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Reaching The Goals

GOAL

5

Adult Literacy and Lifelong Learning

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Prepared by the Goal 5 Work Group
Office of Educational Research and Improvement
U.S. Department of Education

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July 1993

146829

U.S. Department of Justice
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For sale by the U.S. Government Printing Office
Superintendent of Documents, Mail Stop: SSOP, Washington, DC 20402-9328
ISBN 0-16-041869-0

Foreword

In determining sound educational practices for their schools and communities, policymakers, educators, and parents must often find their way through a maze of conventions, recommendations, and theories. Sometimes new research seems to conflict with established practice, with older research, or even with other current research. But does education research allow us to say anything with confidence about what works? In fact, while substantial gaps remain, we do know a great deal about what is effective in education.

In 1989, the President and the nation's 50 governors held an historic education summit that culminated in the adoption of six National Education Goals. These six broad Goals serve as a framework for much of the current reform movement. In order to help all those who are critical to its success—from parents to national policymakers—the Office of Educational Research and Improvement (OERI) has produced *Reaching the Goals*, a series of publications describing what we know from research on individual Goals, as well as the limits of that knowledge.

Each publication is the result of a deliberate process guided by task forces composed of talented individuals from various programs and offices within OERI, including the National Center for Education Statistics, the Office of Research, Programs for the Improvement of Practice, Fund for the Improvement and Reform of Schools and Teaching, and Library Programs. Each task force was charged with assessing the state of research for a particular Goal and developing a research and dissemination agenda for OERI. Lengthier technical documents, which formed the basis for these publications and include all relevant research citations, are available from OERI.

If we are to succeed in improving education and training to meet our ambitious National Education Goals, research must inform and encourage the development of sound policies and practices. By making available in a clear and understandable format the best research we have, these publications can be invaluable to those who are serious about reform.

For copies of the technical report

The technical report which formed the basis for this publication and which includes all relevant research citations is available from OERI, Dept. EIB, 555 New Jersey Avenue NW, Washington, DC 20208–5641.

Acknowledgments

This report was prepared by the OERI Goal 5 Work Group, cochaired by Barbara Lieb and Nevzer Stacey, from the group's technical report on the same subject. The Work Group shared the overall task of collecting and synthesizing information and writing the technical report. Barbara Lieb, with assistance from Liz Torbert, David Loope, and Gayle Fischer, wrote the introductory sections on cross-cutting issues on Goal 5 and the sections on objectives 3 and 4, programs for part-time students and participation in postsecondary education. Nevzer Stacey wrote the sections on objectives 1 and 2, school-to-work transitions and education for the workplace. Sal Corrallo wrote the section on objective 5, assessing and improving communication and higher order thinking skills for college graduates.

Experts on specific aspects of Goal 5 reviewed the technical document and provided assistance to the Work Group at various stages. Many colleagues in OERI provided helpful suggestions, especially Cliff Adelman, John Burkett, Mary Frase, Jeff Gilmore, David Goodwin, Jerome Lord, Jeanette Randolph, Theodor Rebarber, Nancy Schantz, and Maris Vinovskis; from outside the agency, Carol Aslanian, Thomas Bailey, John Bishop, Peter Cappelli, John Daly, Hanna Fingeret, John Guthrie, Diane Halpern, Michael Kane, Michael Nettles, Paul Osterman, Michael Pressley, Esther Rodriguez, and David Stern. Wilma P. Greene, with assistance from Cynthia Hearn Dorfman, edited the report.

The *Reaching the Goals* series was developed under the leadership of Diane Ravitch while she was Assistant Secretary of the Office of Educational Research and Improvement and Counselor to the Secretary.

Contents

Executive Summary

Goal Five, adult literacy and lifelong learning, has far reaching effects on the future of our nation and the individuals in it. The goal states that by the year 2000, every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship. Tracking nationwide progress on the goal presents unique challenges since adult learning occurs in a variety of formal and informal postcompulsory education contexts and since a cohesive body of research has not yet emerged on adults as learners, workers, and citizens.

The goal includes a broad array of issues in postcompulsory education related to skills needed by adults as learners, workers, and citizens. This report focuses on many of those issues, such as wages and education, the transition from school to work, part-time learners, changes in the workplace, business involvement in education, minority participation in college programs, and the outcomes of college education. It presents the findings of an in-depth review of current research and literature on these and other issues related to achieving the five objectives established for Goal Five by the President and governors. Areas where research is still needed are also noted.

Adult literacy, lifelong learning, and knowledge and skills for the global economy and for responsible citizenship are key concepts in the overarching goal. They connect and focus issues under the five objectives established for the goal. Research on these key concepts revealed, among other things, that

- More adults are completing more years of education, and this trend will continue into the next century;
- There are multiple definitions of literacy;
- Adults are increasingly learning at all ages and in settings varying widely in degree of formality and organization;
- Technology presents opportunities for helping adults control the timing and settings for acquiring new skills and knowledge;
- Ever-changing work environments require recurrent education for workers to upgrade skills and knowledge; and

- There is little consensus on what constitutes knowledge for citizenship or on curricular areas likely to contribute to good citizenship.

Highlights of research findings on the five objectives include the following:

Objective 1. Every major American business will be involved in strengthening the connection between education and work.

- There needs to be a system for helping young people make smooth transitions from school to work.
- Although business has been involved in schooling, neither the education community nor the business community can specify the benefits resulting from business-education relationships.
- During the past decade, the numbers of programs connecting workplaces and schools has increased. Evaluations of these programs should be used to improve the programs and to enhance our knowledge about school-to-work transitions.

Objective 2. All workers will have the opportunity to acquire the knowledge and skills, from basic to highly technical, needed to adapt to emerging new technologies, work methods, and markets through public and private educational, vocational, technical, workplace or other programs.

- Successful, high performance workplaces will require workers with advanced generic skills.
- Many adults working or about to enter the work force lack the necessary skills and knowledge to perform in "high performance" work organizations or even adapt to other less demanding changes at workplaces.

Objective 3. The number of quality programs, including those at libraries, that are designed to serve more effectively the needs of a growing number of part-time and mid-career students will increase substantially.

- Adult part-time learning is increasing in diverse settings, such as 2- and 4-year colleges, community programs, work-related settings, the home, and other nonformal settings.
- Postsecondary students are balancing their time between work and education, with community colleges increasingly serving workplace needs.

- Those adults with the greatest need for education experience the most barriers in postsecondary and other education settings.

Objective 4. The proportion of those qualified students (especially minorities) who enter college, who complete at least two years, and who complete their degree programs will increase substantially.

- While enrollments in higher education have increased in the past decade—especially for older, part-time, and ethnically diverse students—there are wide variations in patterns of enrollment and degree completion for various racial-ethnic groups.
- Financial factors have impacted heavily on enrollment and degree completion.
- State policies and institutional practices are important in increasing minority participation and achievement in higher education.

Objective 5. The proportion of college graduates who demonstrate an advanced ability to think critically, communicate effectively, and solve problems will increase substantially.

- Clearer definitions and related levels of proficiency for college graduates are needed for higher order thinking and communication skills, especially in relation to academic learning, work, and citizenship.
- Timing, decisions on comprehensiveness of the skills to be tested, overlap in skill areas, and diversity in the college curriculum present problems in assessing higher order skills for college graduates.

Review of Research on Ways to Attain Goal 5

Introduction

The fifth National Education Goal focuses on adult literacy and lifelong learning, recognizing that efforts to raise standards for education must expand beyond compulsory schooling if Americans are to participate successfully as citizens in an increasingly complex society. The goal also emphasizes the need for learning throughout one's lifetime as a means of helping people cope with the continuous changes in technology, society, and the workplace.

The goal reflects a broad array of concerns about postcompulsory education, centering on the skills needed by adults as learners, workers, and citizens and ranging in complexity from basic literacy to higher order thinking. These concerns also center on the various contexts for adult learning, including the workplace, postsecondary institutions, and community settings such as libraries.

The range and diversity of concerns implied by Goal 5 are so broad that a thorough analysis of all of the relevant issues would expand well beyond the scope of this report. We have, therefore, organized major issues and related research findings around the five objectives established for Goal 5:

1. Every major American business will be involved in strengthening the connection between education and work.
2. All workers will have the opportunity to acquire the knowledge and skills, from basic to highly technical, needed to adapt to emerging new technologies, work methods, and markets through public and private educational, vocational, technical, workplace, or other programs.
3. The number of quality programs, including those at libraries, that are designed to serve more effectively the needs of the growing number of part-time and mid-career students will increase substantially.

4. The proportion of those qualified students (especially minorities) who enter college, who complete at least two years, and who complete their degree programs will increase substantially.
5. The proportion of college graduates who demonstrate an advanced ability to think critically, communicate effectively, and solve problems will increase substantially.

Key Concepts

Lifelong learning, adult literacy, knowledge and skills for the global economy, and knowledge and skills for responsible citizenship are key concepts in the overarching goal. These concepts connect and focus issues under the five objectives and are reviewed first.

Lifelong Learning

"Lifelong learning" and the notion of a "learning society" are variously defined, but most commonly have referred over the past 15 years to "the process by which individuals continue to develop their knowledge, skills, and attitudes over their lifetimes." The terms have been used to describe adult learning for vocational and professional advancement, enjoyment and leisure, remediation and basic skills, and knowledge and skills needed to function as a member of a family or community.

Description of Adult Learners

Adults are learning at all ages and in settings varying widely in degree of formality and organization. A College Board survey of the causes and timing of adult learning concluded that one-half of the adult population (aged 25 and older) was engaged in some kind of learning, with about one-half attending 4-year institutions and the other half learning on their own through books, television, and contacts with other people. Those engaged in learning were found to be younger, better-educated, wealthier, employed, and disproportionately white compared to those not engaged in learning. But, despite demographic characteristics, adults were learning because of changing life circumstances, most often related to career or family. Models for explaining or predicting participation have yet to be tested.

Providers of Learning Opportunities

Providers of lifelong learning opportunities fall into the following four categories:

- Fully or partially tax-supported agencies and institutions, such as public schools, colleges and universities, the Armed Forces, and libraries and museums;
- Nonprofit, self-supporting agencies and institutions, such as religious institutions, community agencies, and professional organizations;
- For-profit providers, such as correspondence and proprietary schools, consultants and shop organizers, computer software and book publishers; and
- Nonorganized learning opportunities, such as television, work, family, and travel.

Role of Technology

There is evidence, moreover, that technology is helping adult learners become increasingly in control of when, where, and how they get new skills and knowledge. Adult learners will "develop sophisticated skills as educational consumers who will be able to identify their own learning styles and needs and to determine selectively what to use from resources distributed by an ever-increasing number of educational institutions and private suppliers," points out one researcher. Computers and telecommunication devices provide new access to learning for remote populations, special populations such as the disabled, and workers on-site and at home.

Conclusion

There is much worthwhile research yet to be done on the objectives, learning paths, and approaches to organized and nonorganized instruction taken by adults in the course of lifelong learning. We also need to learn more about increasing access and incentives for those adults who could benefit from learning but are not now participating.

Adult Literacy

Gaining consensus on the particular skills individuals need to function adequately in a pluralistic society and then measuring those skills have proven to be difficult tasks.

Definition of Literacy

Literacy skills in 1800 were defined largely as abilities to read and write. But, as we move toward the year 2000, we recognize that in our technologically advancing society, information needed for work, citizenship, and learning is processed not only through written materials but increasingly through interpersonal communication, the mass media, and other electronic means. Citizens are expected to use such information in new and more complex ways.

Literacy is now commonly defined as reading, writing, speaking, computing, and problem solving. However, many have urged that the definition be expanded to reflect the more complex abilities needed to function in our society, such as visual literacy, computer literacy, media literacy, and oral literacy (including critical listening and decoding nonverbal messages).

Definition problems are further compounded by the lack of agreement on the minimal level of literacy skills needed for individuals to participate fully in society and on the distribution or mix of literacy skills needed for the population as a whole. Despite these disagreements, progress has been made in measuring those literacy skills of Americans as defined by the National Literacy Act of 1991 (". . . ability to read, write, speak in *English*, and compute and solve problems at levels of proficiency necessary to function on the job and in society, achieve one's goals, and develop one's knowledge and potential."). For example, in 1985 the National Assessment of Educational Progress (NAEP) evaluated literacy skills of America's young adults (aged 21 to 25) by simulating tasks that people encounter at work, home, and in the community. After measuring abilities on three literacy scales (prose, document and quantitative), NAEP concluded that *illiteracy* was not a major problem for this population, since only a small number was unable to do simple reading, writing, and computation tasks. However, literacy is a problem since large numbers of young adults were unable to do minimally complex tasks.

Literacy was found to be a particularly serious problem among minorities. While scale scores increased with levels of educational attainment, black youth scored considerably lower than white youth with the same amount of education, and Hispanic youth generally scored between blacks and whites with the same educational level.

Literacy problems also encompass the growing number of individuals who have limited ability to speak, read, write or understand the English language. By the year 2000, an estimated 17.4 million adults for whom English is a second language will be living in the United States. These include permanent residents, refugees, migrant workers, and immigrants. Many cannot read or write in any language; some have the equivalent of a few years of formal education and minimal literacy skills; and still others are literate in their languages but need to learn English. The growing number of Hispanics who lack literacy skills in their own language illustrates the magnitude of this problem. More than 7 million Hispanics in the United States aged 16 and older (50 percent of all Hispanic adults) are functionally illiterate. Each year this pool grows by more than 200,000 because of immigration and high school dropouts.

Literacy Program Participants

A recent study shows discernible improvements in the literacy of adults who participate in literacy programs. However, research also shows that most participants drop out of such programs before their reading and writing skills can be developed adequately. Reasons for dropping out include motivation problems, the competing demands of family and work, and instruction that is not interesting or is irrelevant to adults. Clearly, research is needed on strategies that successfully retain adults in literacy programs and on those strategies that are appropriate to their successful learning.

Conclusion

There are many ways of conceptualizing literacy. While we can measure adult literacy in many contexts, there is still no universal acceptance of what makes for a literate person in today's complex society, especially among linguistically and culturally diverse populations. There is general agreement that no single measure or specific point on a scale separates the 'literate' from the 'illiterate.' We know that literacy instruction produces positive results, yet we

are a long way from understanding how to improve instruction for the diverse population of adults whose lives would be greatly enriched through improved literacy skills.

The Global Economy

Goal 5 implies that the ability of the United States to compete in the global economy is dependent largely upon improving the education and training of its work force. The role education can play in enabling people to learn and adapt to changing environments is considered crucial in solving complex economic problems. Some major education issues that must be considered as we prepare an American work force for the year 2000 and beyond include the following:

First, nearly 85 percent of America's workers today will be working in the year 2000. In view of rapidly emerging technologies, continuous learning will be necessary not only for global competitiveness but to meet the minimal needs of the American economy.

Second, although job openings are expected at all levels of education and training, opportunities to advance into higher paying occupations will generally require postsecondary education. Also, more and more entry-level workers are minorities, many with educational deficiencies that may prevent them from performing well in the work force or from moving into higher paying jobs. If we fail to educate this group of workers, not only the next generation but also the economy as a whole will be shortchanged.

Finally, in the global market, the U.S. economy is facing stiff competition as other advanced industrial nations are able to challenge U.S. products and services. To realign U.S. institutions so they are responsive to the changing nature of work, our educational institutions have to change dramatically the way they teach and what they teach.

Citizenship

Little consensus exists on the knowledge and skills needed for citizenship or curricular areas likely to contribute to good citizenship. However, in the broad view, citizenship behaviors are being defined as knowledgeable about and competent in the nation's political, economic, legal, and social systems. While some definitions also include one's functioning as a parent or family member, the most

common definitions resemble Indiana University Professor John Patrick's, who defines responsibilities of citizenship as "obligations to contribute to the common good by performing duties to benefit the community," such voting in public elections or serving willingly as a juror. Definitions of civic responsibility appear to be more prevalent than definitions of skills and abilities to be assessed.

Citizenship has been defined by one researcher as consisting partly of "public judgment" or "the capacity to think with others about collective lives and actions," which "requires the ability to talk or imagine different viewpoints and perspectives with others."

Voting and Volunteerism

Declining voting rates and lack of volunteerism have been cited as indicators of declining citizenship. For example, the United States ranks last among democratic nations in voter turnout. Significantly, the largest drop in voter turnout accompanied the lowering of the voting age to 18. Participation fell from 60.8 percent in the 1968 presidential election to 55.2 percent in the 1972 election and has been steadily declining to 50.1 percent in the 1988 election. (The 1992 election saw a reversal in this downward trend with 55 percent voter participation). Voting turnout is even worse in the nonpresidential election years, with only 36.4 percent of Americans voting for the highest office in 1990.

There is also evidence that voting and educational attainment are related. As educational attainment increases, so does voting participation. Recent surveys indicate that college graduates were 67 percent more likely, and high school dropouts were 52 percent less likely, to vote than high school graduates. Of course, we cannot interpret these data as indicators that education causes people to vote.

Concerning volunteerism, in 1988–89 only about 11 percent of 20- to 24-year-olds were volunteers compared to 29 percent of 35- to 44-year-olds. Age comparisons may tell us more about developmental stages of adult concerns than about citizenship.

Civics Knowledge and Skills

While voting and volunteerism may reflect aspects of citizen involvement in social institutions, it is unclear what this means for citizenship knowledge and skills. The actual assessments of civics knowledge of young adults might be more relevant. NAEP studies, for example, indicate that in 1988 the majority of 12th graders had

only a rudimentary knowledge of government and citizenship. They did "significantly less well" in civics than their counterparts tested in 1982 by NAEP. A survey of American youth aged 15 to 24 revealed such basic characteristics as lack of understanding about what is needed to preserve freedoms; less involvement and interest in public life than the previous generation; and feelings that they have been let down by family, school, and government. Still another survey found a lack of familiarity with the Declaration of Independence and the Constitution, inability to identify political leaders, focus on self rather than community, and lack of concern for keeping up with political affairs.

Conclusion

There is little consensus on what constitutes knowledge for citizenship or on curricular areas likely to contribute to good citizenship. The CIVITAS project, developed through the Center for Civic Education, declares that civic education "should consist of the intensive study and understanding of the nation's system of self-government, its values, commitments, and assumptions, and its relevant history; in short, it should involve the theory and practice of a free and open democratic society." Clearly, more needs to be done in preparing for research and instruction in this area.

Objectives

In this section each of the five objectives established for Goal 5 is analyzed with respect to issues related to meeting the objective, followed by additional research findings on the objective and a listing of questions that have yet to be answered by research. The questions are based on the review of literature, available research, and program summaries on that topic.

Objective 1. Every major American business will be involved in strengthening the connection between education and work.

Issues

School-to-Work Transition

Students who graduate from high school or leave school after the compulsory attendance age often have trouble making the transition from school to work. In 1990, almost one-third, 32 percent, of those recent high school graduates who were not enrolled in college were either unemployed or not looking for work. The transition is worse for blacks. Only 45 percent of those black recent high school graduates were employed in 1990 compared to 75 percent of white graduates.

Barriers to making a successful transition include the following: lack of knowledge or skills, coupled with behavioral and attitudinal problems; lack of feedback from employers to schools about what they want their employees to know and be able to do; and employers' unwillingness to hire youth and train them in apprenticeship programs. European employers, who typically pay much of the cost of apprenticeship programs, believe that these programs give them a major competitive advantage over their rivals. U.S. employers continue to train 25- to 44-year-olds rather than younger employees.

There is a growing consensus among researchers that better-structured relationships between schools and workplaces are needed to address the problems of school-to-work transitions. From different standpoints, educators, sociologists, and economists all argue that closer school-work relationships could be used to increase the relevance of the high school curriculum, enhance student motivation, and improve chances for a successful transition.

Business Involvement in Education

Today many programs, such as cooperative education programs, apprenticeship programs, and business-education partnerships, attempt to connect workplaces and schools.

Business-education partnerships are the most common. During the 1987–88 school year, businesses sponsored 52 percent of all education partnerships. Of these, 14 percent were large businesses, 16 percent medium sized, and 22 percent small businesses. Overall, 70 percent of public schools were in partnership with a business during the same school year.

Business involvement frequently grows out of a working partnership among the public school, the city, the Chamber of Commerce, the Private Industry Council, and other community organizations. Between 1983–84, and 1987–88, the number of business-education partnerships rose from 42,200 to 140,800. In spite of the proliferation of business-education partnerships, the research base remains mostly descriptive.

Partnerships can be classified in many ways, but since their activities are diverse, they resist simple categorization. They can be looked at by type of partnership, program, or student. They also can be defined by who initiates them and finances them. In examining partnerships under these categories, we look at the outcomes of such involvements.

Articulating goals at the conception of partnership programs is critical since goals need to be clearly stated at the onset and "clear-sightedly measured" during and at the end of the program. Goals may be time-limited, moderately complex, or multidimensional, but all should identify the appropriateness of each partnership for the needs of the community.

One of the best ways of organizing business-education partnerships is by "levels of impact." For example, since attendance is important both to learning and to performing well on the job, IBM supports regular attendance in school by taking 4,000 young people to Yankee Stadium each year as a reward. The impact of this program is easy to measure. Schools involved with IBM can easily see whether more students improve attendance each year and whether the particular incentive is effective.

Businesses also act as advocates for schools. In 1985, the Committee for Economic Development issued guidelines urging business to advocate for adequate public school funding aimed at school improvement and to apply business strategies to education in cost-benefit analysis, human resources development, staff development, and research and evaluation. Advocacy efforts can be directed at national, state, or local policymakers.

Another category of business activities involves sending clear and appropriate signals to schools on curriculum and academic achievement. Lack of economic rewards for studying and learning is a fundamental problem, since the U.S. labor market fails to reward effort and achievement in high school. Although studies have shown that competence in reading, mathematics, and science are strongly related to productivity in almost all jobs, employees' wages do not reflect this. Wages of employees who demonstrate such competence are only slightly higher than those of employees who lack these skills. In general, employers prefer to hire high school graduates who have work experience, because the applicant's record signals competencies and reliability that help employers identify qualified job candidates. Unfortunately, most recent high school graduates have no school records to bring with them that reflect work experience while in school.

Research Findings

Studies indicate that business involvement with schools has proliferated due to the lack of education employees received in school and the perceived need for better educated employees. Some business-education collaborations have emerged because they act as catalysts for wider support for public education and also can provide at-risk youth with experience and a link between academic achievement and eventual employment.

Preliminary analyses from a survey of about two dozen business-education partnerships show that only one-quarter of the programs reported using outcomes data to measure effectiveness, and about 20 percent were planning to conduct evaluations in the future. The remaining 55 percent were primarily using questionnaires and surveys to elicit feedback from participants. An evaluation of two long-term programs, the Pittsburgh Cooperative Experience Program and the St. Louis-Work Study Program, indicated that such partnerships "enabled schools to better serve at-risk youth" by providing increased access to employment/work experience, job coaching and preparation, and personal attention.

Research also shows that most available data on partnerships are descriptive rather than quantitative and that most projects are still in the design and development phase and have not been evaluated.

In sum, in order to strengthen the commitment of business to schools, we need to examine many issues, some of which are mentioned below. However, prior to this, proof is needed that employers' involvement with schools has a positive effect on students' learning.

Remaining Questions

- To what extent and in what ways do business-education partnerships benefit students? How do they affect learning and careers?
- To what degree are employers obtaining information on high school accomplishments of job applicants and using this information when making hiring decisions? Is this increasing over time? To what extent are students aware of what employers are doing in this regard? To what extent does this awareness influence students' study behavior?
- What evidence exists of intended and unintended outcomes of business-education partnerships that produce changes in the behavior of either party? In what, if any, ways are these outcomes related to the type of business or school?
- How can business involvement in schools and other educational institutions be defined differently? What other examples are there, either in the United States or outside the United States, that are not partnerships but link schools and businesses?
- How can employers provide feedback to schools about the performance of their graduates? What impact does such feedback have on schools and their students?
- What measurements can be developed to reflect a student's level and quality of effort?
- To what extent do schools perceive a conflict between standards and relevance? Is there a concern that too much time spent on business links will compete with time for general learning? How do they resolve such conflicts? How do our foreign trading partners manage such conflicts?

Objective 2. All workers will have the opportunity to acquire the knowledge and skills, from basic to highly technical, needed to adapt to emerging new technologies, work methods, and markets through public and private educational, vocational, technical, workplace, or other programs.

Issues

One of the most often cited problems of the U.S. economy is the rate at which innovation is translated into production. Numerous reports have said that the United States lacks the necessary human resources to solve this problem.

The new technologies demand multiple sets of knowledge and skills. Traditionally, we have expected people to attain these sets of knowledge and skills through postsecondary education. However, in recent years, postsecondary education has been less able to fulfill this need due to students being less well prepared by secondary institutions. Therefore, to help adults become more productive members of society, retraining and access to retraining, both in and out of workplaces, have become crucial issues to be addressed.

Changes in the Workplace and Work Force

Traditionally, most workplaces have been organized around tight divisions of labor and narrowly designed, specialized jobs, with supervisors making decisions about how jobs were to be done, how work was to be scheduled, and how workers were to be evaluated. In contrast, in today's more productive workplaces, jobs are more flexible and emphasize direct employee participation, teamwork, skills training, and an understanding of the organization's goals and objectives. These workplaces are described as "high-performance," and their numbers are few.

Most organizations have been struggling to move from traditional to more flexible alternatives. One of the obstacles in the transition has been employees' lack of necessary skills to function in high-performance work organizations. A recent study found that when employees were given the opportunity to participate in such organizations, they didn't know what to do or how the organization worked.

The shift from a goods-producing economy to a service-producing economy also increases the demand for an educated labor force. As was the case for the transition from an agricultural economy to a goods-producing economy, the transition increases the demand for educated labor. Direct employment in the manufacturing sector peaked during the 1940s when 4 out of 10 Americans worked either as craftpersons or as operatives and laborers. By 1988, the proportion had fallen to 28 percent. The percentage of Americans employed in managerial, sales, clerical, professional, and technical operations rose from 18 percent of the working population in 1900 to 56 percent in 1988. Since 1900, the professional and technical workers' share of employment has increased by 12 percent, a rate of growth exceeded only by clerical occupations.

The Bureau of Labor Statistics projects that professional and technical occupations will be the fastest growing segment of the labor force. By the year 2005, professional and technical workers are projected to account for more employment than any other segment of the economy.

The change in the nature of these and other jobs is just as important as the proliferation of types of occupations. New technologies have created new jobs. For example, computational technologies do not simply automate, they also "informate"—that is, they allow their operators access to previously unavailable information and they require skills that have not normally been expected of a machine's user. Also, blue-collar workers in computer-integrated paper mills have to learn to analyze data and then make decisions based on their analysis in order to control the production process effectively.

Other occupations have similar findings. A pilot study of secretaries in universities, for example, suggests that the spread of personal computers among faculty members is slowly shifting the secretary's work toward that of a research assistant. In the past, such skills were expected of mid-level managers, now they are part of the necessary skills of first-line workers.

Wages, Education, and Skills

The above-mentioned issues deal with a demand created by changes in the workplace. Examining wages to see if there are changes in returns for more education is another way of looking at the demand for skills in the workplace. If education is a substitute for skills and people can earn more money for more education, then

one can infer that the demand for skills is also rising. For example, in the 1980s, the earnings of college graduates compared to those of high school graduates more than doubled. Evidence of dispersions of wages within educational categories is also available. Individuals with more formal education also receive more training and experience greater wage growth.

Occupational projections and labor market "signals," such as higher wages for some jobs, suggest increased demand for more technical and specialized skills in the coming decade. To ensure that all workers have access to education and training and retraining programs, both private and public institutions, formal and informal programs, and small and large businesses must provide appropriate learning experiences. Access information must include the cost, quality of training, and transferability of education and training provided by these institutions. For example, from 1969 to 1984, the percentage of courses on other-than-a-full-time basis offered to adults by schools and colleges fell from 61 percent to 53 percent, while those of nonschool-based providers—business, industry, government, and labor or professional organizations—increased from 39 percent to 47 percent. Business and industry provided about 17 percent of the adult education courses.

Although the conventional model indicates that educated workers are more productive and better paid, this does not hold true for some occupations. For example, technicians who support engineers, nurses who help doctors, and administrative assistants who support high-level managers and who are trained in community colleges and technical institutes receive fewer benefits from training or education than the professionals they support. It is possible for the benefits not to accrue to the individual trained but to others. On the other hand, if employers provide education and training, due to its signaling role, employees are likely to receive higher wages.

Training

Men are more likely to receive employer-sponsored education and training than women, according to a recent study. Twenty-four percent of men reported receiving qualifying training in a formal company program compared to 17 percent of women. A preliminary review of research shows that there are important issues to be examined in encouraging the development of a system of recurrent education that will provide not only access but access to quality programs for all adults who need lifelong education and training.

Research Findings

Since there is very little research on education's contribution to productivity, and what there is has raised more questions than answers, it is more enlightening to concentrate on the rate of return to the individual.

Rate of Return on Education

Initial findings on the economic benefits of investing in human capital via education led to an explosion of research both here and abroad on the effects of schooling on individual earnings, rates of return on investment in schooling, and education's role in stimulating more rapid economic growth. Some of the returns on education may not be in the form of wages but may be reflected in such factors as health, fertility, and future earnings of children.

For the purpose of discussing objective 2, we shall concentrate on the rate of return on different levels of education as indicated by employment rates and wages. For example, 92 percent of 25- to 34-year-old men who graduated from college were employed in 1991 compared to 85 percent of high school graduates. For white male college graduates in this age group, the earnings premium increased from about 15 percent during the last half of the 1970s to about 40 percent in the last half of the 1980s and 1990. For black males the college premium was even larger. The earnings premium of college graduates from 1985 through 1989 was the highest of the 1975–90 period. Also, labor market opportunities for women grew enormously between 1971 and 1990.

The wage differential between students with 2-year degrees and those with 4-year degrees has increased, but not as much as the college/high school differential. Currently, the less educated have a higher unemployment rate. Some possible reasons for this include:

- Less mobility and less access to labor market information.
- Flexible-system production depends on employees' skills, especially their capacity for learning on the job. Those with less education have more to learn and therefore are likely to slow down the process of change.
- More than one-half of the net employment growth between 1976 and 1988 took place within occupations requiring higher levels of education.

- High-tech industries tend to hire people with more years of schooling. In 1980, the most recent year data are available, 20 percent of those employed in high-tech industries had 16 or more years of schooling compared to 11 percent in traditional industries.

In sum, it appears that as long as there are economic incentives to acquire further education and training, even if the evidence on the returns to the economy is not directly attributable to education, some adults will continue to get it. The demand for more education and training due to changes in the economy remains to be determined by future needs.

Remaining Questions

- What are the rates of return for individuals on different types of investments in education and training for adults?
- What is the scope of changes in work methods that require a substantial degree of communication and math skills?
- What historical evidence indicates that the rate of technological change has accelerated? What evidence do we have of the type of skills that will be needed in growth industries and occupations?
- To what extent do various workplaces (public/private, small/large, high-tech/low-tech, service/manufacturing) provide opportunities for adults to acquire postcompulsory education and training?
- What is the rate of return for the employer from providing further education and training to employees?
- What evidence do we have to show which sector should provide what kinds of education and training? What type of institutions are most suited to handle which role in education and training the nation's work force?
- Are there existing training models that may shed some light on productivity issues in the workplace?

Objective 3. The number of quality programs, including those at libraries, that are designed to serve more effectively the needs of the growing number of part-time and mid-career students will increase substantially.

Issues

This objective recognizes that much of adult learning occurs in the context of part-time programs that vary widely in the degree to which they are organized and controlled for quality. Part-time learning activities also occur in diverse settings, such as 2- and 4-year colleges, community programs, work-related settings, the home, and other nonformal settings.

At the community level, libraries have been an important provider of education for adult, part-time learners. The 1966 Adult Education Act provided support for public libraries to work with public schools in providing adult basic education programs. A 1991 study of the role of libraries in promoting adult literacy and learning over the past 25 years notes that libraries are likely to become even more important for part-time learners as library programs incorporate new technologies.

Research Findings

Number of Adult Part-Time Learners

Estimates vary as to the number of adult part-time learners in the United States in any given year. However, the most recent nationally representative study of the educational activities of adults found that 38 percent of adults aged 17 and over, excluding those enrolled full-time in high school, participated in some educational activity over a 12-month period in 1990–91. Of these, 31.6 percent participated on a part-time basis.

A Description of Adult Learners

Recent data from the Bureau of Labor Statistics indicates that many American adults engaged in postsecondary education are already in the work force and are part-time learners. Of the 31.2 million youth aged 16- to 24-years-old in October 1991, about one-half were enrolled in either college or high school. Of those enrolled full-time in college, 53 percent were working part time or

looking for a part-time job; 91 percent of part-time students were in the labor force. The National Center for Education Statistics (NCES), in 1990, found that 44 percent of all undergraduate students were enrolled part-time. Of those enrolled at 2-year institutions, 66.5 percent were part-time. It is clear from these studies that many Americans engaged in postsecondary studies spend part or most of their time working and that most of those enrolled in 2-year institutions are likely to be part-time learners.

While there is apparently an increasing need for postsecondary students to balance their time between work and education, opportunities to do so vary. Fifty-six percent of U.S. colleges and universities reported an increase in part-time students, mostly in 2-year institutions, yet there were great disparities among the states in the opportunities available for such students. A 1990 study of adult education and training providers found that while postsecondary institutions are major sources for learning, employer-provided education has increased dramatically, with community colleges increasingly serving workplace needs.

Findings from a 1989 study of the policies and practices that increase opportunities for "worklife education and training" indicate that participation is related to such factors as age, race-ethnicity, prior education level, income, employment status, and type of education. The study concluded that adults most in need of worklife education and training (i.e., those 55 to 64 years old, black and Hispanic having less than a high school education, incomes of less than $10,000, unemployed, or in lower paid, lower skill occupations) are least likely to participate. Similarly, NCES findings support earlier studies which found that adults who could benefit from participating in education are least likely to do so—that is, adults with a 12th grade education or less, who were unemployed, or whose households were at the lowest income levels. Worklife education and training was defined as "a process whereby individuals, 17 years old or older who are moving into, through, or out of the workplace, undertake formal or organized instruction/activities with the intention of bringing about changes in information, knowledge, understanding, or skills."

Barriers To Participation

A study of barriers to participation in education and training programs found that nonparticipants are deterred by situational barriers such as personal problems, lack of confidence, education

costs, lack of interest in organized education, or lack of interest in available courses. Education costs and lack of time were the most often cited.

Structural barriers (policies or practices of organizations that discourage participation) often cited by part-time students were admission and financial aid policies, availability of advisers in the evening, and class scheduling. Lack of information, particularly for adults with less education, also may be a critical factor.

Services Wanted by Adult Students

A study of adults enrolled in college credit courses found that the top-ranked services wanted by adult students fell into three categories: logistical ease, financial help, and career connections. For example, they wanted to spend their campus time inside classrooms and not waiting in lines; they wanted practical applications of classroom material; and they wanted financial subsidies (only 40 percent received help from their employers).

Theories of Adult Learning

Researchers are also beginning to understand more about how adults learn throughout their lives and how we can serve their learning needs. A recent study of seven theories of adult learning provided some possible answers.

Four common components of adult learning surfaced: (1) self-direction or autonomy as a characteristic or goal of adult learning, (2) breadth and depth of life experiences as content or triggers to learning, (3) reflection or self-conscious monitoring of changes taking place, and (4) action or another expression of the learning that has occurred.

Little is known about predicting the career and education paths of people who engage in formal or informal part-time learning during various periods in their lives.

Remaining Questions

- What contexts, formats, and delivery systems would be most useful for serving the education needs of various segments of the adult population at critical times in their lives?

- What approaches can be used to reduce barriers and strengthen incentives to participation for those adults most in need of literacy and worklife education and training?
- What can be done to enhance collaboration among business and industry, community agencies and postsecondary institutions, to educate mid-career and part-time students? How can new technologies be used to improve access and quality of programs for these learners?
- How can knowledge from research on adult learning be incorporated into instructional programs to better serve adults who are increasingly older, ethnically and culturally diverse, and who tend to be part-time learners?

Objective 4. The proportion of those qualified students (especially minorities) who enter college, who complete at least two years, and who complete their degree programs will increase substantially.

Historically, higher education has been viewed as a place where people can be educated to be "leaders and provide for the welfare of society." This objective is based on the assumption that college degrees represent achievement of knowledge and skills needed not only for leadership but for the good of the economy. It also recognizes that postsecondary institutions need to do a better job of recruiting, retaining, and graduating minority students, primarily for reasons of economic competitiveness, but also for the welfare of the individual.

Issue

Collecting and analyzing data on the enrollment and retention of minorities is complicated by the tendency of researchers and policymakers to treat nonwhite populations as a single group, having experienced the same barriers to education. Factors such as preparing for college, language proficiency, immigrant or nonimmigrant status, financial condition, and cultural influences differ widely within and among groups. These differences must be better understood if cultural diversity is to be achieved in postsecondary and higher education.

Assessments in general of student enrollment, and retention in degree programs, are complicated by the diversity of postsecondary institutions that grant degrees or certificates (e.g., junior colleges, vocational and technical institutions, community colleges, and 4-year colleges and universities). For example, it is difficult to track students' progress when they transfer to other programs within or among institutions. Part of the difficulty in tracking students is due to problems in assessing comparability in quality of programs and instruction. A lack of consensus on the notion of "qualified students" further complicates assessment problems.

Research Findings

Enrollment and Characteristics of Students

It is clear that despite a decreasing number of high school graduates in the last decade, there has been a steady increase in higher education enrollment, reaching a record high of 14.2 million students in the fall of 1991. Eight out of ten 2-year institutions and two-thirds of 4-year institutions reported increased numbers of applications, which were reflected largely in part-time enrollments. Since 1980, overall enrollment in institutions of higher education has increased by about 13.4 percent.

The characteristics of those enrolled in higher education have been changing, especially over the last decade. The number of older students (aged 25 and over) rose 34 percent between 1980 and 1990, while those under age 25 increased by only 7 percent. During 1991 and 1992, 6 in 10 institutions reported continued increases in enrollments of students aged 25 and over. Since 1980, there have been overall increases in enrollments for all racial-ethnic groups in higher education, but especially for Asian or Pacific Islanders (94 percent), Hispanics (61 percent), nonresident aliens (30 percent), and American Indians or Alaskan Natives (23 percent). In contrast, black enrollment increased only 10 percent and white enrollment only 9 percent.

Many students of traditionally younger college ages (18 to 24 years old) apparently delay enrolling in college or delay completing degrees. About 55 percent of the students who enrolled in private 4-year colleges in 1980 earned a bachelor's or higher degree by 1986 compared to 46 percent in public 4-year colleges. Pointing out that the nation currently experiences large losses of talent, the Educational

Testing Service reported that only one-half of the nation's top high school seniors in 1980 (those in the top 25 percent of national test scores) had received a bachelor's degree by 1987.

College preparation is another factor related to college enrollment. A recent Pelavin and Kane study on educational equity indicates that taking college preparatory mathematics courses in high school is strongly associated with college attendance.

Factors in Degree Completion

A variety of factors appears to account for decisions to delay enrollment and to complete degrees, but cost is cited as the most important factor. Between 1979 and 1989, charges at public colleges rose by 109 percent and charges at private colleges by 145 percent. These increases greatly surpassed the projected rise of 64 percent in the Consumer Price Index during that same period.

Conclusions from the American Council on Education's (ACE) 1991 administrators' survey support the fact that financial factors have impacted heavily on institutions and students:

> Financial issues dominate any description of the status of American colleges and universities during 1991–92. Most noticeable are cutbacks in spending on buildings, equipment, and library acquisitions and reductions in the number of courses or course sections offered.

Increased tuition charges are another widespread response to financial pressures, with potential but as yet unclear effects on enrollment. The ACE survey revealed that increasing numbers of students are adjusting their study arrangements for financial reasons (taking a semester off, studying part-time). More students also are requiring full financial support.

Minority Degree Completion

A recent study found that while the college attendance gap between minorities and whites decreased between 1964 and 1986, data on college completion show a gap growing wider over time. Carter and Wilson, for example, reported that blacks and Hispanics earned fewer undergraduate engineering degrees in 1989 than in 1987, led by a decline of almost 9 percent for black men. Black men also received fewer bachelor's degrees in education, health, and life science.

To date, there has been little research on ways of changing the rate of minority degree completion, except for in-depth case studies and evaluations of successful efforts to improve achievement of degrees by minorities at predominantly white institutions. Characteristics of successful efforts include the following: strong policy leadership at state and institutional levels regarding minority recruitment and retention; strong programs for academic preparation and remediation; strong relationships with elementary and secondary schools on precollegiate programs; multicultural environments; and proactive approaches to financial aid and on-campus housing.

Efforts To Increase Minority Participation

There is some evidence that institutions are attempting to increase minority participation in higher education. During 1991–92, 53 percent of the institutions surveyed by ACE reported increases over the previous year in enrollments of black students; 9 percent reported decreases. Almost one-half of the institutions also had increased enrollments of Hispanic and Asian students; one-fourth increased their enrollment of American Indian students.

Since 1990, gains have been made in the proportion of campuses using strategies to increase minority participation. These strategies include tracking minority student attrition and completion rates; developing plans for increasing minority participation; and holding student and faculty workshops to increase racial and cultural awareness. In spite of the overall gains, ACE found that many institutions have not set up such strategies; for example, 3 in 10 had not developed a comprehensive plan for increasing minority participation.

Minority Enrollment in Graduate Programs

Data from the Educational Testing Service indicate that decisions of minorities to enroll in graduate school are related to their undergraduate grade point average, level of debt, and socioeconomic status. Those minorities satisfied with their doctoral programs tend to complete them and feel that they experienced a high degree of support and encouragement from a mentor and experienced little institutional discrimination.

Remaining Questions

- Which state and institutional policies work best to change the enrollment, retention, and degree completion rates of all students, particularly minorities? How can these be translated into specific actions and carried out across diverse kinds of higher education institutions nationwide?
- What are the indicators of institutional success for postsecondary schools, particularly with respect to the successful integration of minority students into various programs? How can these be measured? How can institutions perform better on these indicators?
- How can elementary and secondary schools work with higher education to ensure success for all students, particularly minority students, in completing postsecondary degrees? What are the barriers, in addition to cost, for students in various cultural groups? How can these be reduced?
- What can institutions do to reduce the costs of attending college without sacrificing program quality? What kinds of financial assistance work best for different kinds of students at various points in their lives to enable them to complete college degrees?
- What is the impact of delaying college enrollment and degree completion on the lives of students, particularly as it relates to their participation in the work force?

Objective 5. The proportion of college graduates who demonstrate an advanced ability to think critically, communicate effectively, and solve problems will increase substantially.

Issues

While information on the achievement levels of college students in thinking critically, communicating effectively, and solving problems is limited and fragmentary, some evidence clearly indicates students are deficient in these areas. As mentioned earlier in this report, NAEP assessed the literacy skills of Americans aged 21 to 25 and found that although individuals with 2-year, 4-year and/or graduate degrees fared better than those without degrees, many of these college graduates failed to accomplish rudimentary tasks. For example, only

40.7 percent managed to use a bus schedule (document scale), only 20 percent could estimate the cost of groceries using a unit-price label (quantitative scale), and only 19.4 percent could write a theme from a short poem (prose scale).

A 1987 study of industry practices in hiring college graduates found managers citing general analytical and communication skills as necessary qualifications for entry-level candidates. Two-thirds of the participants stated that those possessing the technical skills required most often lack these so-called "generic skills."

Industry, postsecondary institutions, academic associations, and governments seem to be willing to remedy these basic deficiencies. According to a 1991 American Council on Education survey of postsecondary institutions, 81 percent have student outcome assessments under way, including 24 percent in critical thinking, 32 percent in quantitative problem solving, 28 percent in oral communication, 56 percent in written communication, and 29 percent in long-term outcomes. Of the remaining institutions engaged in assessment, about 40 percent have plans to assess students in critical thinking, problem solving, and oral communication; and 27 percent in written communication.

While there is little agreement on the specific nature of these skills and the levels of achievement expected for each discipline regarding work and citizenship responsibilities, there is considerable agreement that college graduates should demonstrate higher order thinking and communication skills. Citations of learning criteria for specific disciplines consistently name critical thinking, problem solving, and communication as core requirements. For example, a recent U.S. Department of Education publication, *Signs and Traces*, outlines assessment paradigms for five different programs of study (developed independently of each other by faculty teams) and includes as a goal for each the mastery of critical thinking, problem-solving, and communication skills. In addition, the American Association for the Advancement of Science refers to these skills when defining "scientific literacy" for the population at large.

In *Project 2061: Science for All Americans*, the association builds a strong case for developing thinking skills within the science, mathematics, and technology curricula. It argues that it is not enough to have content knowledge and suggests that ". . . knowledge should be understood in ways that will enable it to be

used in solving problems." The goal statements of educational programs at various colleges and state programs offer additional evidence.

It should also be noted that identifying and teaching/learning critical thinking, problem-solving, and communication skills must be coordinated with similar efforts at precollegiate levels. For example, objective 2 of Goal 3 (student achievement and citizenship) includes essentially the same set of skill objectives for students in elementary and secondary schools as those outlined for objective 5 of Goal 5. Clearly, continuity is needed in learning these skills from elementary school through postsecondary education.

Research Findings

Baseline information for measuring the progress toward attaining this objective is generally lacking. Although tests such as the Graduate Record and Academic Profiles of the Educational Testing Service and the American College Testing Service's Comprehensive Outcomes Measures Program include items that assess some of the identified skills, recent experiences with these instruments suggest that further research as to their validity and reliability is necessary. Researchers do agree that students generally lack even limited mastery of the targeted skills before entering postsecondary schooling. One researcher suggests that, in recent years, 80 percent of the 4-year colleges in this country have initiated outcomes assessment programs at some level. However, it is difficult to draw national comparisons since colleges use a variety of instruments and criteria, and since the focus of the assessments differ.

Identifying, Assessing, and Teaching Skills

In 1991 the National Center for Education Statistics identified the following three strategies for identifying and assessing higher order, problem-solving, and communication skills: identification of the skills, assessment of the skills, and enhancement of the teaching/learning of the skills. Although it seems reasonable to identify higher order thinking and communication skills independently of one another, clearly they overlap. Research on effective writing and reading consistently includes a critical thinking element.

A substantial amount of work has already been done on the assessment of communication skills which include reading, writing, speaking, and listening. For example, a 1978 ERIC publication,

Assessing Functional Communication, identified 90 different communication assessments used in early to later education. In contrast, identifying and building a consensus for the skills necessary for problem solving and critical thinking has met with mixed results in the academic community. More recent examples include efforts to develop a consensus listing of critical thinking skills conducted through the American Philosophy Association by Peter Facione; institutional-based projects cited by Loacker, Mentkowski, and Paul and Nosich; and industry activities reported by Capelli.

Capelli's review of industry approaches to identifying needed skills through job analysis techniques cites evidence suggesting that grades in general were not necessarily good indicators of future job success. However, grades in subjects related to an occupation can predict future job performance. In all cases, job performance skills must be clarified and skill proficiency levels defined and validated.

Job analysis techniques have also been used by school systems to identify the link between school and work. The Fort Worth Independent School District, for example, used job analysis techniques to identify and then validate seven basic skills and corresponding levels of proficiency for school district workers. Validation included skills and proficiency levels expected from both high school and college graduates.

With respect to assessing the skills of college graduates, individualized assessment processes tend to result in truer and more unique assessments of student learning. However, a major drawback to this approach is that the administrative costs are necessarily greater with unknown reliability and validity. Portfolio assessment was identified as the most direct individualized assessment approach; however, there are serious questions as to its reliability and validity.

As assessments become less personalized, there is the additional requirement that the approach selected meet the joint technical standards of the American Psychological Association, the American Educational Research Association, and the Code of Fair Testing Practices. For example, consideration needs to be given to such concerns as comparing the skills of college students or graduates with the skills of the noncollege population. How much development can be attributed to maturation, job experience, and cultural and family background characteristics of the students? The potential for "adverse impact" on all populations of tests and standards must be considered. Instruments must be controlled for background factors to get a true sense of learning in college. Also,

for assessments of the effectiveness of teaching and learning systems to be valid, students need to be aware of skill expectations and standards.

With respect to assessing instruction in critical thinking and problem solving, a 1987 survey of teaching thinking through problem solving suggests that some interesting and fairly dramatic efforts have been made both to teach problem-solving skills directly and to teach effective remedial problem-solving skills. These efforts differ as a result of the student's experiential background, the teacher's educational theory, or the method of analysis used to determine the components of problem-solving skills. Nevertheless, each effort, no matter what method has been employed for the teaching or remediating of problem-solving skills, succeeds.

No matter how problem-solving skills are taught, no matter what educational level at which they are taught, the problem-solving skills of the students to whom these skills are taught improve.

With respect to the teaching and learning of communication skills (reading, writing, speaking, and listening), a great deal of research has been and is being conducted from the academic perspective. However, since teaching for work and citizenship purposes might be thought of as broadening the focus, it is not the teaching and learning of communication skills from an academic perspective that this objective focuses on, but rather the application of the skills.

Job analysis techniques can and have been used to identify communication skills needed for the workplace. However, these skills have generally not been linked to college instruction. It may be that the greatest barrier to enhancing the teaching and learning of both communication and higher order thinking skills is not the lack of effective teaching and learning practices, but the lack of faculty commitment to relate these skills to the workplace and citizenship.

As noted earlier in this report, there are problems in the research and assessment of the knowledge and skills needed for citizenship. One researcher, however, notes the relationship of citizenship skills to higher order thinking and communication skills as follows:

> It is about using political talk, thinking, judgment, and imagination to create the capacity to act thoughtfully and prudently on critical public issues.

Remaining Questions

Several areas of concern, with implications for research, have emerged from an analysis of objective 5. These concerns apply to both higher order thinking skills and communication skills. They include:

- Clearly defining higher order thinking and communication skills and related levels of proficiency needed by graduates as they relate to college teaching and learning and to citizenship;
- A reliable and valid national assessment strategy to assess these skills;
- A parallel strategy to communicate the results to the public and to strengthen programs in colleges and universities and other providers of education and training;
- Identifying effective, reliable, and validated teaching and learning strategies and practices;
- Identifying when and how these skills are best learned by various students; and
- Identifying what is to be assessed and how; strategies or incentives needed to motivate students to participate in the assessment process; and incentives necessary for faculty to think in terms of using the results to improve the teaching and learning of these skills.

Resources

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☆ U.S. GOVERNMENT PRINTING OFFICE:1993-342-111/83160

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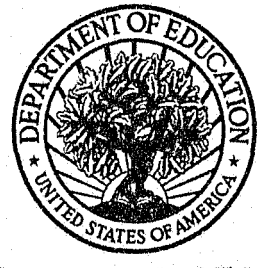

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PIP 93–1021