in the occupation; the market test has been applied. We do know the occupations of the 21- through 25-year-olds in the Young Adult Literacy Assessment, and we can estimate the literacy proficiencies of these young adults in a particular occupational category. But while this can be done with the literacy assessment, the estimates are necessarily limited by the sample size to broad occupational categories. These are managerial, professional, technical, sales, clerical, craft, operative, and service.

The sample of young adults contains many youth who are still in school full time, many who are both learning and earning, and many who have left education and are established in the occupational world. Of those who have left education, some did so as early as ages 16 to 18 when they dropped out or graduated from high school, while others just recently completed their college work. About one in four (26 percent) reported being enrolled in school at the time of the survey, and 69 percent of these

young adults were full-time students, while 31 percent attended class part time.

Of course, many of the students, both full time and part time, were working and thus reported an occupation. However, these young adults have most likely not yet settled into entry-level positions in the occupations that they are aiming for. To take an extreme example, a doctoral student may be working part time driving a taxicab; thus, his or her literacy level is not representative of that job's requirements.

We are, however, able to separate the sample by the students' work status, so as to get near to the group that has completed the transition to work. Of the total sample, 54 percent—an estimated 9.6 million 21- to 25-year-olds—had been working full time for a full year. This group was largely settled into the work world, although some were attending school on a part-time basis. Table 1 shows the average (mean) performance of these full-time workers by occupational category in terms of the three literacy scales.

Table 1.—Mean proficiency scores on prose, document, and quantitative literacy tasks of full-time workers, age 21–25, by occupation: 1986

Occupation	Prose	Document	Quantitative
Managerial	309.7 (4.0)	308.3 (3.7)	310.2 (6.8)
Professional	315.2 (7.5)	323.4 (5.4)	312.1 (7.2)
Technical	308.7 (7.2)	311.2 (6.7)	303.8 (8.0)
Sales	290.2 (6.4)	296.7 (4.8)	298.1 (7.5)
Clerical	299.8 (4.2)	301.1 (4.3)	301.0 (3.5)
Craft	273.1 (4.9)	278.6 (5.7)	281.2 (6.5)
Operative	280.5 (4.8)	281.5 (5.1)	284.4 (5.2)
Service	287.7 (4.9)	285.7 (5.2)	292.0 (5.0)
Laborers	278.4 (9.0)	277.0 (8.6)	283.2 (9.2)

NOTE: Numbers in parentheses are estimated standard errors.

SOURCE: Unpublished data from the National Assessment of Educational Progress, *Young Adult Literacy Study, 1986,* Educational Testing Service.

The reader may find it helpful to refer back to figures 1 through 3 for the meaning of various scale scores, in terms of the kinds of tasks these young adults can probably perform. The sample errors are such that small differences in scores, typically 5 or 6 points, should not be viewed as significant. (The general rule of thought is not to judge as significant those differences that are less than 2 standard errors apart.)

Table 2.—Percentages of young adults at or above selected points on the document literacy scale: 1986

Average proficiency of young adults reporting full time employment by various occupational categories		Selected points on the scale	Total	Race/ethnicity			Levels of education			
				White	Black	Hispanic	0–8 years	9–12 years	H.S. diploma and/or more	2 or 4 year degree or more
		500								
		350	**20.2** (1.3)	**24.3** (1.6)	**2.5** (0.5)	**6.7** (2.0)	**0.7** (0.7)	**0.8** (0.5)	**10.9** (1.3)	**40.7** (1.9)
323 (5.4)	Professional									
311 (6.7)	Technical	325	**37.6** (1.6)	**44.0** (1.8)	**9.0** (1.1)	**20.8** (3.1)	**0.7** (0.7)	**7.5** (1.4)	**28.0** (1.7)	**63.2** (1.8)
308 (3.7)	Manager									
301 (4.3)	Clerical									
297 (4.8)	Sales	300	**57.2** (1.7)	**65.4** (1.7)	**19.8** (1.5)	**37.0** (4.1)	**11.0** (9.6)	**22.0** (2.9)	**50.2** (2.1)	**81.8** (1.5)
286 (5.2)	Service									
281 (5.1)	Operative									
279 (5.7)	Craft	275	**73.1** (1.2)	**80.8** (1.1)	**38.7** (2.6)	**54.7** (3.8)	**21.1** (12.4)	**39.5** (3.6)	**70.6** (1.5)	**91.4** (1.0)
277 (8.6)	Laborer									
		250	**83.8** (1.0)	**89.9** (0.8)	**55.5** (2.7)	**69.0** (3.4)	**31.5** (10.7)	**59.1** (3.9)	**83.4** (1.2)	**96.0** (0.7)
		225	**91.0** (0.8)	**95.0** (0.7)	**71.0** (2.2)	**84.4** (1.6)	**47.3** (9.5)	**72.0** (3.3)	**91.8** (0.8)	**98.9** (0.3)
		0								

NOTE: Numbers in parentheses are estimated standard errors.

SOURCE: Unpublished data from the National Assessment of Educational Progress, Young Adult Literacy Study, 1986.

What table 1 says is that the literacy levels of young adults reporting various occupations do differ considerably. On the document scale, the range is from 323 (professionals) down to 277 (laborers). Only 37.6 percent of *all* young adults in the literacy assessment were estimated to be at or above the 325 level on the document scale. In contrast, 73 percent were at the 275 level or above, about where the average laborer scores.

The distribution of mean proficiency scores for these full-time workers is similar on the other two scales, although the range is not quite so large. For prose literacy, the spread from high to low is 37 points, while for quantitative literacy it is 31 points. These compare to a spread of 45 points for document literacy. Because of the nature of the tasks on the document scale, we have considered it to be the most useful of the three scales for reflecting workplace literacy. Moreover, we see from this comparison that it does have the largest range in average proficiency among the occupations.

Table 2 shows the degree to which young adults and subgroups of young adults achieve these average document proficiency levels possessed by young full-time workers who have made the transition from school. While we will not summarize all the information in the table, we call attention to some disturbing facts. For example, more than 6 in 10 black young adults do not reach a proficiency equal to the average for "laborer," nor do almost half of Hispanic young adults. About 6 in 10 high school dropouts have not reached this level, and almost 8 in 10 are not at the average for clerical workers. In addition, half of high school graduates have failed to achieve the average proficiency of clerical and sales workers.

Again, these are the average proficiencies of the young adults who reported being in these occupations at the time of the survey. We cannot say these are levels the employers thought were necessary, but they are the people who were hired. Also, given the young ages, these levels are more characteristic of entry-level workers in these occupations than of experienced workers. Finally, there is a large range of literacy proficiencies within any single occupation; a much finer classification of occupations would be necessary to establish a narrow range. Having stated these qualifications, we do believe this kind of knowledge, on a more refined basis, would help illuminate the literacy competencies needed in the workplace.

The Fourth *R*: Work Force Readiness

The foundation for measuring prose, document, and quantitative literacy has been laid with the conceptual work, measurement, and "scale anchoring" undertaken at ETS for the young adult literacy study, described above. The workplace needs the kinds of literacy measured on these new scales. But employers are asking for these skills and more.

In addition to seeking workers who can deal successfully with print, employers have a list of skills and competencies they need now, and for which they project an increasing demand in the work force of the future. Many surveys of employers and reports of employer organizations have described these needs, but the National Alliance of Business characterized them most succinctly as the "Fourth *R*: Work Force Readiness."

In the first half of the 1980s, a number of national, State, and local surveys examined what employers wanted entry-level workers, or high school graduates, to know and be able to do. Although these surveys were generally carried out or sponsored by employer organizations, the questions were not always the same, and the specific words used often differed. Still, the central message came through loud and clear: there were several characteristics these new work force members needed to have, and employers were not seeing enough candidates who had them. A brief summary of the conclusions of the national-level studies will convey the messages employers have been sending.

A Conference Board Survey of business executives found, for example, that while computer skills were on the rise, new workers' knowledge of basic skills was deteriorating. Indeed, 65 percent reported seeing declining abilities in reading, 74 percent in writing, and about 60 percent in mathematics. Current education reforms address these skill areas. However, these executives also reported that *attitudes* toward work and the workplace were a primary problem, and few were hiring recent high school graduates.

The Committee for Economic Development surveyed a sample of Fortune 500 companies, as well as 6,000 small firms. Both the large and small companies agreed that the characteristics desired—and difficult to find in

young applicants—were "striving to work well," "learning how to learn," "priority setting," "communicating," and "working well with others."

When Research and Forecasts, Inc., conducted a phone survey of a sample of Fortune 1,300 companies, employers ranked character first in the qualities looked for when they made hiring decisions. Job experience was ranked second, and education third. With regard to education, 7 in 10 thought that "it is more important for students to learn how to think—than it is to learn facts and figures."

A survey of personnel officers, carried out by the Center for Social Organization of Schools at Johns Hopkins University, ranked the qualities these executives looked for in hiring entry-level workers. The rank order was as follows: (1) strong impression in interview; (2) strong recommendation from a firm's manager; (3) strong letters from previous employers; (4) character references; (5) strong scores on written test; and (6) strong school grades.

A survey sponsored by the National Association of Manufacturers found that employers wanted schools to teach both general and specific employability skills, including attendance, punctuality, and good work attitudes.

A U.S. Department of Education survey of executives concluded that "the definition of basic skills typically used by employers includes not only the ability to read and write, but also computation, communication, and problem-solving skills." These executives believed that "schools should emphasize the importance of good habits such as self-discipline, reliability, perseverance, accepting responsibility, and respect for the rights of others."

Beginning in 1984, a substantial number of major employer organizations issued reports reiterating the skills employers need and urging educators to action. These reports, together with the surveys summarized above, established considerable concern that too many young people lack the skills employers seek.

In *Investing in Our Children*, issued in 1985, the Committee for Economic Development emphasized (among other things) the "invisible curriculum" that transmits the traits students should acquire in school. The report urged "schools and teachers to institute policies and practices that are specifically designed to encourage self-discipline, reliability, perseverance, and other positive traits." It also recommended regular assessments both of high school graduates' "employment readiness" and of employers' needs.

In 1984, the National Academy Press published *High Schools and the Changing Workplace: The Employers' View.* Composed primarily of employers, this study group concluded that the critical core competencies "include the ability to read, write, reason, and compute; an understanding of American social and economic life; a knowledge of the basic principles of the physical and biological sciences; experience with cooperation and conflict resolution in groups; and possession of attitudes and personal habits that make for a dependable, responsible, adaptable, and informed worker and citizen."

In 1987, the National Alliance of Business issued *The Fourth R: Work Force Readiness.* Work force readiness, the report said, "includes thinking, reasoning, analytical, creative, and problem-solving skills, and behaviors such as reliability, responsibility, and responsiveness to change."

In *Training America: Strategies for the Nation,* the American Society for Training and Development joined with the National Center for Education and the Economy to describe the skills workers will need if they are to participate as full members of the autonomous work teams that employers are increasingly using in production. This 1989 report concluded that team members will need "high levels of interpersonal teamwork, negotiation, and organizational skills—skills that enhance group effectiveness—as well as leadership skills."

Still another study, *Workplace Basics: The Skills Employers Want,* was issued by ASTD and the U.S. Department of Labor in 1988. This document summarized the basic skills in a very convincing manner, and we offer them as the best composite of all the messages contained in the decade's surveys and reports.

> 3 *R's*, Reading, Writing, Computation. [We believe that from the employer's standpoint these are well captured in the three literacy scales described above—supplemented by assessment of writing.]
>
> Learning to learn
>
> Communication: Listening and Oral Communication
>
> Creative Thinking/Problem Solving
>
> Interpersonal/Negotiation/Teamwork
>
> Self-Esteem/Goal Setting-Motivation/Personal and Career Development
>
> Organizational Effectiveness/Leadership

When the skill needs of the workplace are discussed in the media, the attention is usually wholly focused on formal education or on literacy. These are very important considerations, not to be taken lightly or downplayed. But they are just one component of the ability required to function in the modern workplace. If a young person can deal well with print, but does not listen carefully to instructions, lacks personal discipline, and fails to function effectively in group efforts, then most large employers believe that there will be a deficiency in workplace functioning.

What we argue, then, is that in addition to giving attention to prose, document, and quantitative literacy, this expanded list of skills and characteristics must be addressed. These skills have not become part of any large-scale assessments of students and young adults, so nothing is yet known about the extent to which new workers are aware of their relative importance, let alone possess them. Also, little exists in the way of knowledge regarding whether and to what extent schools emphasize these abilities. And, finally, there are significant questions regarding how skills such as teamwork can be assessed. Indeed, careful development work would be required to field such an expanded assessment. Still, we do know that employers frequently find these skills missing in young people applying for jobs.

Literacy in the Future Workplace

The typical discussion of workplace literacy needs dwells first on *current* employer experience; it moves quickly to an exposition of the rapid advancement in literacy requirements, and then predicts a growing mismatch between skills workers have and those the workplace needs. We are comfortable with the proposition that there now exists a large mismatch between proficiencies and needs; we are much less so with projections that, based on occupational requirements, claim a growing mismatch in the future.

Looking at the post-World War II period as a whole, it can be said with some confidence (although it would take the writing of a book to firmly establish it) that there has been a gradual "creeping up" of the education and literacy requirements of jobs. But it is hard to find evidence that there has been any sudden or rapid escalation in those requirements. It is clear, for example, that in each decade more people in the same occupational classifications have possessed more education, but it is not known how much of that gain has been due to steady advances in school completion at the various levels, and how much to changes in the jobs themselves. Another confounding fact is that a market system results in employers seeking the best prepared labor supply that the supply and demand situation affords them. Still, they will often settle for lesser skills when workers are in short supply. One example is military recruitment: hen supply decreases, the military is forced to choose among lower ability levels to meet manpower requirements. Technological advances are also thought by a great many to raise educational requirements; at the same time, however, technology has been widely used to replace skilled labor, as well as to eliminate people and jobs entirely. This is how many productivity increases have been achieved.

One of us (Barton), when asked to predict the future, is on record as saying (in 1986) that

> We simply *do not know* how technological changes in methods of production and service delivery, organizational changes in the management of production, creation of new products, and thorough advertisement, the creation of an effective demand for them, and changes in the international market, will shape education requirements in the future. Focus on the dramatic factors that raise edu-

> cation requirements may be overshadowed by more mundane developments. For example, at Christmas of 1983, the phenomenal sale of Cabbage Patch Dolls was largely a media feat—they required no new skills to manufacture. Tens of thousands of young people have lost jobs pumping gas because of the relatively new "service stations" where only one person is required to take money. A raft of new low-skilled jobs were created—in the establishment of inspection stations in airports. . . .

In 1987, the evidence was sifted by the Panel on Technology and Employment's Committee on Science, Engineering, and Public Policy, and reported in *Technology and Employment*, published by the National Academy Press. The conclusion: "Like the literature and evidence on the employment impacts of technological change, the empirical evidence of technology's effects on skills is too fragmentary and mixed to support confident predictions of aggregate skill impacts. Despite this uncertainty, however, the evidence suggests that the skill requirements for entry into future jobs will not be radically upgraded from those of current jobs."

A starting point in any effort to see into the future of educational requirements is to be able to project the occupations and the numbers employed in them, and that itself rests on prior work of constructing an "input-output matrix" of the U.S. economy. From these projections, some idea of educational requirements can be gleaned, although difficulties remain. (For example, occupations with the same name can involve changed job content.) While the U.S. Department of Labor's Bureau of Labor Statistics (BLS) has a pretty good record in making these projections, they remain approximations of the future. Harold Goldstein, formerly an associate commissioner of BLS responsible for projections, has evaluated their accuracy. The results were as follows:

	1960–75	1970–80
On target	39.5%	32.8%
Close	39.5%	26.8%
Not close	21.1%	40.6%

That the earlier efforts were more on target than the later ones is not encouraging, although BLS has made many improvements in the estimating methodology since the 1980 projections.

Obviously, these occupational projections are frequently the basis for statements about what the future holds, and the *fastest growing* occupations are pointed to as having higher educational requirements. In the BLS projections for the period 1988 to 2000, the 10 *fastest growing* occupations are:

Paralegal personnel	+ 75%
Medical assistants	+ 70%
Home health aides	+ 68%
Radiological technologists and technicians	+ 66%
Data processing equipment repairers	+ 61%
Medical records technicians	+ 60%
Medical secretaries	+ 58%
Physical therapists	+ 57%
Surgical technologists	+ 56%
Operations research analysts	+ 55%

While these occupations conjure high educational requirements, and most require postsecondary degrees, they account for a job growth of only 694,000, out of a projected total job growth of 18 million during the last 12 years of this century.

In terms of numbers of jobs projected, a quite different picture emerges. The top 10 occupations in terms of absolute job growth are:

Salesperson, retail	+ 730,000
Registered nurses	+ 613,000
Janitors and cleaners	+ 556,000
Waiters and waitresses	+ 551,000
General managers and top executives	+ 479,000
General office clerks	+ 455,000
Secretaries except legal and medical	+ 385,000
Nursing aides and orderlies	+ 378,000
Truck drivers	+ 369,000
Receptionists and information clerks	+ 331,000

These 10 occupations account for almost 5 million projected new jobs, and from 6 to 8 of the occupations are not intuitively associated with increasing literacy requirements, although the literacy standards employers

have for current openings may often exceed skills of entry workers. Following these 10, in the order of growth, are cashiers, guards, computer programmers, food counter workers, and food preparation workers. Taking these occupations apart and forecasting their educational requirements is no easy task.

Recently, the Hudson Institute, in its report *Work Force 2000,* attempted to estimate the educational requirements of jobs in the year 2000, by combining the BLS occupational projections with the scales of educational requirements used in the *Dictionary of Occupational Titles*, published by the U.S. Employment Service. The Hudson Institute reported that the average rating of language requirements for current jobs was 3.1 on a scale of from 1 to 6. The "fast growing" occupations were rated at 3.8, the "slowly growing," 2.7, and the "declining," 1.9. The report concluded that "the fastest growing jobs require much higher math, language, and reasoning capabilities than current jobs, while slowly growing jobs require less."

These numbers suggest some shift toward higher requirements. But we don't know from this report exactly how "fastest growing" jobs are tabulated; we have seen from the BLS projections that occupations with a high percentage growth may be on a small base, and the *numbers* of jobs in such categories relatively small. In the separately available appendix to *Work Force 2000*, a table provides scale ratings for *all* jobs in 1984 and *all* jobs projected for the year 2000; the language scale score for 1984 is 3.1, compared with 3.2 for 2000. The difference is well within the margin of estimating error. Nevertheless, the *Work Force 2000* report has pioneered in estimating future educational requirements, and this marriage of educational requirements with occupational projections is a very promising approach and is to be encouraged.

The job *openings* in the year 2000 will be in *all* occupational categories, not just in the net increase in jobs in the fastest growing occupations; there will also, of course, be positions available in those occupations registering a net decline in average employment. There is a constant milling about in the labor force. Between 1988 and 2000, the BLS estimates that 43 million people will enter the labor force and that, taking account of labor-force withdrawals, the net number of new entries will be 19 million people. No estimate has been made of the educational requirements that those who enter jobs in the year 2000 will be expected to meet.

One thoughtful comment about change was made in the National Academy of Science report *High Schools and the Changing Workplace:*

> The pace of change affecting entry-level jobs will not differ much from that of the past but, as graduates mature and move out of entry-level jobs, the effects of change may become more pronounced. [The many changes] imply a continuous need to understand and master constant technical change.
>
> From the worker's standpoint, the nature of many jobs will change in the coming years, although their titles will remain the same. Obviously, the degree of change will vary from job to job and industry to industry, sometimes drastically, sometimes slightly.

A National Research Council report, *Education for Tomorrow's Jobs*, offered this assessment:

> There is no agreement of what these skill requirements will be or even in the general direction of change.
>
> The precise direction this change will take is even more difficult to specify. . . . Given the uncertainty regarding the skill requirements of the economy, it is essential that the education of America's young people be designed to enhance their abilities to adapt as necessary to these changing requirements.

Two researchers who have written throughout the 1980s on the educational requirements of jobs are Russell W. Rumberger and Henry M. Levin. They have just published a reanalysis, entitled *Schooling for the Modern Workplace.* The principal conclusion was that:

> The average educational requirements of future jobs will not be significantly different than current jobs, as both high-skilled and low-skilled jobs will continue to exist in the future economy.

This discussion by no means is meant to suggest that the Nation should be less vigilant about raising literacy levels. The evidence is to the contrary—*present literacy levels are much too low to meet current needs and expectations.* Further, there is no reason to expect needs to diminish, even if they advance slowly or not at all. From the labor supply standpoint, we face a future where minority populations with traditionally lower educational attainments and traditionally lower literacy levels will be a growing proportion of new labor force entrants. Thus, society will have to run faster just to stay in the same place.

Moreover, we do counsel against failing to press onward in efforts to predict the future occupational structure and its underlying educational requirements.

Some Implications and Recommendations

1. Addressing Inadequate Literacy

We have stated, and reiterated, the distinctions between the common approach of "counting the illiterates" and the more sophisticated strategy of profiling the population on literacy proficiency scales. We have emphasized this distinction for two reasons. First, literacy is a complex set of socially practiced knowledge and skills that needs to be understood in terms of *what* workplace, doing *what* kinds of tasks, and delivered in *what* kinds of training and education programs. If the problem is not framed correctly, the answer derived will be the wrong one.

The second reason is that the nature of the problem cannot be measured if the population is sorted into just two groups. What we have seen is that most young adults, high school graduates, and, to a lesser extent, high school dropouts can perform simple tasks conveyed through the printed word. Meanwhile, most illiteracy programs seem aimed at teaching adults to read the printed word. But while there are significant numbers of adults who can benefit from this type of training, they are not our major difficulty. Rather the larger problem, in terms of numbers, are those who can read at some basic level, but seem to lack the necessary information-processing skills that would enable them to carry out the kind of moderately complex tasks frequently encountered in everyday life.

These are the facts with which workplace literacy campaigns must come to grips. How are these information-processing skills to be improved? Are the programs we are creating directly addressing them? Such discussion raises, in turn, the important question of whether better ways to teach the current curriculum are needed or whether the need is to rethink not only how schools teach but what is taught.

2. Expanding Measures of Proficiency in Literacy Tasks Beyond Classroom Reading

One of the problems employers and others concerned with literacy encounter is that the existing instruments available to assess literacy are geared to measuring what students can do in school classroom-type read-

ing exercises. The kinds of instruments ETS-NAEP used in the young adult literacy assessment (the results of which are described above) are not currently available for testing individuals. Such instruments would, however, give a truer picture of the skills entry workers have, and permit more appropriate placement in remedial programs. ETS is currently under contract to create such a test for clients of several U.S. Department of Labor programs—Unemployment Insurance, the Employment Service, and the Job Training Partnership Act.* Not only will this secure test be available for public use by summer 1991, but ETS is also under contract to produce a nonsecure test of adult literacy for Workplace Resources, a division of Simon & Schuster, Inc.

With measurement instruments that identify the level of literacy attainment and that are linked with instruction geared to raising workers and potential workers from where they are now, workplace competencies can be increased. New measures, however, are only one step; people who diagnose literacy needs and develop and operate literacy programs need to understand the distinction between classroom reading proficiency and real life literacy requirements and gear programs to raising literacy levels.

3. The Future is Now

We have concluded that there is *now* a very large gap between the literacy skills possessed by a large proportion of young adults and the needs of the workplace. With the proper approach, this gap can be addressed now; the problem is upon us. Also, we do see an increasing problem in a future that can be foretold: a growing percentage of new labor force entrants will be from minority groups whose educational performance has traditionally lagged behind that of others. If this gap is not closed soon, society will have to run faster just to stay in the same place, since those youth with lower literacy levels will become an increasing proportion of the total.

At the same time, we are not comfortable resting the case with projections that conclude, as so many have recently done, that the educational requirements of jobs are advancing rapidly. In any event, the Nation does not have the luxury of waiting until a future problem develops, since an urgent need exists for action now.

We have said that there will be change, and this is particularly true in how employment organizations are structured; we will see more coopera-

*The contract also provides for profiling the literacy proficiency of these three populations.

tive effort and greater reliance on worker initiative. This will affect both younger and older workers, and will require that they be able to adapt. Otherwise, their worklife transitions will be rocky, and industrial productivity will suffer. Barton commented on these trends, already well evident, in 1982: "As workers are expected to participate more in problem solving and decision making, a greater premium will be placed on broad preparation as compared to narrower skill training. I would speculate that the need will be for more teaching of problem-solving skills, teamwork methods, and knowledge of how organizations function."

4. Improving Literacy Skills in the Schools

To raise literacy as it is defined here, instructional practices must be broadened. Although the two are obviously related, a distinction has now been established between the knowledge and skills associated with reading in school settings and those associated with performing tasks frequently encountered in adult contexts outside the schools. Despite many decades of theory and research on how young people learn to read and how reading is best taught, the book is not closed on the subject of acquiring literacy. Using the new literacy scales, we need to assess *literacy* in the schools, beginning in middle school, if we are to do better in aiding its development.

There are good reasons to believe that traditional classroom approaches fall short in teaching the kind of problem-solving tasks used in the literacy assessment. Students may need to be put into problem-solving situations that give them greater opportunity to use and apply these skills and strategies—or at least be provided with classroom simulations of such experience. This was the view expressed in the recent report *Training America: Strategies for the Nation*, issued by the National Center on Education and the Economy and the ASTD:

> Employers have long been advocates of an applied pedagogy. They argue that learning that occurs in some functional context produces better students as well as better employees.

This view gains support from the research described in Sylvia Scribner's and Joy Stevens' 1989 report, *Experimental Studies on the Relationship of School Math and Work Math*. They conclude: "It appears from the high level of literality observed in our studies, that school math instruction does not promote the use of expert problem-solving strategies in nonschool situations. This observation is in keeping with judgments reached by a number of educators on the basis of student math performance in school and test

situations." What they suggest is "to situate some aspects of math instruction in contexts of actual practice." They are not the first to caution against divorcing the classroom from the rest of life: "As societies become more complex in structure and resources, the need for formal or intentional teaching and learning increases. As formal teaching and training grow in extent, there is danger of creating an undesirable split between the experience gained in more direct associations and what is required in school." What John Dewey said a long time ago is being proven by scientists today.

We urge the development of more instructional approaches that involve or simulate real experience.

5. Improving Measures and Tools for Evaluation

An Employment Readiness Profile

While literacy skills are of great importance to employers and productivity, employers have made it clear that they have requirements beyond literacy and that the characteristics they seek are in short supply. (These "employment readiness" characteristics are reviewed above in the section "The Fourth *R*: Work Force Readiness.") We believe that useful assessment instruments can be developed to track national progress in all of these areas. Such an effort should be carried out with the participation of employers and employer organizations, as well as labor market experts and educators. We have called this an Employment Readiness Profile; it could be administered periodically to national samples of school leavers, to help track national progress in developing a work force that can meet coming competitive challenges.

Tracking Literacy: Comparable Measures Over Time

Literacy experts are continually asked: Is there more or less literacy than 10 or 20 years ago? While there are grounds for making guesses, the truth is unknown. Literacy measurement has been sporadic; it has used different definitions and concepts; and it has been applied to different age groups. One measure of concern about literacy is willingness to periodically measure it in a consistent manner. A start has been made with the upcoming National Adult Literacy Survey that ETS will conduct under contract with the U.S. Department of Education. Not only will it survey all adults ages 16–64, but it will commence to track trends by permitting comparisons between the 21- to 25-year-olds of 1986 and those of 1992. These popu-

lations will also be compared with enrollees in Job Training Partnership Act programs, Employment Service applicants, and Unemployment Insurance claimants assessed in 1990.

Developing Literacy Tasks From Workplace Materials

While we believe that the conceptual and scaling approaches used for the young adult literacy assessment, with its prose, document, and quantitative literacy scales, are appropriate for workplace use, additional resources for developing assessment items could increase their usefulness.

While literacy would still be reported on the same scales as the NAEP assessment, these additional tasks—assessment items identified with workplace settings—could be developed with the aid of employers. For example, the prose tasks could use print found in a variety of work settings; the documents would be kinds frequently encountered in employment, and so would the quantitative tasks. However, while the tasks would be drawn from workplace settings, they would have to be of general usefulness in simulation exercises. They could not be so dependent upon context as to require specialized knowledge on the part of the test taker. If items could not be developed to meet this criteria, such an effort would not be feasible.

Analysis of Occupations

Much progress has been made in measuring literacy proficiencies. A lot more will occur when the new National Adult Literacy Survey is completed. But more knowledge is needed about the literacy levels that different occupations require, particularly the typical entry-level occupations.

We have suggested one line of analysis in showing the actual literacy levels of the young adults in particular occupations in the 1986 study. ETS is also using job analysis (called literacy audits) in a limited feasibility study of five occupations. Expert judgment by panels of employers is another approach.

By the nature of this assignment, we have dwelt on the literacy needs of the workplace. And to some extent, we have contrasted workplace tasks with those of the classroom. By making a sometimes arbitrary distinction between the workplace and the school, we do not want to contribute to widening the chasm which has existed, and is now the source of some of the growing consensus about the inadequacy of literacy skills.

The larger point we would close with is that to envision distinct, separable kinds of literacy that are called upon in isolation one from another is not a very useful concept. Specialized literacy skills are not things that can be turned on and off in different settings. Life is not so compartmentalized; it is, in fact, a seamless web.

All citizens need a broad base of literacy skills to function in the school, in the family, in the community, in the voting booth, and in the workplace. The challenge is to understand how such skills and knowledge in these several contexts are similar, and how they are different, as part of a critical effort to find ways to promote their development.

Our desire has been to look at literacy through the window of the workplace, but as one window in a house with many rooms. Through this window, we see prose, document, and quantitative tasks that occur with some regularity in our society. More importantly, for too many young adults in our society, these tasks represent competencies that are not being acquired. Unless something is done, the percentage of young people who demonstrate these deficiencies is likely to grow over the next decade. As a Nation, we will see these deficiencies impact greatly on our social and economic fabric.

Bibliography

Barton, Paul E. "Employers and High Schools: The Fit Between Learning and Working." *Peabody Journal of Education*, 63 (2) (Winter 1986).

———, Paul E. "Responding to Change: Occupational Preparation in the 1980s," in *Responsiveness of Training Institutions to Changing Labor Market Demands*. Ed. Robert E. Taylor, Howard Rosen, and Frank C. Pratzner. Columbus: Ohio State University, National Center for Research in Vocational Education, 1983.

Carnevale, Anthony P., and Leila J. Gainer. *The Learning Enterprise*. The American Society for Training and Development and the U. S. Department of Labor, Employment and Training Administration. Alexandria: American Society for Training and Development, 1989.

Carnevale, Anthony P., Leila J. Gainer, and Ann S. Meltzer. *Workplace Basics: The Skills Employers Want*. The American Society for Training and Development, and the U. S. Department of Labor, Employment and Training Administration. Alexandria: American Society for Training and Development, 1988.

Carnevale, Anthony P., and Janet W. Johnston. *Training America: Strategies for the Nation*. National Center on Education and the Economy, and the American Society for Training and Development. Alexandria: American Society for Training and Development, 1989.

Committee for Economic Development. *Investing in Our Children: Business and the Public Schools*. New York: Committee for Economic Development, 1985.

Committee on Science, Engineering, and Public Policy. *High Schools and the Changing Workplace: The Employers' View*. Report of the Panel on Secondary School Education for the Changing Workplace. Washington, DC: National Academy Press, 1984.

Crain, Robert L. *The Quality of American High School Graduates: What Personnel Officers Say and Do About It*. Center for Social Organization of Schools, The Johns Hopkins University. Baltimore: Center for the Social Organization of Schools, 1984.

Hudson Institute. *Work Force 2000: Work and Workers for the 21st Century*. Indianapolis: Hudson Institute, Inc., Herman Kahn Center, 1987.

Kirsch, Irwin S., and Ann Jungeblut. *Literacy: Profiles of America's Young Adults*, part of the National Assessment of Educational Progress. Princeton: Educational Testing Service, 1986.

Kozol, Jonathan. *Illiterate America*. Garden City: Anchor Press, 1985.

Lund, Leonard and E. Patrick McGuire. *The Role of Business in Precollege Education*. New York: The Conference Board, 1984.

National Alliance of Business. *The Fourth* R: *Work Force Readiness*. Washington, DC: November, 1987.

National Center for Research in Vocational Education. *As Others See Vocational Education: A Survey of the National Association of Manufacturers*. Columbus: 1982.

National Research Council. Committee on Vocational Education and Economic Development in Depressed Areas. *Education for Tomorrow's Jobs*. Washington, DC: National Academy Press, 1983.

National Society for the Study of Education. *Becoming Readers in a Complex Society: Yearbook of the National Society for the Study of Education*. Ed. Alan C. Purves and Olive Niles; editor for the society, Kenneth J. Rehage. Chicago: National Society for the Study of Education, 1984.

Panel on Technology and Employment, Committee on Science, Engineering, and Public Policy. *Technology and Employment: Innovation and Growth in the U.S. Economy*. Washington, DC: National Academy Press, 1987.

Research and Forecasts, Inc. *Business Poll*. New York: Research and Forecasts, Inc., 1983.

Rumberger, Russell W., and Henry M. Levin. *Schooling for the Modern Workplace*, prepared for the U. S. Department of Labor, Commission on Workplace Quality and Labor Market Efficiency. Washington, DC: 1989.

Scribner, Sylvia, and Joy Stevens. *Experimental Studies on the Relationship of School Math and Work Math*. New York: National Center on Education and Employment, 1989.

Silvestri, George, and John Lukasiewicz. "Projections of Occupational Employment, 1988–2000." U.S. Department of Labor. Bureau of Labor Statistics. *Monthly Labor Review*. Washington DC: November, 1989.

U.S. Department of Education and the U.S. Department of Labor. *The Bottom Line: Basic Skills in the Workplace*, Washington, DC: 1988.

Wilms, W. W. *Technology, Job Skills, and Education*. Higher Education Research Institute. Los Angeles: University of California, 1983.

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