
Leadership Group on 21st Century Skills

BRIEFING BOOK

for 21st Century Jobs

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THE WHITE HOUSE

Office of the Vice President

For Immediate Release
Tuesday, January 12, 1999

Contact:
(202) 456-7035

**REMARKS AS PREPARED FOR DELIVERY
BY VICE PRESIDENT AL GORE
LIFELONG LEARNING SUMMIT
Tuesday, January 12, 1998**

I want to thank all of you for joining us today for this important summit -- at over 1,000 satellite sites, in every state in America. We're here to talk about one of our greatest challenges: how do we give every American the chance to learn 21st Century skills, so they can fill high-paying 21st Century jobs?

This is a time of great prosperity for America. Just four days ago, President Clinton marked what is now the longest peacetime economic expansion in the history of the United States.

Today's economy is also a changing economy. We are now in the early stages of an information revolution -- not just in our high-tech industries, but in our core industries and manufacturing as well. Some of you may be familiar with a new fact of life known as Moore's Law, which explains that we are now doubling our computing power every 18 months, while the cost of computing power drops by almost 25 percent a year. Just think about the new productivity that is being unleashed -- at large and small businesses alike. Consider this one example: a Ford Taurus now has more computing power than the Apollo 11 that took us to the moon.

At the same time, car manufacturers have trimmed about 1,000 pounds from the weight of an average car by using lighter materials, smarter engineering, and more efficient engines. Throughout our economy, skills, intelligence, and creativity are replacing mass and money -- which is why, in the past 50 years, the value of our economy has tripled, while the physical weight of our economy as a whole has barely increased at all.

Clearly, today's workplace is becoming more high-tech, and more high-skilled. It is becoming more competitive, as we sell our products to billions of global consumers. And as CWA (Communications Workers of America) President Morty Bahr puts it: "Skill is the new source of security in the 21st Century."

With all that change comes a significant challenge: how do we make sure everyone has the chance to compete and win in this new knowledge-based economy?

A central answer must be a good education, and the ability to keep learning for a lifetime. Education can no longer stop after you leave high school, or even college.

Right now, our skill needs and our workplaces are changing quickly -- yet 75 percent of the people who will be working in the year 2010 are already in the workforce. That's one reason why the average age of students at community colleges is now 29 and rising.

The comedian Dana Carvey once put it this way: "I'm only 30 years old, but I read at the 34-year-old level."

In the 21st Century, we must make sure that everyone -- even those 30-year-olds, 40-year-olds, 50-year-olds and beyond -- can get the education and skills to rise with the tide of our new and renewed economy.

Many of our most crucial industries are facing shortages of the skilled workers they need. In manufacturing, 88 percent of companies are having trouble finding qualified applicants for at least one job function. One in five say they can't expand their businesses because their workers don't have the right skills. Think about that: the lack of skills and training is actually slowing down our economy!

Here are some compelling facts from a new report I am releasing today from our

Departments of Education, Commerce, and Labor; our Small Business Administration; and the National Institute for Literacy:

- In 1997, college graduates earned 77 percent more than high school graduates -- up from 58 percent in 1975.

- Adults with higher levels of education earn more, have greater job security, are less likely to be unemployed, and are more likely to find reemployment quickly if they are displaced.

- In fact, dislocated workers with an associate's degree or higher are finding new jobs that pay more than the jobs they lost!

And higher skills is one of the best investments a company can make. According to our new report, a 10 percent increase in education investments leads to an average productivity gain of 8.6 percent -- nearly three times the return on capital investments.

No wonder Jerry Jasinowski of the National Association of Manufacturers told me earlier today that there is no higher priority than lifelong learning -- that it is a way to increase productivity and workers' earnings at the same time.

Yet too many of our people are not getting the education and training they need -- especially those that need it the most. As Mayor Clarence Anthony of South Bay, Florida reminded me at our roundtable this morning, for all our economic strength, too many are still being left behind. There are other challenges: some employers may worry that those who receive training will take their new skills elsewhere, or have very limited resources. Some individuals face serious barriers: lack of money, time, and information. In today's breakout session on the role of community colleges, you spoke about the special challenges of part-time learners -- those who have to keep working while they expand their skills.

We must overcome all these barriers together. For we are at the next great economic frontier. Once, land and capital were the key strategic resources. Now, knowledge is our key strategic resource and learning is our key strategic skill.

In the past six years, with President Clinton's leadership, we have opened the doors to higher education wider than ever before -- simplifying our nation's job training system, helping to make at least two years of college universally available, and passing a tax credit of up to 20 percent off tuition for courses throughout one's lifetime. Now we must take the next bold step: we must find a way to make sure every American has access to the resources they need to keep learning for a lifetime. Buying lifelong learning should be as affordable and routine as buying a new appliance or financing a car.

That is why I am pleased to announce today that President Clinton and I will create a new advisory committee of outside leaders to explore ways to meet this challenge -- such as low-income loans, grants, tax incentives, and other ways to help adults get 21st Century skills for 21st Century jobs. In particular, we should explore ways to help Americans pool their own savings, contributions from their employers, and possibly also federal funds to pay for lifelong learning. We should consider creating lifelong learning savings accounts, to help people pay for the higher education they need to get ahead.

At the same time, we need to make high-quality education and training more widely available -- in the community and on-line. And we must ensure that all of our people have good, up-to-the-minute information and counseling on available jobs, the training needed to get those jobs, and the where to get the resources to pay for it.

Today, I'm pleased to make some brand new announcements that will move us closer to our shared goals. First, I am calling on employers to provide more worker scholarships for the 21st Century, and I am proposing an expanded version of our current tax break to help them do so. This proposal will assure that employees can receive educational benefits from their employers tax-free -- for undergraduate or graduate courses.

Next, I am unveiling a new, \$60 million plan to help train our workers for high-skill jobs in industries that face serious skill shortages. This new initiative will provide grants to regional partnerships of employers, colleges, unions, our new workforce investment boards, and others -- to help them identify skill shortages in their communities, and the connect workers to the training and jobs they need. As you concluded at today's

sessions on high growth and on the needs of small businesses, regional skills alliances are the best way to meet our most vital skill needs -- industry by industry, community by community.

We must also help the 44 million American adults who struggle with a job application, can't read to their kids, or are stuck on the welfare rolls because they lack basic skills. As you discussed in today's breakout session on basic skills, education and training can play a powerful role in moving people from welfare to work.

I also know that in this morning's breakout session on workplace education, you focussed on the need to make it easier for employers to provide workplace education through targeted tax breaks. We hear that message loud and clear. That's why President Clinton and I are proposing a new ten percent tax credit for employers who provide literacy, English as a second language, and basic education programs. These new tax breaks will help all American get the skills they need for the jobs they deserve.

I am also creating a new 21st Century High-Skills Community Award. Just as the Baldrige Award recognizes companies with world-class growth strategies, this award will celebrate communities that build our economy by investing in our people.

To help every American understand the training they need and the training that is available, our Labor Department is creating a new on-line American Learning Exchange -- a website that tells people about the training and education opportunities in their community, and tells providers about potential enrollees. This website will also offer on-line financial counseling -- telling workers the kinds of resources available to them, and also the likely amounts they can apply for and receive.

Finally, in today's breakout session on labor-management partnerships, you spoke of the need for the federal government to highlight best practices, and you talked about new ways that labor and management can work more closely together to expand lifetime learning. We want to encourage exciting new partnerships across all sectors. That is why we are creating a new leadership group of top business executives, labor leaders, educators, and community leaders to find new ways, beyond the steps government can take, to dramatically expand lifelong learning. I look forward to your ideas, your energy, and your recommendations.

Let us realize that the if we truly want to meet this challenge -- if we want to give every American the chance to reach their highest potential, and soar as high as their dreams can carry them -- then we must do it together. It will take the best thinking of business, labor, educators, and community groups across the country. That is what I hope this Summit will unleash -- and it is why I am so eager to hear from you...

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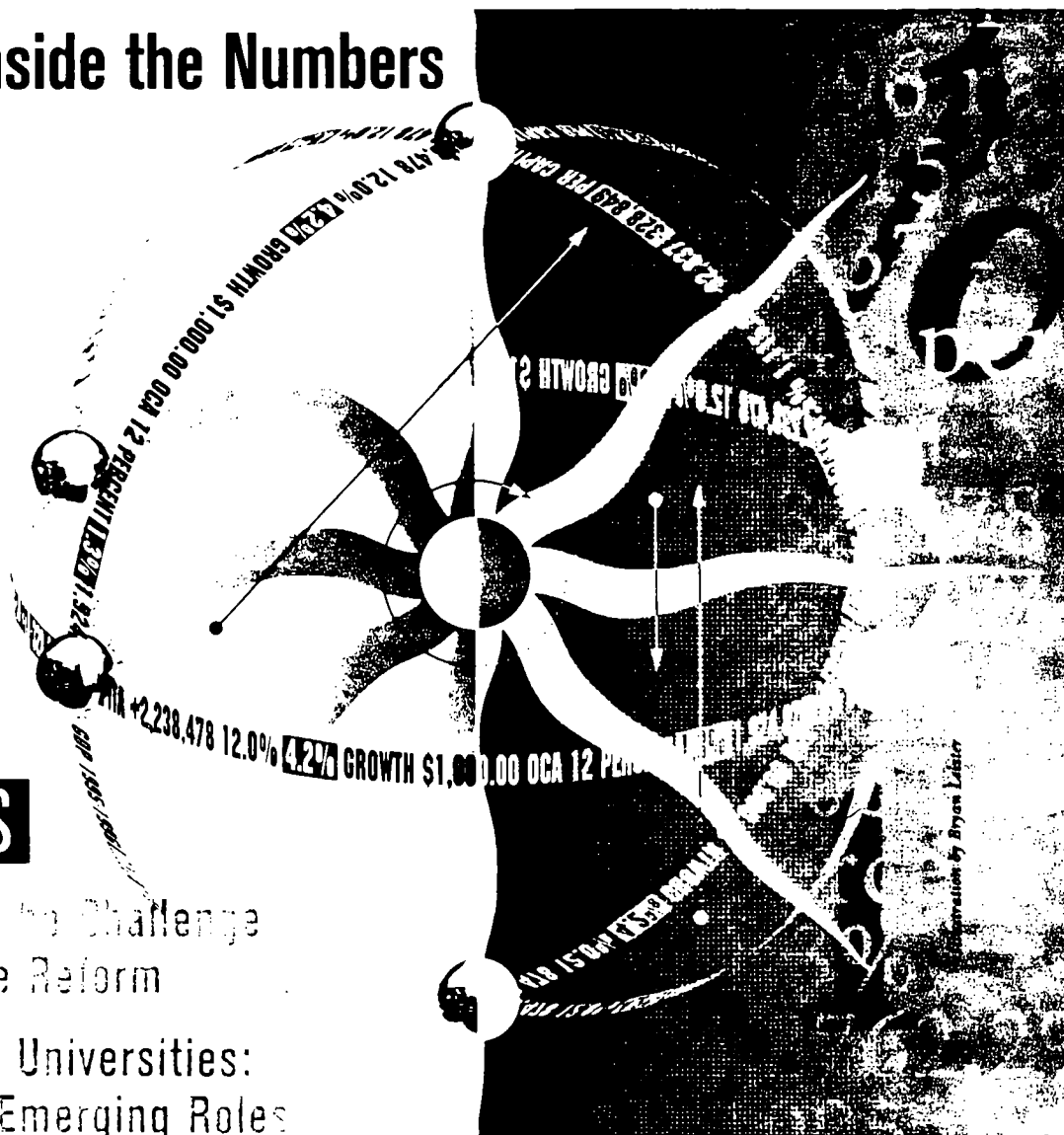
Economics

The U.S. Labor Market

Getting Inside the Numbers

Facing the Challenge of Welfare Reform

- **Corporate Universities:**
New and Emerging Roles



From the Editor

With unemployment rates and welfare rolls at their lowest levels in 30 years, the expanding economy has generated new opportunities and challenges for firms, industries, workers and regions.

However, important changes occurring within the labor market are hidden in the aggregate statistics. In the cover article, we show that job growth is concentrated in industries paying above-average wages, in occupations requiring new skills and a more educated workforce, and in industries that disproportionately employ "knowledge workers." The data on these broad indicators parallel each other, suggesting that the changes along one dimension are part of a larger change that is reshaping the labor market.

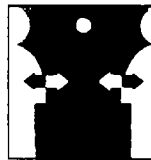
In "Unconventional Wisdom," we review pertinent data about the success of welfare reform. Certainly, the number of people on welfare has declined dramatically, but the reasons for the decline are unclear. Several studies suggest that a strong economy and fundamental changes implemented in welfare-to-work legislation two years ago provide important incentives for welfare recipients to move toward economic self-sufficiency. Businesses are stepping up to the plate and hiring welfare recipients.

Still, ensuring that people who are new to the workforce retain their jobs and that they move up the economic ladder are important challenges.

We welcome your suggestions on future issues and any comments you may have on this one. You can also visit the Alliance home page at www.nab.com. My e-mail address is Kenneth_P_Voytek@NAB.COM.



Kenneth P. Voytek
Director of Economic Research



Corporate Universities: New and Emerging Roles

Do corporate universities represent an opportunity or a threat to higher education institutions? A recent book by Jeanne C. Meister, president of Corporate University Xchange, Inc., takes on the issue by providing an overview of the growth in corporate universities and a look at how they are changing the market for education and learning services.

The book, *Corporate Universities: Lessons in Building a World-Class Workforce*, also highlights some of the best practices among corporate universities. It profiles companies that are forging new partnerships with suppliers, customers, and education and training providers to ensure that workforce training meets company needs. The book ends with a series of lessons that companies (and even other providers) have learned about structuring and designing a corporate university.

For more information or to order a copy of this book, contact McGraw-Hill at www.books.mcgraw-hill.com or call 800/262-4729.

The Role of Business in Welfare to Work

The Manpower Demonstration Research Corporation (MDRC) has developed a guide, *Business Partnerships: How to Involve Employers in Welfare Reform*, that provides practical advice on engaging the business community in welfare reform efforts. The advice is important given the critical role business must play for welfare to work to succeed. The guide:

- describes a range of programs and initiatives from across the United States,
- provides guidance on how to engage the business community in such efforts,
- outlines approaches that companies are using to integrate former welfare recipients into workplaces, and
- discusses how to bridge the gaps between former welfare recipients and jobs.

For more information on this report or to order a copy, contact MDRC at www.mdrc.org or call 212-532-3200.



The U.S. Labor Market

Getting Inside the Numbers

As we approach the final year of the century, it is worth reflecting on where the labor market has been and where it is headed. Numerous articles have been written about the stellar performance of the U.S. economy, especially in terms of job growth. Some people suggest that we are entering a new economic era in which many of the old rules and conventional wisdom about the economy are outdated.

A Strong Economy

The U.S. economy has performed solidly over the last several years. Low inflation, strong growth in labor demand, low unemployment, high levels of private investment, growing weekly earnings and strong productivity growth characterize the most recent economic expansion. However, economic growth (as measured by changes in gross domestic product, or GDP) is somewhat lower now than during the economic expansion of the late 1980s, as are increases in per capita disposable income. While employment growth is slower today, it is also important to consider that labor supply is growing more slowly as well (see June 1998 *Workforce Economics*).

The performance of these indicators has not fallen off in the first six months of 1998. Real GDP grew by 1.7 percent in the first six months of the year. Productivity and employment both grew by 1.6 percent. Productivity continues to grow faster than its average of about 1.1 percent between 1973 and 1990, suggesting that the economy and living standards should increase at faster rates as well.

Changes in the Labor Market — The Broad Indicators

Over the last several years, the U.S. labor market has experienced robust job growth. Since the end of the



recession in 1992 through the first six months of 1998, more than 17 million net new jobs have been added to the U.S. economy, which represents nearly a 16 percent increase in employment. In comparison, labor supply over the same period grew by just over 9.1 million persons, a 7 percent increase.

The divergence in these numbers has meant tighter labor markets and the lowest unemployment rates in nearly 30 years. For the first six months of 1998, the unemployment rate averaged 4.5 percent, compared with 4.9 percent for all of 1997. The last time the U.S. economy experienced similarly low rates of unemployment was in the late 1960s.

Changes in Economic Performance

	Annual Rate of Change	
	1987-89	1995-97
Gross domestic product	2.4%	2.2%
Real private investment	1.3%	5.3%
Industrial production	2.1%	2.8%
Per capita real disposable income	1.3%	1.1%
Employment growth	1.9%	1.4%
Productivity growth	0.5%	1.3%
Average weekly earnings	2.3%	2.5%
Employment cost index	3.2%	2.2%
Total compensation	2.3%	2.4%
Consumer price index	2.7%	1.2%

Source: 1998 Economic Report of the President and the Joint Economic Committee

A Strong Labor Market Benefits Different Segments

A strong labor market benefits different segments of the population. Unemployment rates for persons at different education levels highlight the importance of a strong economy in creating economic opportunity for all persons. Unemployment rates for those with less than a high school diploma fell by the largest amount between 1992 and 1997. The message is clear: The best jobs program is a strong economy.

A Churning Labor Market

While the data below highlight job growth as measured by changes between two points in time, it is interesting to consider how these changes played out in terms of gross job gains and losses. To capture this dynamic, we examined employment

data for nearly 300 detailed occupations and focused on how employment within each occupation changed over time. Then we aggregated the results for the years 1983 through 1995.

These data indicate a high degree of churning in the labor market. In periods of either economic expansion or recession, large numbers of jobs are simultaneously being created and eliminated in a given year. For instance, between 1990 and 1991, nearly 2.4 million jobs were created and more than 3.3 million were lost.

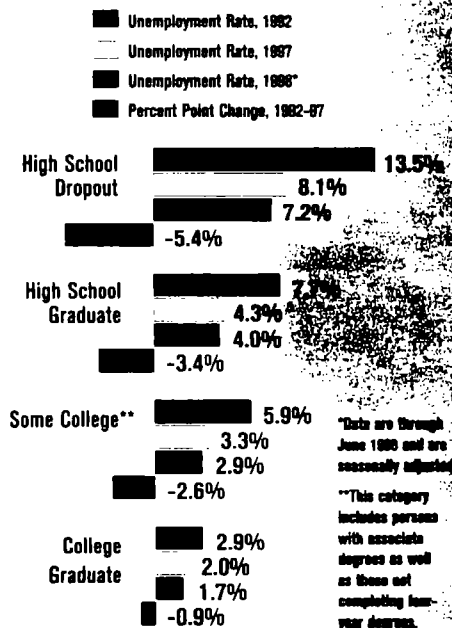
Unemployment Duration Remains High

Despite the low rates of unemployment and tight labor markets, unemployment duration remains stubbornly high. In June 1998, the median duration of unemployment

was 6.6 weeks; in 1989, it was 4.8 weeks. Moreover, the percent of those persons unemployed for more than 26 weeks remains high compared with earlier time periods. Less than 10 percent of those persons unemployed in 1989 remained out of work for more than 26 weeks, compared with just over 14 percent for the first six months of 1998. At the same time, as the share of unemployment that reflects permanent job loss has increased, so has the duration of unemployment (see July/August 1995 *Workforce Economics*).

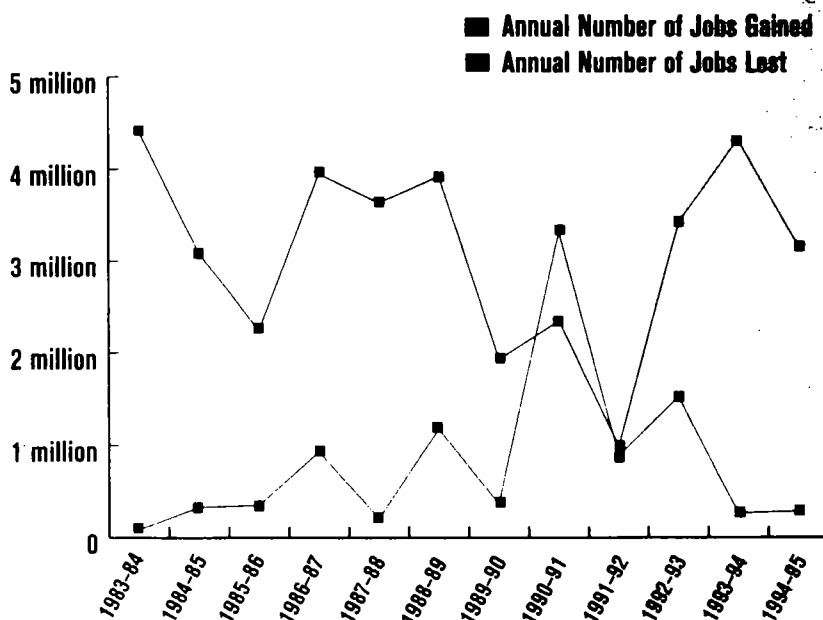
While we see a long-term upward trend in unemployment duration over the last 30 years, the median duration of unemployment did drop significantly in the first half of 1998, from 7.4 weeks in January to 6.6 weeks in June. Some suggest that more unemployed individuals have become discouraged

Unemployment Rate by Education Level



Source: Unpublished data from the U.S. Bureau of Labor Statistics and Employment and Earnings

A Choppy Labor Market



Source: Unpublished data from the U.S. Bureau of Labor Statistics, Occupational Employment Statistics

over job prospects and dropped out of the labor force altogether, but the data do not support this hypothesis. In fact, the number of persons not in the labor force for this reason fell by about 12 percent between June 1997 and June 1998.

Others suggest that changes in unemployment duration reflect a growing mismatch between the skills needed in the workplace and the skills of the unemployed. There appears to be empirical support for the argument that the long-term upward trend in unemployment duration is related to the accelerating pace of technological change.

William Baumol and Edward Wolff, in a study published by the Jerome Levy Economics Institute, correlated the following five technology indicators with unemployment duration:

- Total Factor Productivity;
- the ratio of research and development expenditures to GDP;
- the number of full-time equivalent scientists and engineers per 1,000 employees;
- investment in new plant and equipment per full-time equivalent employee; and
- investment in office, computing and accounting equipment per full-time equivalent employee.

The authors found that a 1 percent increase in the annual rate of Total Factor Productivity is associated with a 12 percent increase in the average duration of unemployment. They also found that a \$1,000 investment in office, computing and accounting (OCA) equipment was associated with a 53 percent increase in the average duration of unemployment. Interestingly,

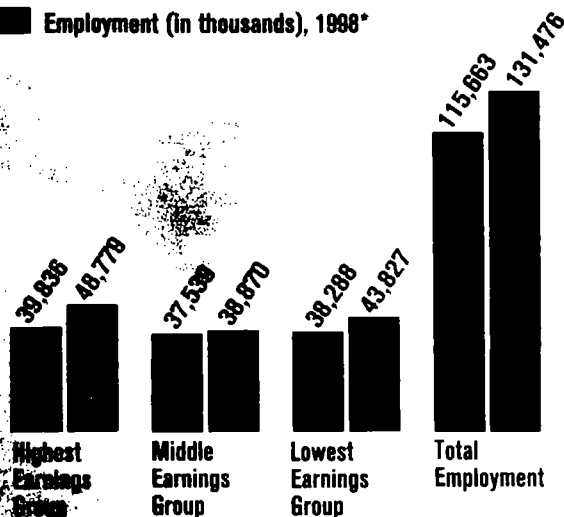
Baumol and Wolff found that increases in OCA investment increased the duration of unemployment for older workers but lowered the duration of unemployment for younger workers (see December 1996 *Workforce Economics*).

Job Quality: Good Jobs or Bad Jobs

While labor demand is strong, many suggest that the quality of jobs being created is poor. For example, most job growth has occurred in the service and retail industries (which are lower-paying industries). On the other hand, if we look at job growth from an occupational perspective, we find job growth is concentrated in managerial and professional specialty jobs (higher-paying occupations). Crossing industry and occupational data provides a truer picture of job quality.

Employment Change by Earnings Level

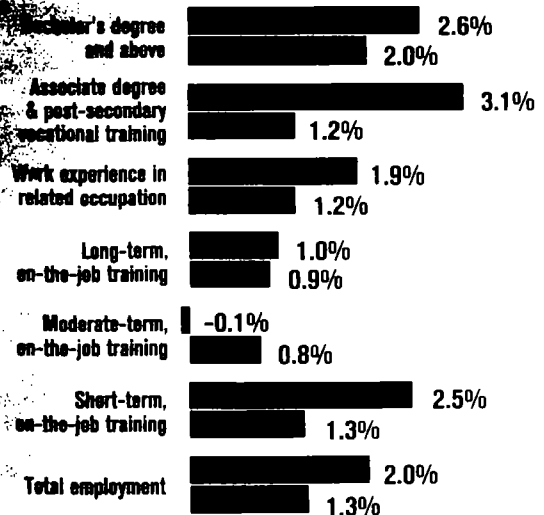
■ Employment (in thousands), 1989*
■ Employment (in thousands), 1998*



*Data are for January 1990 and June 1998
Source: Employment and Earnings

Job Growth by Training Required

■ Annual Rate of Job Growth by Training Required, 1983-88
■ Annual Rate of Job Growth by Training Required, 1988-2006 (projected)



Source: U.S. Bureau of Labor Statistics

Randy Ilg of the U.S. Bureau of Labor Statistics (BLS) ranked 90 major industries and occupations according to median weekly earnings in 1993. He then grouped the industry-occupation cells into three categories that each represented approximately one-third of total employment at the beginning of the time period. The range of median weekly earnings for each category is as follows: Highest (\$1,083 to \$502), Middle (\$502 to \$342) and Lowest (\$341 to \$167). The National Alliance of Business has updated the data from the original time series developed by BLS to include data through June 1998.

Job growth has been concentrated in those industry-occupation cells paying above-average wages. Job growth in the middle is well

below average. Roughly two-thirds of the job growth occurring between 1989 and June 1998 was concentrated in jobs paying above the median weekly earnings. Indeed, 56 percent of the job growth over this period is accounted for by jobs in the highest earnings group. Employment in the highest earnings group, composed of primarily managerial and professional specialty occupations, increased by nearly 22.5 percent, or 9 million jobs, between 1989 and June 1998. Jobs in the middle earnings group, composed of primarily manufacturing occupations, rose by only 3.5 percent, or 1.3 million jobs. Jobs in the lowest earnings category, composed of service and low-skill jobs, increased by 14.5 percent, or just over 5.5 million jobs, during the same period.

3.1 percent annual rate compared to a 2 percent annual growth rate for all employment. Jobs requiring a BA or above increased at a 2.6 percent annual rate. Jobs requiring short-term, on-the-job training grew at a 2.5 percent annual rate over the same period. BLS projections for the 1996-2006 period are similar to the patterns seen from 1983-96.

The Alliance aggregated these categories into high, medium and low training needs and examined the net changes projected to occur in these categories by 2006. There will be a significant increase in the number of jobs requiring higher skills during the period 1996-2006. While jobs in the high training category represented approximately three in 10 jobs in 1996, they will account for just over four in 10 net new jobs created through 2006. In contrast, jobs in the low category accounted for approximately 52 percent of all jobs in 1996 but will account for 45 percent of all net new jobs created through 2006.

Knowledge Industries

Significant attention has focused on identifying whether job growth is and will be concentrated in those industries making more intensive use of knowledge workers. The Alliance classified industries into three categories on the basis of the percentage of industry employment represented by managerial, administrative, management support and professional specialty occupations. We divided industries into three categories: those with over 23 percent of employment in the occupations noted above, those employing between 10 percent but less than 23 percent in these occupations, and those with less than 10 percent of employees in those occupational groups. Across all industries, the percent of jobs in

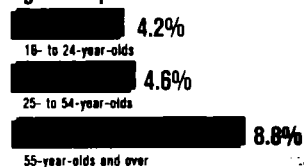
Strong Labor Demand Benefits Different Segments of the Labor Market

Percentage Change in Employment, 1989-1998

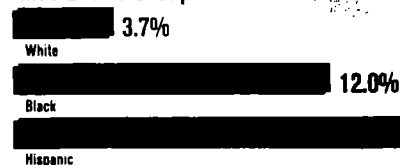
Marital Status



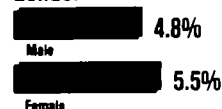
Age Group



Race/Ethnic Group



Gender



Source: Employment and Earnings, U.S. Bureau of Labor Statistics

Education and Training

The types of jobs that will grow the fastest in the future will be those requiring more and more education and training. Using data from BLS, the Alliance examined how the educational requirements of jobs have changed over the last 15 years and what BLS projections say about the future. These data parallel the findings above — jobs at the high end are growing the fastest and those in the middle are getting squeezed.

From 1983 to 1996, employment in occupations requiring an associate's degree or post-secondary vocational training grew at a

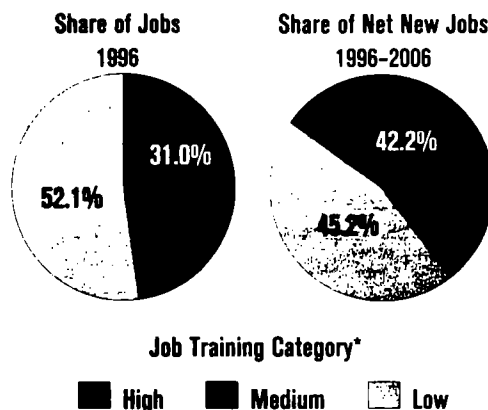
administrative, managerial, professional support and professional specialty occupations is just over 23 percent.

Industries in the first category include petroleum and instruments manufacturing, telecommunications, financial services, health care, education and business services. Industries in the second category include several manufacturing industries (electronics, chemicals, machinery), transportation, and a variety of service industries including real estate, advertising, personnel and supply. The third category includes industries such as primary metals, food processing, apparel and textile, retail trade, and many personal services industries.

The results of this categorization are compelling. Industries that employ a higher percentage of high-knowledge workers have grown much faster than those that employ medium- or low-knowledge employees. They will continue to grow in the future. Between 1983 and 1996, employment levels in industries employing high-knowledge workers increased by 41.7 percent, more than double the increase of employment in industries with medium-knowledge workers, and more than 15 percentage points higher than those employing low-knowledge workers. Using BLS's projections, employment in high-knowledge worker content industries will grow twice as fast as employment in low-knowledge worker content industries.

These changes also translate into important changes in the distribution of jobs. In 1983, about 44

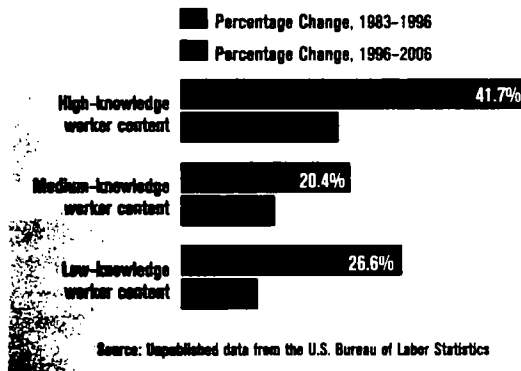
Most Job Growth in High Training Categories



*High includes all jobs requiring an associate's degree or post-secondary education and above. Medium includes jobs requiring work experience in a related occupation and long-term on-the-job training. Low includes jobs requiring moderate- or short-term on-the-job training.

Source: U.S. Bureau of Labor Statistics

Employment Growth Fastest in Industries with High-Knowledge Worker Content



Source: Unpublished data from the U.S. Bureau of Labor Statistics

percent of the jobs in the labor market were in high-knowledge worker content industries; by 2006, the percent of all jobs accounted for by these industries will increase to approximately 49 percent. At the same time, the percent of jobs in low-knowledge worker content industries is projected to fall from 27 percent in 1983 to 25 percent in 2006.

The data on job growth by earnings, by education/training and by knowledge worker use do parallel

one another. Many conclude that, while entry-level jobs will continue to exist, the challenge will be to move people up the ladder into jobs with better pay that require higher and higher skill levels.

Conclusion

While it may be too bold to say that all these trends point to a new economic era, there is no doubt that important changes are taking place. As Richard K. Lester noted in *The Productive Edge*, "The evidence ... points toward the need for a new national agenda for economic growth, tailored to the volatile, unpredictable conditions that seem certain to persist for the foreseeable future, and focused on the problem of investing in knowledge and skills."

There is growing consensus that in the new knowledge-based economy, organizations will gain the competitive edge by being able to learn faster than their competitors. What will count is an organization's ability to attract, retain and continuously

grow the capabilities of knowledge workers and provide the environment for rapid and continuous learning and innovation.

Productivity growth, which is the key to increasing living standards, depends more and more on our continued investment in education and training. An educated workforce is not simply a luxury or pipe dream; it is a necessity in this new, high-tech global market system.

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Remarks by Chairman Alan Greenspan

The interaction of education and economic change

At the 81st Annual Meeting of the American Council on Education, Washington, D.C.

February 16, 1999

When Neil Rudenstine first invited me to join you today, he suggested that it might be valuable to discuss the roots of the changes that our economy has been experiencing in recent years. As leaders in higher education, you have all been dealing with the practical effects of these shifts.

But, in more theoretical terms, what do these historic changes teach us about the way we learn and innovate? What is their impact on the workforce and on your graduates? How has technology transformed our ability to understand the natural and social world?

Our faculty for rational thought has carried the human race one arduous step at a time into a deeper understanding of how the world works. Decade by decade, scholars have recorded their insights, building knowledge from one generation to the next. We have learned to use that knowledge to alter our physical environment for the betterment of mankind.

That process has become increasingly conceptual in nature and ever less reliant on physical materials. Indeed, the endeavor to economize on physical resources has led to widespread downsizing of the elements of the nation's output. We have dramatically reduced the size of our radios, for example, by substituting transistors for vacuum tubes. Thin fiber-optic cable has replaced huge tonnages of copper wire. New architectural, engineering, and materials technologies have enabled the construction of buildings enclosing the same space, but with far less physical material than was required, say, 50 or 100 years ago. Most recently, mobile phones have been markedly downsized as they have been improved.

Over the last century, for example, the rate of increase of the gross domestic product in the United States, adjusted for price change--our measure of gains in the real value of output--has averaged around three percent per year. Only a small fraction of that represents growth in the tonnage of physical materials--oil, coal, ores, wood, raw chemicals, for example. The remainder represents new insights into how to rearrange those physical materials to better serve human needs.

This process has enabled valued goods to be transported more easily and to be produced with ever fewer workers, allowing the more efficient division of labor to propel overall output and standards of living progressively higher.

The share of the nation's output that is conceptual appears to have accelerated following World War II with the insights that led to the development of the transistor and microprocessor. They have spawned remarkable alterations in how we, and other developed societies, live.

Computers, telecommunications, and satellite technologies have enabled data and ideas, the ever more important elements of output, to be speedily transferred geographically to where they can be put to best use. Thus, these advanced means of communication have added much the same type of value that the railroads added in transporting the more physical goods of an earlier century.

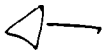
Here in the United States, we have developed an exceptionally sophisticated stock of capital

assets--plant and equipment--fostered most recently by what has to be the most conceptual and impalpable of all new major products--software.

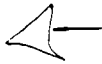
The breakthroughs in information technology have facilitated an elevated rate of "creative destruction," as noted Harvard economist Joseph Schumpeter put it earlier this century. Our capital stock is undergoing an increasing pace of renewal through investment of cash flow from older-technology capital facilities into new, more efficient vintages. Some Silicon Valley firms claim that they completely reconstitute themselves every year or two. This renewal process is driven by an increasing ability to more finely calibrate the value preferences of consumers. In turn, those preferences are converted, through market transactions, into prices of products and assets. They, in turn, signal entrepreneurs which capital facilities to build to meet those shifting consumer needs.

But as human intelligence appears without limit to engage our physical environment, human psychology remains, in some more primordial sense, invariant to time. The rapidity of change in our capital assets, the infrastructure with which all workers must interface day-by-day, has clearly raised the level of anxiety and insecurity in the workforce. As recently as 1981, in the depths of a recession, International Survey Research found twelve percent of workers fearful of losing their jobs. In today's tightest labor market in two generations, the same organization has recently found thirty-seven percent concerned about job loss.

The fear of job obsolescence when confronted with a rapidly changing work environment is arguably one reason for a massive increase in the demand for educational services--the rise in on-the-job training, the proliferation of community colleges enhancing work skills, so-called corporate universities that combine jobs-oriented curricula with some broader excursions into the liberal arts, and, of course, the traditional university curricula.

The heyday when a high school or college education would serve a graduate for a lifetime is gone. Today's recipients of diplomas expect to have many jobs and to use a wide range of skills over their working lives. Their parents and grandparents looked to a more stable future--even if in reality it often turned out otherwise. 

However one views the uncertainty that so many in our workforce are experiencing in their endeavor to advance, an economist can scarcely fail to notice a marketplace working efficiently to guide our educational system, defined in its widest sense, toward the broader needs of our economy.

But this is not new. The history of education in the United States traces a path heavily influenced by the need for a workforce with the skills required to interact productively with the evolving economic infrastructure. Historically, technological advance has brought with it improvements not only in the capital inputs used in production, but also new demands on workers who must interact with that increasingly more complex stock of capital. Early this century, these advances required workers with a higher level of cognitive skills, for instance the ability to read manuals, to interpret blueprints, or to understand formulae. 


Our educational system responded: In the 1920s and 1930s, high school enrollment in this country expanded rapidly, pulling youth from rural areas, where opportunities were limited, into more productive occupations in business and broadening the skills of students to meet the needs of an advancing manufacturing sector. It became the job of these institutions to prepare students for work life, not just for a transition to college. In the context of the demands of the economy at that

telecommunications. Our universities have shown the patience and the flexibility to accept that uncertainty, confident that the rigorous effort to explore ideas would eventually lead to discovery.

If we are to remain preeminent in transforming knowledge into economic value, America's system of higher education must remain the world's leader in generating scientific and technological breakthroughs and in meeting the challenge to educate workers. With two-thirds of our high school graduates now enrolling in college and a growing proportion of adult workers seeking opportunities for retooling, our institutions of higher learning now bear the overwhelming responsibility for ensuring that our society is prepared for the demands of rapid economic change.

What our colleges and universities produce is highly valued in today's economy. The rise in that value over the past several decades has been reflected in a widening spread between compensation paid to college-educated workers relative to those with less schooling. Accordingly, college enrollment rates among new U.S. high school graduates have been rising. And despite competitive pressures to improve university education abroad, almost one-third of all students who leave their home countries to study elsewhere choose to study in the United States. In recent years, the most popular fields of study for both groups have been business and management, but, as you are all aware, interest in life sciences, math, and computer sciences has been growing rapidly.

Another measure of the value placed on university education is the rising propensity of older workers to return to school. Today, more than one-fourth of all undergraduates are over thirty years old; one-fifth of these older students are enrolled in full-time programs. These individuals are already responding to the need to seek retooling during their careers. As a result, education is increasingly becoming a lifelong activity. Businesses are now looking for employees who are prepared to continue learning and who recognize that maintaining their human capital will require persistent hard work and flexibility.

The press for lifelong learning and the availability of technology have spawned a variety of education initiatives outside the traditional classroom. Courses now can be taken "at a distance" over the Internet. These are just the newest in a series of attempts to move learning closer to workers on the job and to make it more relevant to changing business needs. Although many of these new programs focus on specific, applied skill training, some degree-granting programs already exist, and companies that have successfully developed interactive educational software for the classroom are looking to move it online. Competition is the necessary driving force toward delivering a superior product or service. We should not shy away from it. Colleges and universities are being challenged to evaluate how new information technologies can best be employed in their curricula and their delivery systems.

Beyond these more practical issues, the most significant challenge facing our universities is to ensure that teaching and research continue to unleash the creative intellectual energy that drives our system forward. As the conceptual share of the value added in our economic processes continues to grow, the ability to think abstractly will be increasingly important across a broad range of professions. Critical awareness and the abilities to hypothesize, to interpret, and to communicate are essential elements of successful innovation in a conceptual-based economy.

The roots and nature of how the human mind innovates have always been subject to controversy. Yet, even without hard indisputable evidence, there is a remarkable and broad presumption that the ability to think abstractly is fostered through exposure to philosophy, literature, music, art, and

time, a high school diploma represented the training needed to be successful in most aspects of American enterprise. The economic returns for having a high school diploma rose and, as a result, high school enrollment rates climbed.

At the same time, our system of higher education was also responding to the advances in economic processes. Although many states had established land grant schools earlier, their support accelerated in the late nineteenth century as those whose economies specialized in agriculture and mining sought to take advantage of new scientific methods of production. Early in the twentieth century, the content of education at an American college--as you all are aware--had evolved from a classically based curriculum to one combining the sciences, empirical studies, and modern liberal arts. Universities responded to the need for the application of science--particularly chemistry and physics--to the manufacture of steel, rubber, chemicals, petroleum, and other goods requiring the newer production technologies. Communities looked to their institutions of higher learning for leadership in scientific knowledge and for training of professionals such as teachers and engineers. The scale and scope of higher education in America was being shaped by the recognition that research--the creation of knowledge--complemented teaching and training--the diffusion of knowledge. In broad terms, the basic structure of higher education remains much the same today. That structure has proven sufficiently flexible to respond to the needs of a changing economy.

Market economies have succeeded over the centuries by granting rewards to those who could anticipate changes in the value preferences of society. America's system of higher education has evolved into a highly diverse and complex range of institutions--large research universities that combine undergraduate and graduate offerings, small liberal arts colleges, and vocation-oriented community colleges--all seeking their competitive advantage. What makes that system work effectively is that it has been influenced importantly by the values of a strong market economy--competition, risk-taking, and innovation.

America's reputation as the world's leader in higher education is grounded in the ability of these versatile institutions, taken together, to serve the practical needs of the economy and, more significantly, to unleash the creative thinking that moves our society forward.

In a global environment in which prospects for economic growth now depend importantly on a country's capacity to develop and apply new technologies, the research facilities of our universities are envied throughout the world. The payoffs--in terms of the flow of expertise, new products, and startup companies, for example--have been impressive. Here, perhaps the most frequently cited measures of our success have been the emergence of significant centers of commercial innovation and entrepreneurship--Silicon Valley, the Research Triangle, and the clustering of biotech enterprises in the Northeast corridor--where creative ideas flow freely between local academic scholars and those in industry.

Beyond these highly visible achievements, what has made our research universities so extraordinarily productive is their promotion of peer-reviewed scholarship and the value they place on creativity and risk-taking. Although some innovations move quickly from the development stage to applications, more often, we cannot accurately predict which particular scientific advance, or synergy of advances, will ultimately prove valuable. One has only to recall our experience with the laser, which had to wait for improvements in fiber optics to yield important applications. Indeed, according to Nobel Laureate Charles Townes, in the late 1960s the attorneys for Bell Labs initially refused to patent the laser because they believed it had no applications in the field of

languages. Liberal education is presumed to spawn a greater understanding of all aspects of living--an essential ingredient to broaden one's world view by "vaulting over disciplinary walls," as my good friend Judith Rodin put it, and exploring other fields of study. Most great conceptual advances are interdisciplinary and involve synergies of different specialities.

Yet there is more to the liberal arts than increasing technical intellectual efficiency. They encourage the appreciation of life experiences that reach beyond material well-being and, indeed, are comparable and mutually reinforcing. The intense pleasure many experience from listening to Mozart's great D Minor Piano Concerto has much in common with the deep satisfaction of solving a complex mathematical problem. The challenge for our institutions of higher education is to successfully blend the exposure to all aspects of human intellectual activity, especially our artistic propensities and our technical skills. What makes the challenge particularly daunting is that scientific knowledge expands and broadens the measurable rewards of its curriculum at a pace that liberal arts, by their nature, arguably have difficulty matching. The depth of knowledge in nuclear physics is today far greater than it was a century ago, creating an enormous expansion in economically useful teaching hours. But do the same economic opportunities exist for courses in English literature?

A related difference between science and the arts arises in the non-academic world: Engineering and metallurgical advances have reduced the number of hours required to produce a ton of steel, but the same number of musicians will be needed to perform a Beethoven quartet this evening as were needed a century ago. Many of you will recognize this application of Baumol's Law. To make the point even more graphically, Senator Daniel Patrick Moynihan has noted that the Minute Waltz could be played in 50 seconds, but he wondered if it would sound as good.

Overwhelmed with the increasing scientific knowledge base, our universities are going to have to struggle to prevent the liberal arts curricula from being swamped by technology and science. It is crucial that that not happen.

The advent of the twenty-first century will certainly bring new challenges for our society and for our education system. We cannot know the precise directions in which advances in technology and the transmission of knowledge will take us. However, we can be certain that our institutions of higher education will remain at the center of the endeavor to comprehend those profound changes and to seize the opportunities to direct them toward ever-rising standards of living and quality of life.

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Divider Title: _____

Remarks by Chairman Alan Greenspan

The interaction of education and economic change

At the 81st Annual Meeting of the American Council on Education, Washington, D.C.

February 16, 1999

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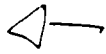
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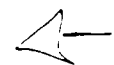
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Applicants Not Making Grade

Skills Shortage Plagues Firms Digging Deeper Into the Labor Pool

By KIRSTIN DOWNEY GRIMSLEY
Washington Post Staff Writer

More than a third of job applicants nationwide lack the basic math and reading skills to do the jobs they are seeking, up from 19 percent in 1996, according to a new survey of more than 1,000 personnel executives conducted by the American Management Association.

The numbers primarily reflect the tightening of the labor market rather than an abrupt deterioration in the educational system or general academic ability, association officials said. It's a question of rooting around for the few qualified workers who are unemployed, at a time when companies want workers to perform jobs that require ever-increasing skill levels.

"The sharp increase in the deficiency rate is not evidence of a 'dumbing down' of the incoming work force," said Eric Rolfe Greenberg, the management association's director of management studies. "Instead, it testifies to the higher skill levels required in today's workplace, where new technologies have raised the bar for job applicants in terms of literacy and math."

For example, a warehouse supervisor once would have needed to know how to transport bulky items by hand or by forklift, while the accounting or

Here is an example, from a Wonderlic Personnel Test, of a test that job applicants might be asked to take.

WPT Sample Question

1. Look at the row of numbers below. What number should come next?
8 4 2 1 1/2 1/4 ?

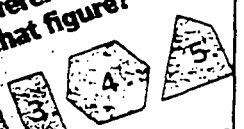
2. Assume the first 2 statements are true. Is the final one true or false?
1. true 2. false 3. not certain?
The boy plays baseball. All baseball players wear hats. The boy wears a hat.

3. Paper sells for 21 cents per pad. What will 4 pads cost?

4. How many of the five pairs of items listed below are exact duplicates?
Neiman, K.M. Nieman, K.M.
Thomas, G.K. Thomas, C.K.
Hoff, J.P. Hoff, J.P.
Pina, L.R. Pina, L.R.
Wanner, T.S. Wanner, T.S.

5. RESERVE—Do these words have similar meanings or contradictory meanings?
1. have similar meanings 2. have contradictory meanings 3. mean neither the same nor the opposite?

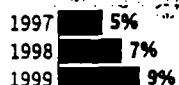
6. One of the numbered figures in the following drawing is most different from the other four. Which number is that figure?



Percentage of job applicants tested by major U.S. firms who lacked sufficient reading and math skills to do the job they sought, according to a survey by the American Management Association:



Percentage of surveyed firms that say they hire applicants whose tests show deficiencies and enter them in remedial training programs:



SOURCES: Wonderlic Personnel Test, American Management Association

NATO Access

Here are the 12 companies that have paid \$250,000 to have an executive (in parentheses) serve as one of the directors on the NATO summit's host committee:

- Ameritech (Richard Notebaert)
- DaimlerChrysler (Robert Liberatore)
- Boeing (Christopher W. Hansen)
- Ford Motor (Jacques A. Nasser)
- General Motors (George A. Peapples)
- Honeywell (Michael R. Bonsignore)
- Lucent Technologies (Richard A. McGinn)
- Motorola (Arnold Brenner)
- Nextel Communications (Daniel F. Akerson)
- SBC Communications (Edward E. Whitacre Jr.)
- TRW (Joseph Gorman)
- United Technologies (George David)

SOURCE: NATO Anniversary Summit Host Committee

THE WASHINGTON POST

a variety of technology firms, including Ameritech Corp., Lucent Technologies Inc. and Nextel.

"Most of the companies are not companies you would have expected in the old day, companies selling bombs and missiles, what have you," Blinken said. "You've got communications companies."

Yet a good number of the firms on the host committee sell weaponry. Although the economic crisis that spread throughout Asia and other parts of the world last summer has somewhat cooled their enthusiasm, new NATO members such as Poland and other countries such as Turkey are viewed as prime candidates for U.S. weapons. Poland has been considering new fighter jets from either Lockheed or Boeing Co.

TRW's Christy said the summit was low on the radar of most companies just a couple of months ago, when the events committee made its first solicitations. But the fighting in Yugoslavia has focused attention on the gathering.

"All of a sudden," he said, "now this is beginning to burnish a little into the consciousness."

Job Applicants Come Up Short

SKILLS. From E1

purchasing departments handled much of the paperwork. Now, however, the same employee might be required to track inventories by computer and research and order products online from numerous vendors.

Auto mechanics are now high-tech workers required to understand the computer diagnostics and other electronic systems in today's cars and trucks.

Such requirements make it harder for companies to recruit good employees. "Companies are saying, 'Help, help!'" said Charlie Wonderlic, president of Wonderlic Inc., an employee-testing firm based in Libertyville, Ill.

Many companies are rejecting candidates who fail to make the grade, even if positions go unfilled for a time. BellSouth hired about 13,000 workers last year but turned away even more because they did not meet hiring criteria, including math and reading skills and a functional knowledge of electronics and electricity.

"We're seeing some drop-off in skills, but the spectrum is being stretched—we're seeing very high as well as very low," said Val Markos, executive director of human resource planning and development for BellSouth.

Meanwhile, the nation's unemployment rate fell to 4.2 percent last month, the lowest level in more than 29 years.

"A large part of what we are seeing is a tight labor market," Markos said. "In a tight labor market, you need to recruit where you can and how you can ... but you have to deal in the digital world, where people need more computer skills and data and

information skills."

Other employers said that although they have been able to find good candidates, there is pressure to hire almost anyone to keep operations fully staffed.

"Go up and down Rockville Pike," said Barry Sher, a spokesman for Giant Foods Inc. in Landover. "There are help-wanted signs in every window. Everybody needs people. ... It's been difficult. It's a matter of finding bodies."

The problems are evident among companies' existing work forces. At Owens-Corning, the Toledo, Ohio-based manufacturer of building materials, the educational shortfalls came to light when the company sought to implement a single, company-wide computer system that would allow it to better track all its operations, rather than the 150 independent systems it had.

To prepare for the change, the company asked its employees, about two-thirds of whom are between the ages of 30 and 50, to take a test that would measure their basic math and reading skills. Even though many of the workers had performed adequately over the years, about 20 percent to 30 percent of the firm's 20,000 employees were found to perform at the third- or fourth-grade level, while they needed at least eighth-grade-level skills to use the new computer system.

"It's certainly an issue, especially as the labor force gets tighter," said John Mallin, leader of corporate development and learning at Owens-Corning. "The skills bar raises higher and higher every year, sometimes even rising in a single year."

The biggest literacy gap was reported by executives in wholesale

and retail industries, who said 56 percent of the employees they tested failed to meet basic math and reading standards, while at manufacturers, about 43 percent reported such deficiencies.

The American Management Association found that about 41 percent of firms conduct some kind of employee testing to gauge workers' basic skills levels.

The association, whose 10,000 corporate members employ more than one-fourth of the U.S. work force, based its findings on a survey of 1,054 companies. The respondents had tested 165,684 job applicants in 1998 and found 58,867, or 35.5 percent, to be deficient in math and reading skills.

Despite the companies' hiring difficulties, the survey found that fewer firms are offering their workers remedial education programs than in the past. In 1998, 14.4 percent of the companies surveyed offered remedial programs, down from 24 percent in 1993. The association's Greenberg said many such programs fell victim to cost-cutting in the mid-1990s.

Some executives also believe weak educational systems are partly to blame for declines in academic performance. Markos, of BellSouth, said, however, that his company has noted signs of improvement. School systems that have instituted higher certification and educational standards for teachers and students have begun producing better students, he said.

"It's a very clear indication and measure," Markos said. "Where the curriculum was strengthened, the applicants are strengthened and they are more qualified for the jobs."

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THE WORK FORCE

Helping Students Graduate To Jobs

A private program is helping thousands of at-risk students become capable members of the labor force.

By James Worsham

For some of the students at Mount Pleasant High School in Wilmington, Del., one of the daily classes is far from ordinary.

It's not a course on a fringe subject or a session taught in an unorthodox manner. It's a class that's clearly relevant to each and every student—a session on preparing for, locating, landing, and holding a job.

The class for selected students at Mount Pleasant is part of Jobs for Delaware Graduates, a program that has been replicated in 26 other states and the Virgin Islands under the national auspices of Jobs for America's Graduates, Inc. (JAG).

"This was 'school-to-work' before the phrase was invented," says Montana Gov. Marc Racicot, the current chairman of JAG. This spring, the 20-year-old program—with nearly 50,000 students in 800 public high schools serving 1,106 communities nationwide—expects its graduate total to reach 250,000.

JAG's major beneficiaries are small companies. About 12,000 small firms have taken a major share of JAG graduates over the years, and 80 percent of the companies have gone back to hire additional graduates, according to JAG officials.

Delaware Gov. Thomas Carper, vice chairman of JAG, notes that "most of the kids work in small businesses while in the program," a reference to the requirement that students spend time at companies either working at or observing jobs. "A great many subsequently work in small businesses once they graduate."

The Students At The Center

The state chapters of JAG focus on at-risk high-school students. They are the students who, if they don't receive special attention and help, might not make it through high school and thus would be at a major disadvantage in the job market.

To be eligible for the program, a student must meet at least two of the following criteria for at-risk students: He or she

comes from a low-income home, has an absenteeism problem, has been on probation at least once in the past year, lives with one or neither natural parent, has a mother who is not a high-school graduate, has close friends with limited education and expectations or who are dropouts, or is at least a year behind in school.

Once in the program, students report to

students plot their regular high-school studies and conducts one class a day with them, where the focus is on the skills needed to get and hold a job and develop a career.

Business's Involvement

The specialist also oversees another requirement of JAG students: While in high school, each must spend time working or



Job specialist Randle Hohnes of the Delaware affiliate of Jobs for America's Graduates helps students at Mount Pleasant High School in Wilmington with everything from career choices to family problems.

a "job specialist," who may be an educator, a business person, or a social-services professional. Job specialists are responsible for getting students through the JAG program and must help them deal not only with academic requirements but also with personal problems that may threaten success in school.

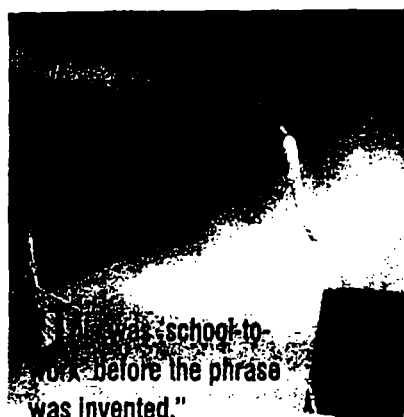
"They have to be whatever is missing in that kid's life," says Kenneth Smith, president and CEO of JAG, based in Alexandria, Va. He says that could mean helping a student get eyeglasses, find day care, or deal with a family problem.

The job specialist helps his or her stu-

in job-shadowing arrangements in local businesses. For a year after graduation, the job specialist follows students to help them get started in their new jobs.

About 12,000 small firms nationwide hire graduates. Nearly all students find employment in their home communities, and JAG affiliates make sure that graduates don't get stuck in dead-end jobs. "If our kids are in fast food, we make sure they are in a position to move up to assistant manager," says Smith.

Ideally, the program picks students in the eighth grade and starts them on a five-year program. But programs in several



It was school-to-work before the phrase was invented."

—Montana Gov. Marc Racicot, JAG Chairman

states are not fully developed, so students in those states are not selected until as late as the senior year in high school.

Examining The Results

In Delaware, there are programs in 23 of the state's 28 public high schools, and almost all the students are in the bottom half of their class academically.

Although the program is designed to help keep students in school and prepare them to find and hold jobs, it also aims to help them decide what kind of jobs they want through career counseling and job-shadow-

ing arrangements. "It's important to understand what they want to do and what they don't want to do," says Wayne Bastian, president and CEO of Jobs for Delaware Graduates, Inc., a nonprofit organization.

Last year, 77 percent of Delaware's graduates landed full-time jobs. The rest found part-time work, entered training courses, went to college, or were not working.

In Montana, only 16 of the state's 177 public high schools participate in the Jobs for Montana Graduates program, and some of the schools have fewer than 100 students. "To be in rural Montana is a disadvantage in itself, and we need to teach the kids about the opportunities in the rest of the world," says Lorelee Robinson, state coordinator for the program, which is run by Montana's Department of Labor and Industries.

A majority of last year's graduates in the Montana program entered the job market, but 20 percent went on to post-secondary education, 17 percent went into the military, and 5 percent took other training, according to Robinson.

Nationwide, Smith says, it costs JAG an average of about \$1,200 to put a student through the final year of high school and monitor his or her career for the following year. That's about half the cost of other job-training programs, and typically those programs don't offer 12 months of follow-up after graduation, he says. The cost is borne by the program, whose funding is supplied by various federal and state agencies and by private entities; the mix of sources varies from state to state.

Delaware's Gov. Carper likens JAG to professional baseball's farm system in bringing up qualified young people for jobs. Moreover, he says, "a lot of those high-school graduates have worked for small businesses."

Montana's Gov. Racicot says the program is open to needy students "at a most important moment in their lives" and that it provides a certain safety net for students seeking to do better, despite their personal and academic problems.

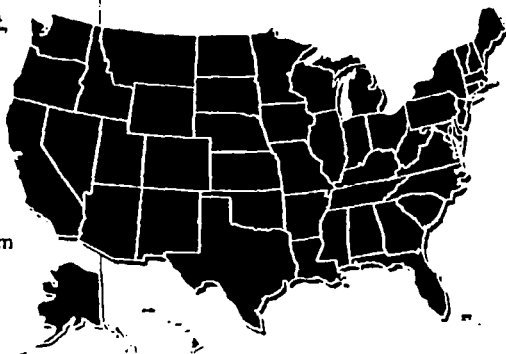
Racicot calls it "a net that makes it hard to escape success."

How To Sign On

To become a business partner of Jobs for America's Graduates, Inc., contact a participating high school or the JAG affiliate in your state.

To find out how to reach a state affiliate or to express interest in establishing a JAG program in your state or community, call Kimberly Barr at JAG headquarters in Alexandria, Va.; (703) 684-9479. Or go to JAG's World Wide Web site at www.jag.org and click on "State Affiliates" for contacts.

The following 27 states have JAG programs: Alabama, Arizona, Arkansas, California, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Kentucky, Louisiana, Maine, Massachusetts, Mississippi, Montana, New Hampshire, Ohio, Pennsylvania, Rhode Island, Tennessee, Texas, Virginia, Washington, West Virginia, Wisconsin, and Wyoming. There is a JAG program in the Virgin Islands as well.



Coming In June

Here are some key stories coming in next month's issue.

Cover Story

How small firms are using the increased speed of doing business to their advantage.

Insurance

Special Report: Trends in Property and Casualty Insurance

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Why family-owned businesses have unique competitive strengths.

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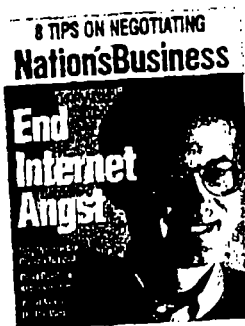
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**AS FOOD COMPANIES INCREASE THEIR OPERATIONAL SOPHISTICATION,
HOW CAN THEY HELP THEIR WORKERS KEEP UP?**

by Pan Demetrakakes, Senior Editor

Technologically as well as chronologically, the food industry is heading for the 21st century.

But is it leaving its workers behind?

As food plants gradually assimilate electronic controls and instruments, high-speed equipment, computerized maintenance and trending systems and other high-tech elements, some managers fear

that their workers may not be able to keep up. Low educational levels and difficulty with written English, which are endemic in some areas, can make it especially hard to find workers to handle the demands of more sophisticated systems.

What are some of the most common causes of worker problems with high-tech systems? And how can food companies help overcome them?

In a sense, the food industry's problems with worker readiness reflect those of American industry as a whole. According to the National Institute for Literacy, about 20 percent of American workers have low basic skills in reading, writing and computing, and more than 60 percent of front-line manu-

"THEY'LL GO BACK AND WORK IN THE FIELDS BEFORE THEY GO BACK TO SCHOOL."

-TOM MARTINEZ, NESTLE BRANDS

facturing workers have trouble making inferences from written information.

Demographic trends also are squeezing industry. The low post-baby-boom birthrate has slowed the rate of growth in the work force. It grew about 16 percent in the 11-year period from 1982 to 1993, but is projected to rise only 12 percent from 1994 to 2005. Of perhaps more immediate concern is the pressure brought on employers by the unemployment rate, which hit a 24-year low of 4.8 percent last May.

Low unemployment means that workers who can handle complex jobs have, in many cases, their choice of workplaces. This can be bad news for some food plants.

"Let's face it, a lot of [food] plants are hot or cold, messy, and wet," says one executive—who asked not to be identified and who has managed several food plants. "If someone has a choice between working with food and working with [silicon] chips in a clean room, you can bet he'll take the clean room."

DOWN ON THE FARM

Several other aspects of the food industry tend to attract less sophisticated employees. Food plants traditionally have been closely linked with agriculture, both geographically and in terms of products: they often draw employees from the ranks of agricultural laborers, who are likely to have less formal education. In many cases, the work is seasonal, which is less attractive for skilled employees who want steady work. Also, the food industry generally is behind most other manufacturing sectors in terms of sophisticated production techniques. This means many food plants are struggling through automation-related issues that a lot of other industries already have put behind them.

All this can spell trouble for some plants when they try to bring in more sophisticated operational or maintenance sys-

tems. Nestle Brands found that out when it started modernizing its three facilities headquartered in Moses Lake, Wash. The plants employ about 1,000 workers to make frozen french fries for McDonald's and other nationwide fast-food chains.

Nestle Brands began the modernization process by installing an automatic defect-removal system in the early 1980s. Improvements have progressed steadily since then, with high-speed equipment and centralized controls bringing the efficiency needed to compete in a commodity business like french fries.

But the more the plant progressed, the more it became apparent that the skills of the work force weren't keeping up, says Tom Martinez, director of administrative services. Many of the employees had been working there for 10 years or more, and had become accustomed to the non-demanding nature of the work. Training was on-the-job and was done haphazardly, Martinez says: "It was kind of, 'Here's the new person, train him,' and it wasn't consistent."



Southern Soya successfully integrated automation at its plant in Esroll, S.C. Extraction operator Clyde Harriott checks a processing parameter.

The problems went beyond training. "One thing we learned is that our workers were deficient in the basic skills they needed," Martinez says. These ranged from being able to read and comprehend troubleshooting messages from equipment controls, to calculating ratios and percentages in the quality-assurance lab.

Many of the problems arose because a large proportion of the workers did not speak English as their first language—or at all. In some cases, cultural as well as linguistic differences were an obstacle. Many workers had an agricultural background in which academics played little part. "They'll go back and work in the fields

before they'll go to school," Martinez says.

Nestle tried to alleviate the problem through its company-wide educational assistance program, which uses a variety of local resources such as community colleges, private tutors and literacy groups. But the results were mixed at best. "We

got a wide range of reactions, from people who were eager to learn...to people who were resistant, to people who just didn't want to," Martinez says.

The situation came to a head at the plant in Othello, Wash., where management determined that about 70 workers lacked even minimal language skills. They rejected repeated warnings, until the day came when management notified them that they would be fired. They then reluctantly started attending ESL classes, but many of them dropped out and left the company.

Martinez predicts the problems will smooth out over time. For one thing, automation has cut the overall number of jobs, allow-

ing the company to be more selective in hiring; Nestle Brands now does pre-employment screening in math and verbal skills. As for the current work force, "as we move forward with these things, employees see rapid change and they'll adjust."

THINK LIKE A COMPUTER

One of the biggest problems in automating is getting workers to think about their jobs in different terms. When their machines are controlled by computers, they have to be able to understand, on a conceptual level, how computers work.

"The individuals coming on [the plant floor] have to under-

stand controls of systems and electronics. You need more than an on-off switch today," says Gene Wisakowsky, former head of R&D for Campbell-Taggart. "From a line worker's perspective, it's becoming a more technical position. It's being able to understand data that the PLC is showing you and being able to understand logic to work efficiently."

The inability of workers to think in harmony with computers is causing frustration at a snack food company in Texas. The company is in the process of establishing computerized maintenance and statistical records, and many of the workers are having trouble adjusting.

"They're not unintelligent, it's just that they have no background," says the company's director of operations, who asked for anonymity.

Many of the workers lack math and language skills, but the problem goes beyond that: They're simply not used to being told what to do by a computer. "The mentality was, when it breaks, we'll fix it," the operations director says. Workers need to be familiarized with the idea of a computer administering a preventive maintenance schedule, he says. "It's an untraining process as well as a training process."

SOY FAR, SOY GOOD

On the other hand, it's not always necessary for a work force to have high academic skills to cope with computers. Southern Soya proved that when it automated its soybean plant in Easton, S.C. About 30 production workers (out of about 80 total) process soybeans into oil and meal.

Up until a few years ago, the machinery—mills, sifters, evaporators, etc.—was controlled with pneumatic

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being built in the Midwest will require line workers to have at least two years of technical school or equivalent experience.

"We want people who can operate and maintain equipment and communicate," says the plant manager, who asked not to be named. "The two-year degree assures us that they'll have those skills. From there we'll be able to train them in the specific skills they'll need to run our lines."

But introducing new technology to an existing work force is much trickier. In fact, determining the best way to do it requires clear thinking about core issues—what the company wants to accomplish with the technology and how it expects workers to relate.

"There are clearly two paths that companies can go down," says Ray Scannell, director of research for the Bakery, Confectionery and Tobacco Workers Union, based in Kensington, Md. "One path is to eliminate as much direct labor as possible. The other is to invest in technologies that extend worker skills."

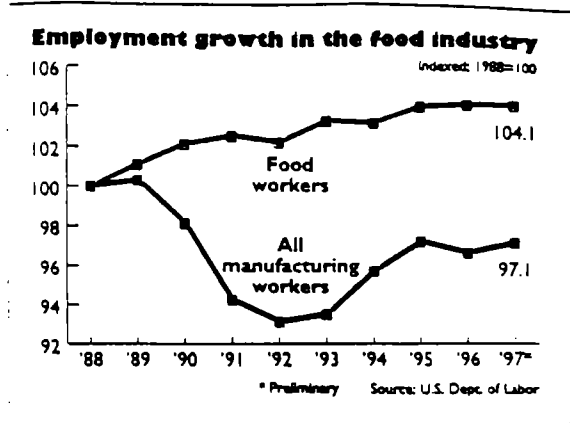
When companies make up their minds to use automation solely as a way to eliminate workers, they are almost compelled to shut workers out of the process. That cuts off the company from the workers' accumulated experience, some-

THE APPROACH TO TRY TO RAISE THE LEVEL OF EDUCATION OUT THERE IS AN IMPOSSIBLE ONE."

-NORM NELSON, IMPAC

times with disastrous results.

Scannell cites the example of Fornaca Bakeries Inc., the San Diego-based baker of Holsum and other brands of bread and rolls. Fornaca moved into a new \$10 million plant in 1991 with an automation system that was supposed to reduce the work force by one-third. But the system kept crashing—"robots were throwing scrap across the room," according to Scannell—and Fornaca ended up having to hire more workers to run the plant while the computers were down. That situa-



tion, combined with financing and regulatory problems, eventually drove Fornaca into bankruptcy. The plant now is owned by the U.S. subsidiary of Mexico's Grupo Industrial Bimbo.)

Scannell named Kansas City, Mo.-based Interstate Bakeries as an example of a company that went about automating the right way. When Interstate brought high-tech equipment into its bakeries in Jacksonville, Fla., and Rocky Mount, N.C., it was careful to integrate its current work forces into the technology. "They have the advantage of workers who understand how bakeries work and can run them when the computer crashes," Scannell says.

Jim Widler, executive vice president for Interstate's eastern division, says vendors and community colleges were important resources, but the key was customized training. "We really tried to tailor it to the individual," Widler says.

STAY IN FOCUS

To have the best chance of success, technology training must be tailored not only to the individual, but to the task at hand, say training consultants. The best training takes into account worker limitations and offers narrowly focused, application-specific strategies for overcoming them.

Trying to teach English or math is not a reliable strategy for worker training, says Norm Nelson, president of Impac, an industrial efficiency consulting firm based in Newport Beach, Calif. "The approach to try to raise the level of education out there is an impossible one," Nelson says.

Rather than offering generalized instruction, companies should identify the tasks that are giving their workers the most trouble, then break them down so the difficulty can be overcome. Even the most complex tasks can be broken down this way, Nelson says. "Every process comes down to some sort of repetitive action on the worker level."

Nelson gives an example of an apple-packing facility where a packing machine kept shutting



Sonny Stanley checks a workstation at the Southern Soya plant.

The entire process had about 15 data points, conveyed by low-tech devices such as circular recorders and pneumatic instruments. After the process was wired into a single PLC, with interface software from Wonderware Corp., Irvine, Calif., the data points mushroomed to 150. All of a sudden, operators were expected to make machine adjustments based on trending and historical data for parameters like temperature and flow rate.

"We have a lot of operators that have 20 or 25 years of experience," says Paul Hankey, vice president of operations. "They have always been with this process, but they didn't have any experience with electronic controls or instruments."

To get the workers used to computers, the company set up an unconnected terminal and organized a solitary tournament. But beyond that, Southern Soya found that the increase in data under the new system enhanced their workers' understanding of the process. Their ability to adjust to the new system didn't seem to correlate at all with education. Hankey says: his best operator was illiterate.

"It was almost independent of education," he says. "There were some people who had an immediate grasp of where the process was going by looking at trend lines and relationships."

This was probably because they understood the process well to begin with, he says: "Over the years, people that have been good operators had an innate ability to understand processing relationships." For such people, computer control enhanced their understanding instead of challenging it. "It was like a revelation to them to say, 'If I change this on the left hand, this on the right hand will change,'" Hankey says.

HOLDING ON

Southern Soya's experience illustrates a key point about automation: In almost every case, no matter how wide the gulf between the workers' skills and those required by the new system, it's better for the company to retain as many of its current workers as possible. The institutional knowledge of an established work force is simply too valuable to lose. This is especially true in the food industry, where many physical and chemical aspects of processing are incompletely understood. This makes some processes

SUCCESSFUL USE OF ELECTRONICS "WAS ALMOST INDEPENDENT OF EDUCATION."

-PAUL HANKEY, SOUTHERN SOYA

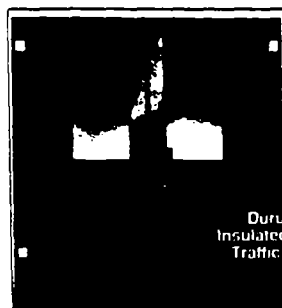
very hard to replicate, which means that worker experience is vital to successful execution.

Perhaps the easiest situation is when a company is building a plant from the ground up and can hire a work force to match the technology. For example, an aseptic pudding plant now

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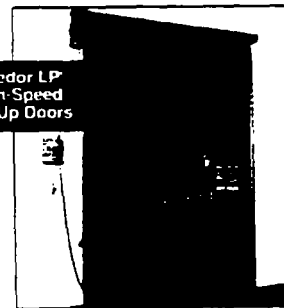
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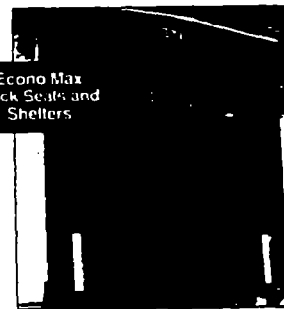
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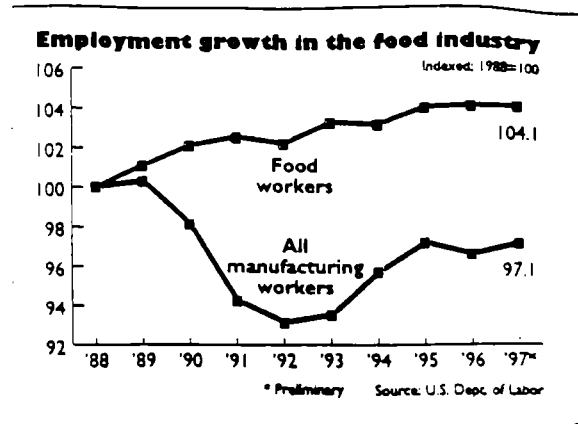
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- NORM NELSON, IMPAC

times with disastrous results.

Scannell cites the example of Fornaca Bakeries Inc., the San Diego-based baker of Holsum and other brands of bread and rolls. Fornaca moved into a new \$10 million plant in 1991 with an automation system that was supposed to reduce the work force by one-third. But the system kept crashing—"robots were throwing scrap across the room," according to Scannell—and Fornaca ended up having to hire more workers to run the plant while the computers were down. That situa-



tion, combined with financing and regulatory problems, eventually drove Fornaca into bankruptcy. (The plant now is owned by the U.S. subsidiary of Mexico's Grupo Industrial Bimbo.)

Scannell named Kansas City, Mo.-based Interstate Bakeries as an example of a company that went about automating the right way. When Interstate brought high-tech equipment into its bakeries in Jacksonville, Fla., and Rocky Mount, N.C., it was careful to integrate its current work forces into the technology. "They have the advantage of workers who understand how bakeries work and can run them when the computer crashes," Scannell says.

Jim Widler, executive vice president for Interstate's eastern division, says vendors and community colleges were important resources, but the key was customized training. "We really tried to tailor it to the individual," Widler says.

STAY IN FOCUS

To have the best chance of success, technology training must be tailored not only to the individual, but to the task at hand, say training consultants. The best training takes into account worker limitations and offers narrowly focused, application-specific strategies for overcoming them.

Trying to teach English or math is not a reliable strategy for worker training, says Norm Nelson, president of Impac, an industrial efficiency consulting firm based in Newport Beach, Calif. "The approach to try to raise the level of education out there is an impossible one," Nelson says.

Rather than offering generalized instruction, companies should identify the tasks that are giving their workers the most trouble, then break them down so the difficulty can be overcome. Even the most complex tasks can be broken down this way, Nelson says. "Every process comes down to some sort of repetitive action on the worker level."

Nelson gives an example of an apple-packing facility where a packing machine kept shutting



Sonny Stanley checks a workstation at the Southern Soya plant.

A NEW MODEL FOR VOCATIONAL ED

If there's one thing industrial executives agree about when it comes to worker readiness, it's that schools aren't doing their job.

"The K through 12 system is not producing a product that industry can use in lots of cases," says Tom Martinez, director of administrative services for Nestle Brands, Moses Lake, Wash. "I talk to a lot of educators, and I tell them, 'Industry is your customer. If you were in private business, you'd be out of business.'"

Educators, of course, must deal with many social and public policy issues besides the needs of industry, including funding, societal expectations, family dysfunction, race, class and ideology. But one area where schools and industry unquestionably intersect is vocational education.

Currently, American high school students take less than one-fifth of their courses in vocational education, and participation has been declining during the past decade. Some food industry leaders would like to reverse that trend. "What are we trying to train young people to do?" says Gene Wisakowsky, former head of R&D for Campbell-Taggart. "Vocational

schools have fallen out of favor, but I think they could have a tremendous impact on American industry in general."

Vocational education in the food industry, such as it exists, traditionally has taken the form of training for careers in foodservice. But a model suggested by a vocational-education expert might provide a useful way to impart the kind of general logic and problem-solving skills needed to cope with increasingly sophisticated technology.

Gary Hoachlander, a member of the National Center for Research in Vocational Education at the University of California at Berkeley, told the U.S. House in testimony last May that "vocational education as we have traditionally conceived of it is not likely to be effective." The problem, Hoachlander says, is that classic vocational education is too divorced from mainstream education, and tied too closely to specific occupations.

Under the model Hoachlander proposes, specific occupations or industries would be replaced by 16 broad-based sectors that

encompass virtually all paid activity; the relevant one for the food industry would be "manufacturing, installation and repair." Integration with the mainstream curriculum would be accomplished by relating core courses—math, English, history and so on—to the chosen sector, by using that sector as a theme. For example, math courses would stress the relevance of different skills to manufacturing; history classes would pay special attention to the history of industry, and so on.

While cautioning that "most employers are not in the business of education," Hoachlander says industry nonetheless would play an important role in his model: helping schools relate instruction to the real world. "It is ironic that so much time is devoted by teachers to making up problems for students to work on, when the world is full of real problems, big and small, begging for solution," he says. "Engaging employers...in defining useful problems of students' energy and attention could be a very significant strategy for improving the link between classroom and work-based learning."

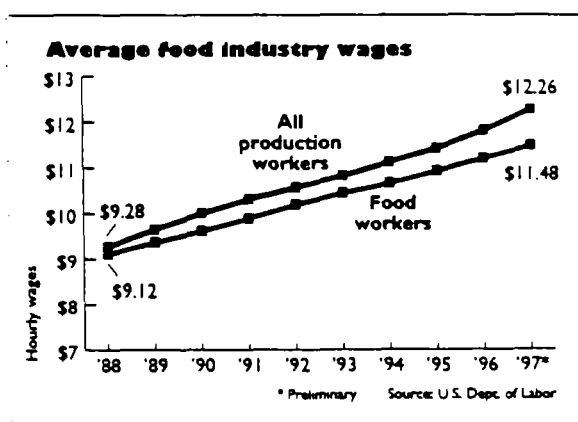
down because workers were feeding it trays of the wrong size. Impac instituted tray collection points, one for each size of tray, at which removable color labels were posted. The colors were matched to labels at the machine infeed points. Misfeeds dropped from 10 a day to near zero.

In another instance, language barriers made it difficult for workers to describe breakdown trends with a certain machine. Impac had the company issue them marbles of different colors, with each color corresponding to a certain problem. Each time a breakdown occurred, a worker would put the proper color marble in a coffee can, which was collected by a supervisor at the end of the shift.

After the problem has been broken down and a solution determined, a supervisor who understands the situation must take charge and implement the solution, Nelson says: "Leaderless units, where everyone's empowered and there's no one making overall decisions, are a dream."

The nature of industrial automation means that almost all workers, regardless of their education levels, will need some kind of training to deal with it, says Dick Herling, training manager at Metsys Engineering, an Eden Prairie, Minn.-based training consulting firm. The problem is that electronic control brings a hidden layer to machinery. As it takes hold, the gap grows between what workers understand and what is actually happening.

"It's not that these people aren't capable of doing it. It's just that they're not coming in with those skills," Herling says. "If



you were looking for people with mechanical skills who knew how to use a screwdriver, they were abundant. If you're looking today for people who come in off the street and can program a PLC, they're not as abundant."

But the general computerization of society gives workers a boost in learning specific skills on a job, Herling says. "With the use of computers in the home and ATM machines, people are used to interacting with computer screens."

In the end, companies are responsible for training their own workers. Carefully conceived and well-executed training tailored specifically to the tasks at hand, can overcome virtually any difficulty.

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Brave New U

Online Learning and Other New Technologies Are Changing What College Means for Both Student and Teacher

By WENDY SWALLOW WILLIAMS

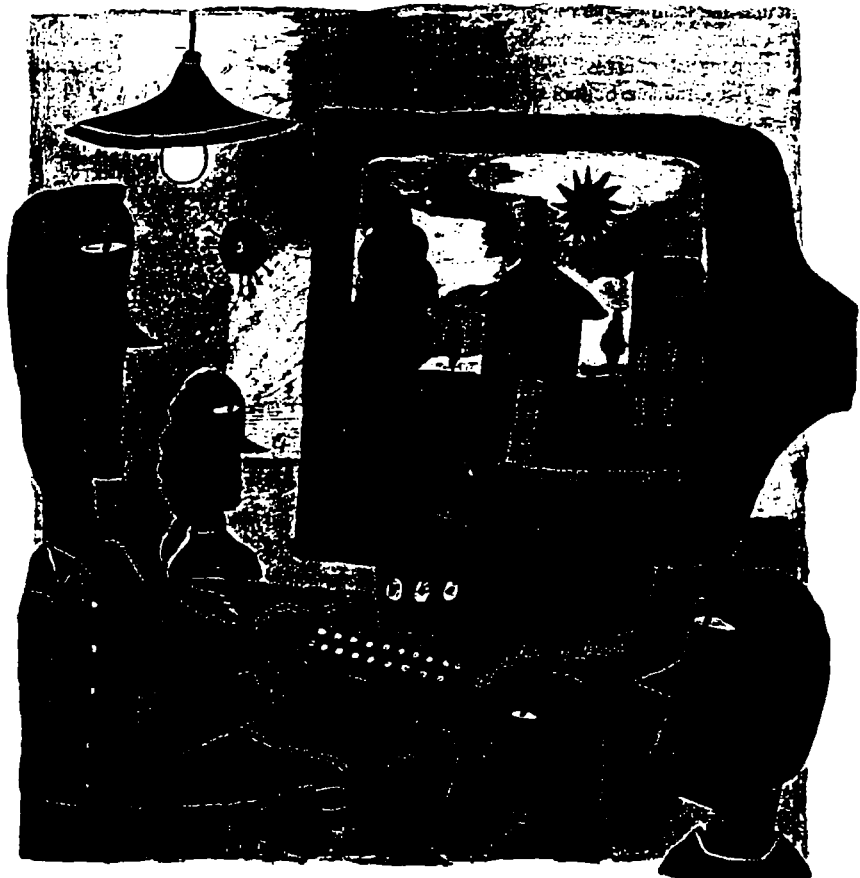
THE PROBLEM: DESIGN A BUILDING for higher education in the 21st century. The solution: a facility laced with the latest computer technology where faculty work in modular cubicles rather than behind closed doors so they can be more accessible to students, where classrooms are modeled after meeting rooms and can be easily reconfigured with movable walls, and where students can retreat to a central area with a soothing fountain and Japanese-style seating to talk and think.

It sounds like something out of the future, but for the five George Mason University undergraduates who designed this building model as part of a course in the school's New Century College, the future is here. John Aarnio, Zack Appleton, Collin Barth, Robin Alexander, and Michelle Linderer created their building in a course called Vision Quest: Modeling the Natural World Using Art, Computer Programs, and Science.

They started with a topographical map of the campus and finished with multimedia presentations that included animated 3-D computer modeling, artists' renditions, overhead projections, and a landscaped model. The course was team-taught by a physicist and an artist with help from a university architect.

New Century College—a school within a school where 800 students take classes from teams of teachers who cross academic disciplines and focus on real-world applications, such as conflict resolution and new media—is part of George Mason's ef-

Wendy Swallow Williams teaches journalism at American University.



fort to hold on to bright students and to do a better job of educating them for the new millennium.

Before George Mason launched the project, it consulted with local business leaders about the skills and experience considered essential to employment today. The program emphasizes group learning, personal attention from faculty, and problem-centered projects, says New Century College dean John O'Connor.

All 80 students finishing this year have designed their own majors, and graduates leave with a portfolio of professional-quality work and extensive experience in computers and group dynamics.

This isn't college as most of us remember it—cold classrooms with little more than a chalkboard and desks, stacks of musty books in ivy-covered libraries, and faculty locked away in private offices. New

Century College is housed in a technology-dense building that combines an open-stack library with a food court, a theater, classrooms, conversation pits with sofas and low tables—and 800 computer jacks.

Says O'Connor: "The building encourages group work in the same way the traditional library encourages solitary learning."

UNDER THE PRESSURES OF A COMPETITIVE job market and the wide-ranging changes that information technology is bringing to teaching and learning, a different educational landscape is emerging.

George Mason's New Century College isn't the only area alternative to traditional academic programs. Innovative approaches are cropping up at many local colleges and universities, from online faculty office hours to classes paired up with universities around the globe for team projects pro-

Universities are experimenting with on-line testing, course Web sites linked to resource pages, and digital "slide" presentations using PowerPoint software. Everything from English lit to molecular biology seems to be fair game for innovation.

It isn't a cadre of technology-happy faculty driving these changes. Students and businesses are demanding that schools adapt to new methods, offer more relevant curricula, and train people for jobs as well as for thinking. These demands are spawning surprising alternatives.

At Keller Graduate School of Management, an management program that set up shop in Tysons Corner, classes are held at night and on Saturdays in a high-rise office building. The registrar is a receptionist, the library is online, and the bookstore is a storage room. The professors are almost all local professionals who tumble out of the nearby businesses for a chance to share their expertise and earn extra money. During breaks, students gather in a lounge around a couple of vending machines and talk about their jobs.

For a growing number of people, this is what graduate school looks like. The US Department of Education says nearly half of those studying for graduate degrees today are part-time students over 25, and that percentage is expected to increase. It's not just the site and the student body that make Keller different. The Chicago-based school, which has no traditional campus, is an arm of DeVry Inc., a for-profit company banking on what Wall Street sees as potential growth in the graduate-education business over the next decades.

With flexible programs, an emphasis on service, and a price about half that of bigger-name business schools, Keller is doing so well that this past February it opened a second area site in Crystal City. The nation's capital is only one of Keller's recent conquests. The school has 31 sites in 9 states, with plans for a host of others, and is beginning to offer courses online.

While some academics dismiss schools like Keller as a new version of correspondence schools, students say the program is rigorous and challenging. Former Navy pilot Paul Nesbit, now a market researcher for the information-technology firm TRW, signed on with Keller for his MBA hoping the degree would prepare him for more general management work. He had an undergraduate degree from the Naval Academy and received a master's in national-security affairs at Georgetown. What he needed now was a solid MBA program to help with his transition out of the military. Because he is a single parent, flexibility was key. No other MBA program around town, he says,

student—or its price tag.

TECHNOLOGY HAS NOT ONLY CHANGED how courses are delivered; it has also opened up the competitive field.

In the old days, a student wanting to learn about government might be attracted to a school in Washington because of its proximity to Capitol Hill. Today, a school could easily set up a satellite office in DC, staffed by a secretary and a program director, and conduct classes from the home campus via the Internet while students intern on the Hill.

"This technology treadmill is moving at speeds outside anything academia is used to. In some respects, we need to blow up our buildings and systems and build new ones in their place."

The digital revolution is eliminating the boundaries of geography that have defined market niches in education. With the rapid growth of Web-based and distance education, schools are forced into competition with one another—from Oxford University in England, which has started offering online graduate degrees to tap the lucrative Asian market, to the for-profit University of Phoenix, which has an online campus and also sets up operations in business offices, using local professionals as "practitioner faculty." In two decades, Phoenix has grown to 60,000 students nationwide and is beginning to make traditional educators nervous.

As a result, competition for desirable students—those who are bright and can pay—is accelerating, and many traditional schools are trying to find new types of students. Student demand for more professionally oriented curricula is blurring the line between education and training, throwing the liberal arts into a defensive position on many campuses.

"WHEN I WENT TO SCHOOL IN THE early '60s, my professors could look at their own careers and experience and pretty well predict what my career would look like," says Wendell Cochran, a journalism professor at American University. "But that's not true anymore. Essentially, the shelf life of an education is re-

where the technology is changing things rapidly. I can't really envision what journalism will look like in 20 years, so how do I teach students who will work in the field for the next several decades?"

Cochran says AU still teaches journalism in the traditional categories—broadcast and print—but the faculty are beginning to think they should instead be teaching in terms of skills: visual literacy, critical analysis, layout and design, writing in linear and nonlinear formats, audio, computer research, data analysis, and photography. In this way, students would have a toolbox with which to adapt if their jobs change out from under them.

Journalism is not alone in this respect. From the sciences to economics, business, engineering, and even some of the traditional humanities, professors are scrambling to learn new analytical tools, to tap the array of resources on the Web, and to understand the changes technology is bringing to their disciplines.

"Teachers are finding that there is a constant need to update equipment and relearn techniques before they can even address the substance of a course," says Cochran, who teaches computer-assisted journalism and media ethics at AU. "The problem is that this technology treadmill is moving at speeds well outside anything academia is used to. In some respects, we need to blow up our buildings and systems and build new ones in their place."

For Cochran, who came to AU with extensive experience in reporting and data management from his years as a computer guru for Gannett News Service, this technology treadmill has meant developing Web-based reporting scenarios, recasting his lectures in PowerPoint software, and learning to build Web sites where journalists and students can retrieve and analyze data. This semester he's taking a class to learn how to use software tools to analyze and present geographic data.

A FEW YEARS AGO, IN AN EFFORT TO MEET the needs of students looking for a blend of disciplines, analytical skills, and technical knowledge required for modern careers, Georgetown University launched a new graduate program in Communication, Culture, and Technology. According to CCT director Martin Irvine, the program was designed for students who will be working in a world marked by "convergence, complexity, and globalization."

Outside Irvine's office one day, a group of CCT students was huddled around computers that had been clustered together as a discussion area in the program's main office. They were engrossed in a debate

about how the Internet has given new life to the phenomenon of "urban legends," stories like the one about the cat in the microwave that get passed around and are almost never true.

One student suggested a research project that would track the path of a manufactured urban legend as it took off around the Web, watching it jump continents and seeing how quickly it might filter into print and television.

"We were trying to create a program that maps onto the realities of the digital age, particularly in terms of developments in business, education, and government," says Irvine. "If Congress passes a new telecommunications bill, we need to be able to teach to the issues raised by that political act."

UNIVERSITIES ARE ALSO EXPERIMENTING with technology to find ways to make their programs academically stronger and more efficient. At George Mason, a team of computer-science professors has created an online testing system called the Hyper-learning Meter, a Web-based program that allows instructors to present factual material through tutorials and assigned readings and that tests students through a self-assessment and certification system at the end of the course. Their lab is a room filled with computers that have something like a subway map on their screens—a guide to the tutorials embedded in the program.

Peter Denning and Daniel Menasce, who built the system, talk about how the program can free faculty from having to teach basic facts in courses like math, statistics, and biology, leaving the class time to struggle with the more difficult questions. At any point in the semester, the teacher can check the online grade book and see how many of the students have passed a specific test or section of the material.

Denning and Menasce are hoping to patent the system and sell it to other teachers looking for easy computer tools to incorporate into their curricula. Denning says George Mason is interested in using the program to teach functional prerequisites for other courses, and both professors have used it successfully in their computer-science classes.

The system has limits, they acknowledge, offering reassurances that it will not replace faculty in the classroom. "There is this aphorism that we are moving from the age of the sage on the stage to one where teachers will be a guide at your side, but I challenge that," says Denning. "Teachers are more than guides—they are representatives of the profession and experts in the field that can give students better access to the profession. The thought that, with a

program like ours, you could teach these classes with just a graduate assistant there to guide students through the difficult parts is not true."

Denning and Menasce say it is unlikely that most faculty will adopt technical tools until they are simple enough not to get in the way of teaching. Those who have pioneered innovative approaches tell horror stories of failing servers, systems that lock up, and applications that can't take the demands of the classroom.

Christopher Simpson, a professor of media studies at AU and one of the university's "early adopters" of new technol-

Frank Connolly taught a computer-science course last year that was conducted entirely online. He found the lack of visual cues from the group both disconcerting to him and isolating for the students.

ogy, says the struggle to bring technology into the curriculum is more like a learning wall than a learning curve. His favorite method, he says, is to present a problem to students and let them go at it, experimenting with whatever they can think of to get the technology to work. He reports that eventually someone gets over the wall, at which point they all can go up the same rope. For this to happen, however, Simpson has to admit the limits of his own knowledge—something some professors are reluctant to do.

TO HELP TEACHERS AT GEORGE WASHINGTON University adopt new technology, faculty from the School of Engineering and Applied Science are often paired with faculty from other disciplines to develop courses.

Rachelle Heller, a professor of engineering and applied science at GW, teamed up with another engineering professor last year and taught a course in electronic commerce, where, says Heller, the discipline and the medium went hand in hand. The students met with the teachers face to face each week but had to create an entire electronic market—with a bank, credit cards, vendors, and advertising—on the Internet.

"There is nothing inherent in the technology that makes it a better teaching tool to address my discipline, but it has certain fea-

tures that can be a great vehicle for getting my discipline delivered," she says. "In order for the students to create a bank, they had to learn a lot about banking, they needed to know something about the technology to put it on the Net, and they needed to know a lot about security, encryption, coding schemes. But it's not that it has so much to do with the technology as much as what those bits are talking about. It has to do with how you bring content to your students."

This semester, Heller is teaching a course called A Walk on the Moon, open to science and engineering students at GW as well as to science students at Gallaudet University.

"The purpose is for the students at the two universities to come together on the Internet for a real project," says Heller. Students will use Moonlink, a US government-supported Web site containing moon data, to write proposals for investigations that would explore some aspect of lunar science. The project is part of a grant from the National Science Foundation to encourage women in science and engineering.

Education students at Rand Afrikaans University in Johannesburg are participating in another course, called Design and Implementation of Educational Software. According to Heller, the South African students will work with their GW counterparts mostly online. "We're not teaching online, though we are hoping to have some video conferencing. They are eight hours out of phase with us, and their class only meets four times a semester, so you can see the problems. It could be a total flop," Heller admits.

DISTANCE LEARNING, WHICH MANY PEOPLE say is going to transform education, turns out to be a mixed bag for professors who have tried it.

Frank Connolly, a computer-science professor at AU, taught a course last year that was conducted entirely online, from registration through the final exam—but because of problems with video-conferencing software, the class was forced to do all of its business through written text, mostly as online discussion and e-mail. Connolly found that the lack of visual cues from the group was both disconcerting to him and isolating for the students.

"I really missed the feedback, and the students felt the same way," he says. "Especially when we had technological problems, they would all be frustrated, but they were having those feelings alone in their own homes. A lot of the cues in a good class come through body language, and the class lost that."

Connolly says that having to conduct the class through writing also took more effort

than he had anticipated. Once I started writing my lectures, I took more time to vet sources, check references, because I was actually publishing when I put them in digital form." Connolly notes that students also found the written format intimidating and took longer to respond to questions, in part because they felt they had to write mini-papers on all the discussion questions.

"In class they wouldn't have gone to so much trouble. They spent a lot more time [online] thinking about things before responding, but we probably didn't cover as many topics as we could have in a normal course."

Other teachers report that students are often more willing to comment when given the time to reflect and when they don't have to compete with other students for a chance to speak. Rachelle Heller of GW believes that Internet-based discussions can empower female students to contribute because the class dynamic is more balanced.

MANY PROFESSORS HAVE NOTICED THAT computers can force other changes in classroom dynamics. Simpson offered a course last semester on the use of satellite imagery to promote human-rights teaching. A handful of the students were on campus; 200 people from 24 countries audited the class via audio and video on their computers, accessing the course Web site, and participating in discussions through an e-mail listserve. As far as Simpson can tell, it was the only course on the topic in the world, and it attracted interest among security officials, some from states with repressive policies.

"There are ways to use the Web to create learning communities, but there is also the potential for serious abuse of the academic process," says Simpson. "If the classroom is to be something other than an indoctrination center, students have to feel they can speak freely, say stupid things, and learn from their mistakes. But if you are holding the discussion across the Web, open for anyone to see, it doesn't take a wild imagination to see that these conversations could be monitored and that information used against people."

Simpson says he has already seen this concern stifle discussion in his course, and he worries about the implications: "Not only are these conversations monitored; they potentially never go away. There's no way for any person to know if some offhand comment, made at the age of 20 in a college course, will come back to haunt them."

DESPITE THE PROBLEMS AND COSTS OF adapting courses, some schools are moving forward with ambitious online

programs, including the University of Maryland, whose University College has an entire undergraduate catalog of online classes. Even in the traditional humanities, computers are shaking things up.

Maryland now offers two courses for music majors that allow them to use computers to write compositions with the ease of word processing. The system includes a Macintosh computer linked to a Korg synthesizer routed through a Musical Instrument Digital Interface, or MIDI. Students can write and record compositions for

"College isn't just about being able to run the machinery. If young people don't have a chance to think and dream, then I don't want them voting on my Social Security."

everything from a small ensemble to a full orchestra. If they don't like how it sounds, they can change it instantly, note by note.

"Knowledge of this technology is a real asset to many musicians in today's music industry," says Robert Gibson, director of the university's School of Music MIDI Lab. "To have this experience upon graduating can open doors."

In Maryland's Government and Politics Department, chair Jonathan Wilkenfeld has created a project called International Communication and Negotiation Simulations, or ICONS, which lets students act as foreign-policy negotiators over the Internet, covering such diverse issues as nuclear proliferation, human rights, and drug trafficking. Every year, students from more than 40 colleges in the United States and other countries participate.

BECAUSE MORE AND MORE COLLEGE STUDENTS come from high schools where technological teaching tools such as online class discussions are taken for granted, they arrive on campus with ever higher expectations. Most faculty, however, are still trying to figure out how to get their syllabuses on a Web page and to respond to student e-mail, let alone use information technology to its full advantage.

"A lot of the resistance from faculty is generational and cultural," says Georgetown's Irvine. "You have to create an internal culture that values these things, and

you need to lead by example. It's hard to do it in a concerted, unified way because universities are not unified—and many faculty are more loyal to their field, the leadership in their discipline, than to their school."

To get the faculty to work together on long-range planning, Georgetown recently launched a new forum called the Georgetown Project on the Future, in hopes of clarifying the school's mission, particularly in terms of nurturing and expanding the liberal-arts college at its core.

"My worst nightmare is that Georgetown will not develop any coherent vision and strategy for how to be a university in the 21st century and instead will become a 'boutique' experience," says Irvine, a member of the project. "That students will come here for nostalgic reasons, wanting to replicate a certain experience they somehow imagine college should be."

Irvine hopes that Georgetown can become, instead, a school that preserves the traditional residential experience but makes it better wired and better connected to the world. He also believes the school can best support the liberal arts by taking advantage of new niches, such as offering continuing education to alumni or developing programs in partnership with area businesses.

MANY SCHOOLS ARE TRYING TO DEVELOP more lucrative graduate and continuing-education programs to subsidize the undergraduate core. One way to do that, say experts, is to fragment graduate education, breaking up traditional master's programs into smaller modules that could be accomplished quickly or combined to meet specific professional demands.

At Johns Hopkins University in Baltimore, a student in the Science Writing Program takes a smattering of courses in the traditional master's program in writing as well as electives in the School of Public Health and the science departments. To earn a Business of Medicine Graduate Certificate, students take courses in the medical school and the business school.

Johns Hopkins, which has branched out into Washington with campuses in Rockville and downtown DC, offers a variety of such innovative graduate and continuing-studies programs. Called "responsive programming," it is considered one of the most lucrative areas for schools trying to expand. The number of certificate and corporate-directed programs is growing, particularly as schools seek new graduate markets. GW also has a range of professional master's programs, such as tourism administration and acquisition management, which focuses on the work of corpo-

rate and government executives in managing property, services, research, development, and construction.

In light of this competitive market, it's not surprising, educational experts say, that programs such as George Mason's New Century College combine intensive technology, personal attention, and cross-disciplinary courses—all factors that could, ironically, be instrumental in saving the traditional liberal-arts curriculum.

Despite the demand from students for more professional training, business leaders are quick to say they need people with a broad-based education and skills in writing, communication, and critical thinking. The question isn't whether to teach Shakespeare anymore but how to make him relevant—how to relate *Richard III*, say, to a degree in political science.

"The core issue is, what promise do you make to students?" says Patricia Aufderheide, a professor of media studies at AU. "Schools that fail to make a strong case to their students and faculty that they are unique social institutions of free thought are extraordinarily vulnerable to the University of Phoenix phenomenon. It isn't just about being able to run the machinery. You want a place where young people can aspire to be thoughtful citizens. If they don't have a chance to think and dream in

college, then I don't want them voting on my Social Security."

BECAUSE A RESIDENTIAL UNDERGRADUATE education is expensive and becoming more so, most schools are looking for new ways to sell the value of that experience. Following a national trend, several in the area are reviving the centuries-old concept of bringing faculty back to live on campus so that the college experience can be infused with mentoring and other personal attention.

Howard University, hoping to improve the quality of on-campus residential life, recently undertook a partnership with the financial company Fannie Mae to provide money for faculty and staff to purchase abandoned rowhouses in the historic LeDroit Park neighborhood, on the southern end of campus. The school bought the land years ago to expand Howard University Hospital but recently decided instead to keep the neighborhood intact. The first few faculty and staff families moved in this past winter. A similar idea was endorsed as part of a new strategic plan approved at AU several years ago, although no one has yet asked teachers to move into the dorms.

"If schools are just seen as a ramp for performance on the job, then we're in seri-

ous danger of becoming an overcredentialed but undereducated society," says Leonard Steinhorn, a professor of communication at AU. "When degrees are easy to get, it's like grade inflation—it cheapens the quality of the work by the best." Steinhorn says that if graduate education and the liberal arts are going to be worth what they will cost in the future, they need to teach both critical thinking and a broader knowledge of how professional skills fit into society as a whole.

"We have to make the case again for the liberal arts," he continues. "Students can read six books, but they need someone to weave them together and put them in context. Students have a real hunger for that advice and guidance." To professors like Steinhorn, adopting a business model, particularly one that relies on distance learning to capture market share, will undermine the core value of the educational process.

"We raised our kids as a generation of absentee parents, and now we're going to educate them as a generation of absentee faculty," he says. "The reason people sought out universities in the first place was to help them make sense of the world. We want to educate people to those old Jeffersonian ideals—to become better-informed citizens, not just better workers." □

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SEPTEMBER 1998

NATIONAL  ALLIANCE
OF BUSINESS

WORKFORCE ECONOMICS TRENDS

THE BUSINESS VOICE ON WORKFORCE DEVELOPMENT

THE DEMOGRAPHIC CHALLENGE: NEW PATTERNS FOR A NEW CENTURY

Demographics are important and will become more important in the future. They already have far-reaching economic and social implications as well as a permanent impact on the American economy. Increasingly they play an important role in policy debates at every level.

Along with changes in technology and the integration of the world economy, changes in the population, the workforce, and student enrollment drive social and economic changes. These changing demographic patterns will have significant implications for our local communities, our workplaces, our schools, and many other institutions. However, there is a general lack of public awareness of these trends and, in some cases, the implications of these trends have been misinterpreted. Demographic change moves slowly and the effects emerge over time. However, if we take a long-term view of these changes, it is clear that these shifting demographic patterns will be an integral part of our economic and social future.

In this issue of *Workforce Economics Trends*, we look at the impact that demographic change will have and the promise and the challenge these trends pose. Drawing from a variety of sources, we find that:

- World population is changing. The world population is growing rapidly, more people live in urban areas, and the share of the world's population living in OECD countries is shrinking.
- United States population is changing and becoming older and more diverse. Minorities will represent a larger share of the U.S. population and the population is gradually growing older.
- Demographic changes are playing out differently across the regions of the United States. Broad changes in the composition of the population mask important differences within and across regions. For example, according to Census Bureau data, the West had the highest concentration of minorities (36 percent) followed by the South (30 percent), the Northeast (23 percent), and the Midwest (15 percent) in 1995.
- Workforce changes parallel changes in population. The workforce in the United States will become more diverse across a range of characteristics. Women, minority groups, older workers, and disabled persons will represent a larger share of the workforce as we move into the next century.
- Educational attainment of the workforce is changing and more persons are investing in education. However, while education attainment continues to rise for most groups, there remain important gaps in educational attainment across population groups.
- Demographic change will also impact educational institutions. Minorities will represent a larger share of K-12 enrollment and a larger share of post-secondary education enrollment. In addition, other important changes are occurring in terms of post-secondary education enrollment patterns as well as the increasing share of disabled students in K-12 schools.

Clearly, demographic change will drive economic and social change. While the year-to-year changes will be small and subtle, their cumulative impact will be far-reaching. It is clear that we need to understand and embrace these changes and recognize the opportunities and challenges they present to our workplaces, schools, civic, and social institutions.

Workforce Economics Trends is a compilation prepared by the Alliance of research profiling our nation's current and future workforce. The information — statistics, facts and demographics — highlighted is intended to help advance efforts to build a quality workforce.

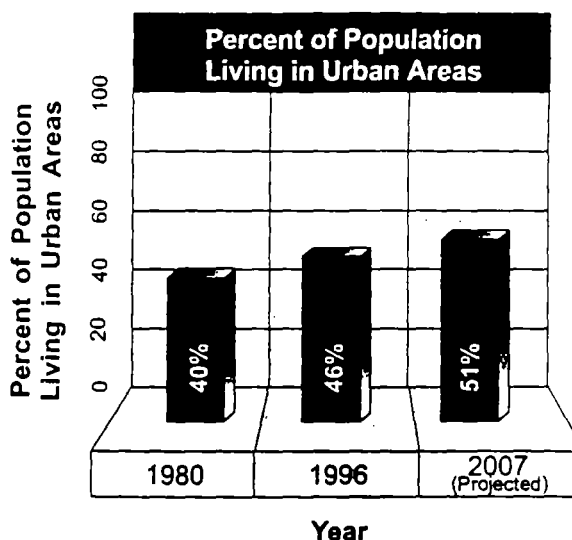
Alliance members receive *Workforce Economics Trends* six times per year, bimonthly. Further information and analysis about the state of the American workforce are provided through the Alliance's newsletters — *Work America*, *Workforce Economics* and our faxed bulletin *Legislative Update*.

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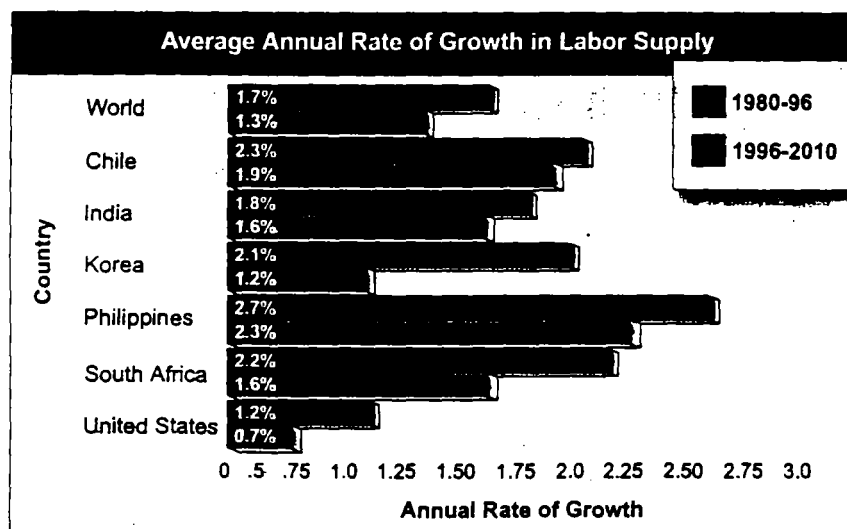
Over Half the World's Population Will Live in Urban Areas . . .

For the first time in history, one-half of the population will live in urbanized areas by the early part of the next century. The increasing urbanization of the world's population is important because of pervasive powers of agglomeration and localization economies.

Source: *The World Bank, World Development Indicators 1998* and projection by the National Alliance of Business.



Workforce Growth is Faster in Areas Outside the United States . . .



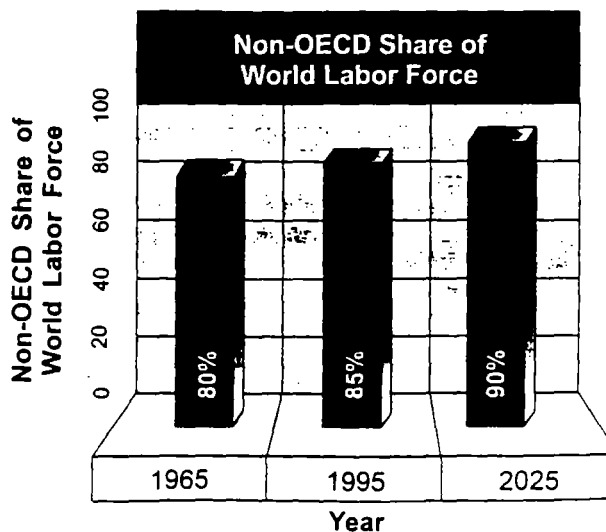
The labor force is growing much faster outside the U.S. Between 1980 and 1996, labor supply in the world grew at a rate nearly one and one-half times as fast as it did in the United States. The differential is expected to increase in the future. The world labor supply will grow at a rate nearly 80 percent faster between 1996 and 2010 than the growth in labor supply in the United States over the same period.

Source: *The World Bank, World Development Indicators 1998*.

OECD Countries Represent a Small Share of the World's Workforce . .

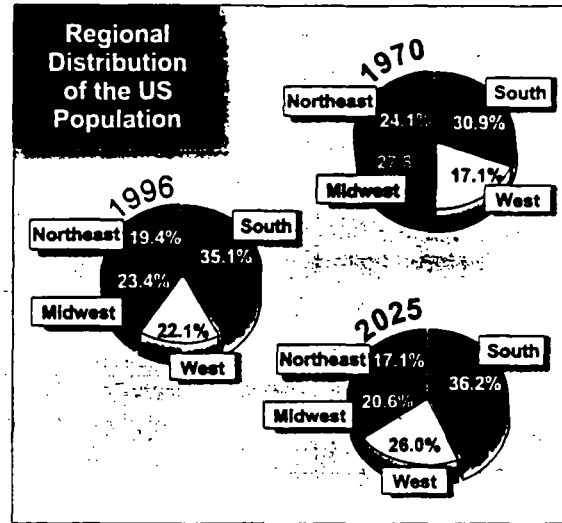
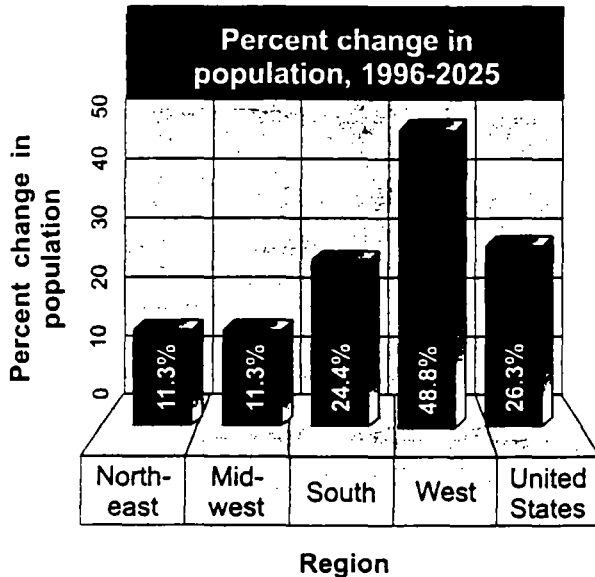
More workers live and work outside OECD countries. In 1965, non-OECD countries accounted for eight in ten workers in the world. By 2025, non-OECD countries will account for nine in ten workers in the world.

Source: *The World Bank, The World Development Report 1995*.



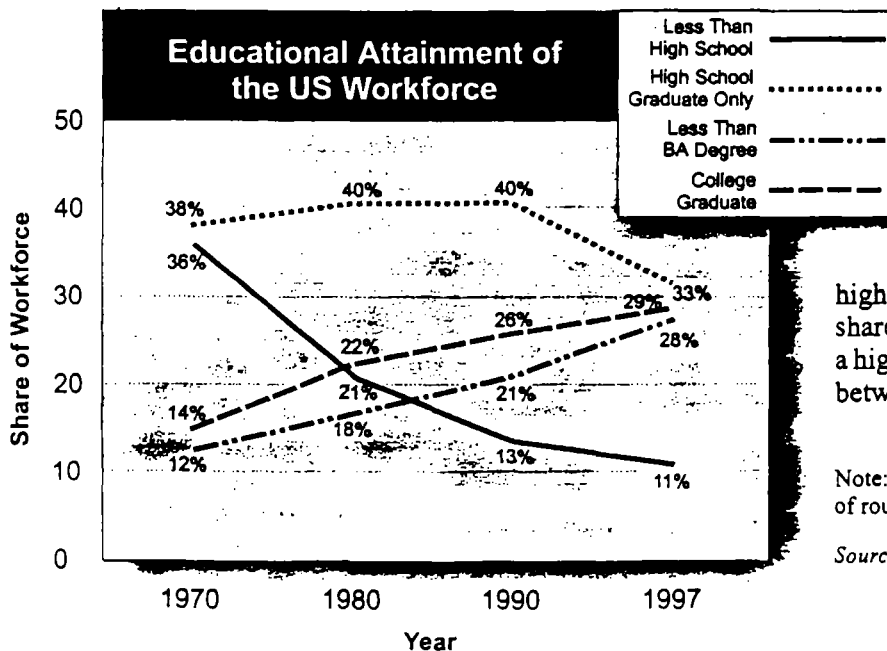
The Regional Distribution of Population is Changing...

Population growth rates across the regions of the United States between 1996 and 2025 will vary dramatically. While the population in the Northeast and Midwest is expected to increase by just over 11 percent between 1996 and 2025, the population growth rate in the South will be twice as large and population will grow over 4 times faster in the West compared to the Northeast and Midwest. These differences in population growth rates will translate into substantial changes in the distribution of the population. In 1970, the U.S. population was nearly evenly split between the Northeast and Midwest and the South and West. By 2025, less than 2 out of every five persons will live in the Northeast and Midwest.



Source: US Census Bureau.

The US Workforce is More Educated...



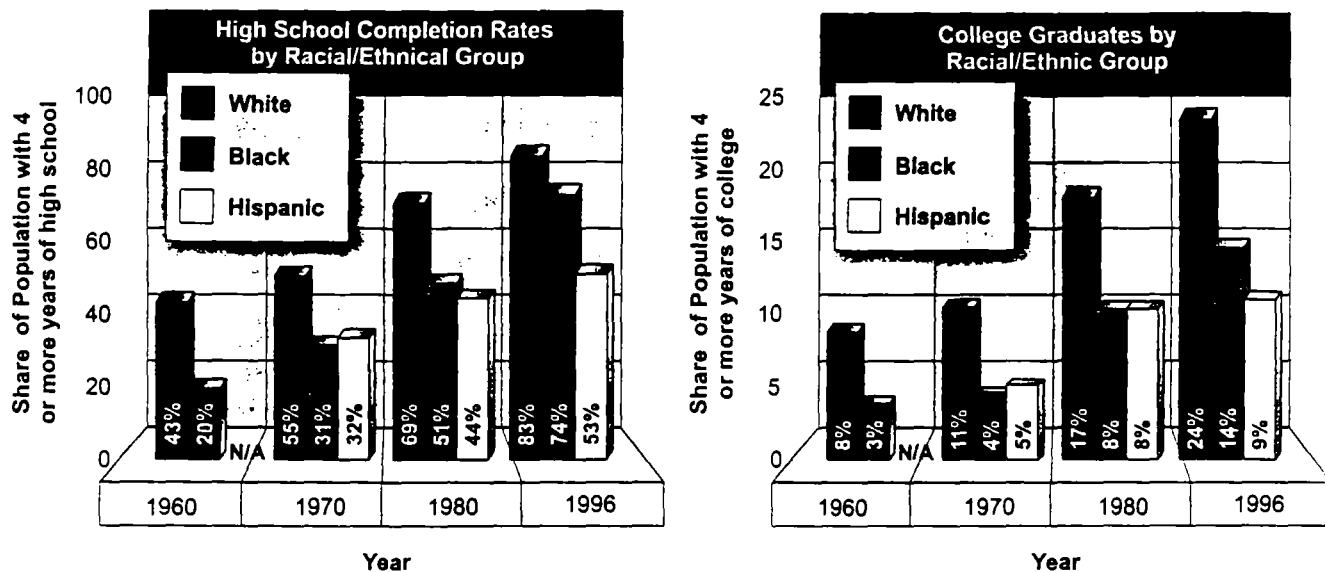
Over the last 25 years, the educational level of the workforce has shifted dramatically. In 1970, 35 percent of the U.S. workforce had less than a high school diploma. By 1997, less than 11 percent of the U.S. workforce had less than a high school diploma. In contrast, the share of the US workforce with more than a high school diploma more than doubled between 1970 and 1997.

Note: Numbers may not add up to 100 because of rounding.

Source: US Bureau of Labor Statistics.

Minority Groups are Increasing Their Educational Attainment...

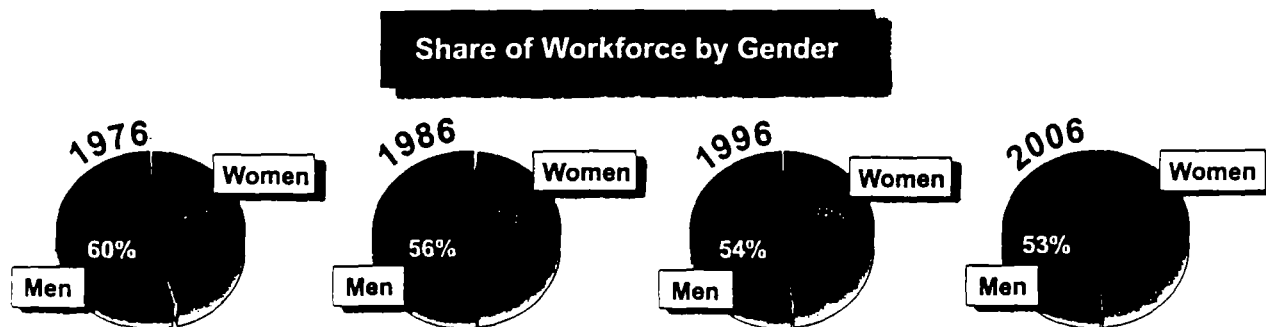
Educational attainment is increasing for all groups. The share of blacks with a high school diploma or more increased by nearly fourfold between 1960 and 1996. In 1960, one in five blacks had a high diploma or more and by 1996 nearly three out of every four blacks had at least 4 years of high school. A similar pattern is evident when we examine the share of each group with 4 or more years of college. However, while minority groups have made large strides over the past 3 decades, a gap still exists between the education levels of whites compared to many minority groups.



Source: US Census Bureau.

Women will Represent a Larger Share of the Workforce in the Future...

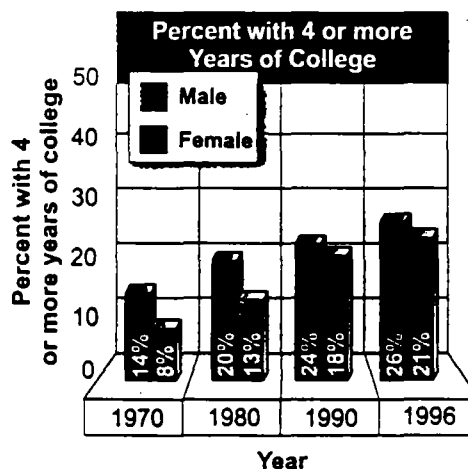
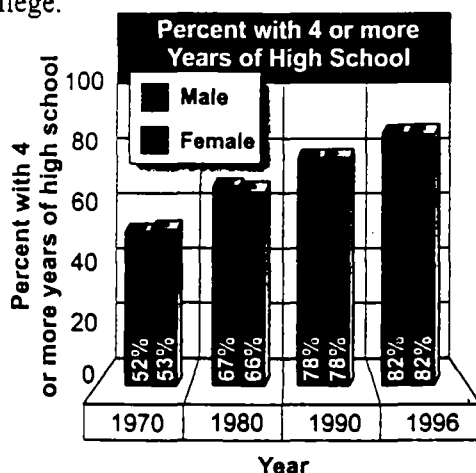
Women will represent a large share of the population as we enter the 21st century. In 1976, women represented approximately 40 percent of the workforce and by 2006 women will represent nearly one-half of the workforce.



Source: Howard N. Fullerton, Jr. "Labor Force 2006: slowing down and changing composition." *Monthly Labor Review*, November 1997.

Women Are Increasing Their Investments in Education . . .

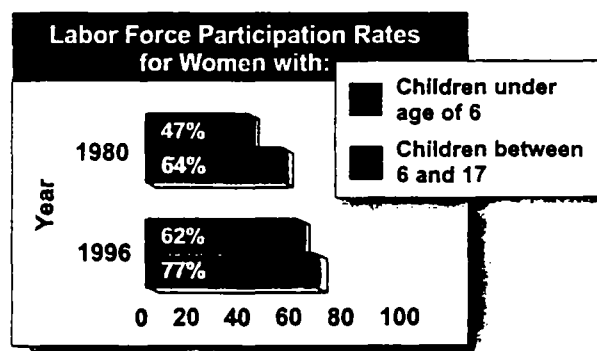
The portion of females with 4 or more years of high school is similar to that for males. In 1996, approximately eight out of ten males and females had completed 4 or more years of high school. However, compared to males, the portion of females with 4 or more years of college is lower although the gap is closing. By 1996, nearly one in four males had completed four or more years of college while just over one in five females had completed four or more years of college.



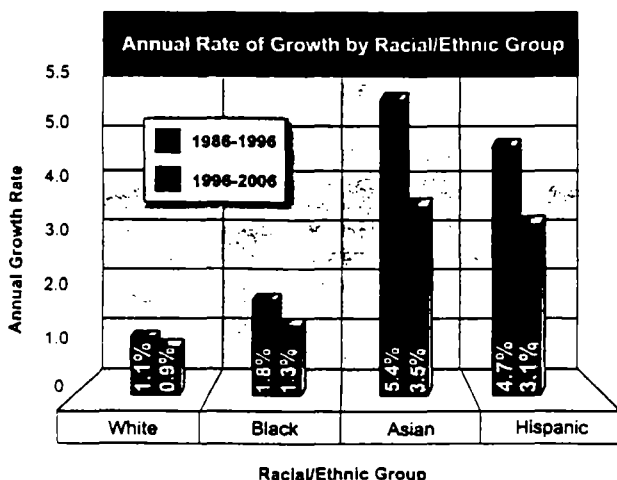
Source: US Bureau of Labor Statistics.

More moms are working...

Over the last 16 years, the portion of women with children participating in the labor market has increased dramatically. Nearly two-thirds of all women with children under the age of 6 are in the labor market and over three-fourths of women with children between the ages of 6 and 17 are in the labor market. The labor force participation rates for women with children under the age of 6 jumped 15 percentage points in the last 16 years and the labor force participation rates for women with children between the age of 6 and 17 rose 13 percentage points between 1980 and 1996.



Source: US Bureau of Labor Statistics.



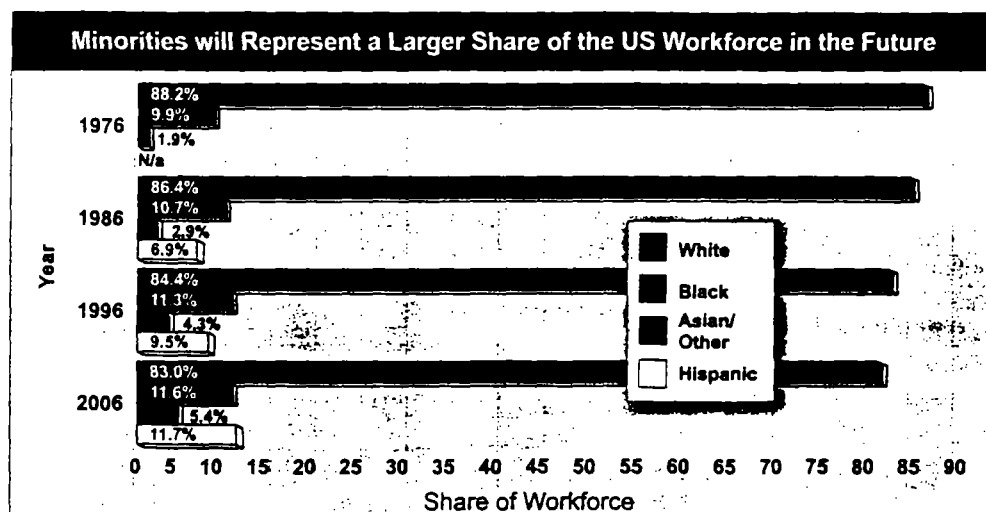
Minorities Will Be the Fastest Growing Segment of the US Workforce....

Between 1986 and 1996, minorities were the fastest growing segment of the US workforce. Over this period, the number of Asians in the labor market grew nearly five times as fast as Whites. The number of Hispanics in the workforce grew over 4 times as fast as Whites. BLS projects these disparate trends to continue. Minorities will be the fastest growing segment of the workforce between 1996 and 2006.

Source: Howard N. Fullerton, Jr. "Labor Force 2006: slowing down and changing composition." *Monthly Labor Review*, November 1997.

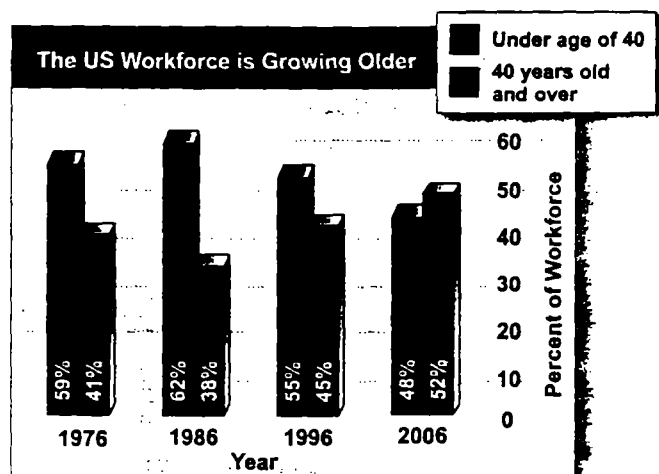
Minorities will Represent a Larger Share of the US Workforce...

As a result of their much faster growth, minorities will represent a larger share of the US workforce in the future. By 2006, Hispanics will be the largest minority group in the workforce and their share of the workforce will nearly double between 1986 and 2006. In 1976, blacks and Asians represented almost 11 percent of the US workforce. By 2006, blacks and Asians will represent 17 percent of the US workforce.



Note: Persons of Hispanic origin may be of any race. Therefore, numbers do not add up to 100 percent.

Source: Howard N. Fullerton, Jr. "Labor Force 2006: slowing down and changing composition." *Monthly Labor Review*, November 1997.



The US Workforce will Continue to Grow Older....

The US workforce is growing older. In 1976, nearly 60 percent of the US workforce was under the age of 40; by 2006 only 48 percent of the US workforce will be under the age of 40.

Source: Howard N. Fullerton, Jr. "Labor Force 2006: slowing down and changing composition." *Monthly Labor Review*, November 1997.

The World Population is Aging at a Slower Rate Compared to the United States . . .

The world population is younger compared to the United States. Nearly one in five persons will be over the age of 60 in the United States by the year 2010 while just over one in ten persons will be over the age of 60 in the world by 2010. In several other industrialized countries, the changes will be even more dramatic.

Country	Share of Population over 60 Years Old		Change in Share 1996-2010
	1996	2010	
World	9.6%	10.8%	1.2 points
Japan	21.0	29.8	8.8 points
Germany	21.0	25.1	4.4 points
United Kingdom	20.7	23.3	1.6 points
India	7.3	8.6	1.3 points
Mexico	6.2	8.1	1.9 points
South Africa	6.5	7.3	0.8 points
United States	16.4	18.8	2.4 points

Source: The World Bank. *World Development Indicators* 1998.

The Aging of the Workforce is Playing out Differently Across Regions...

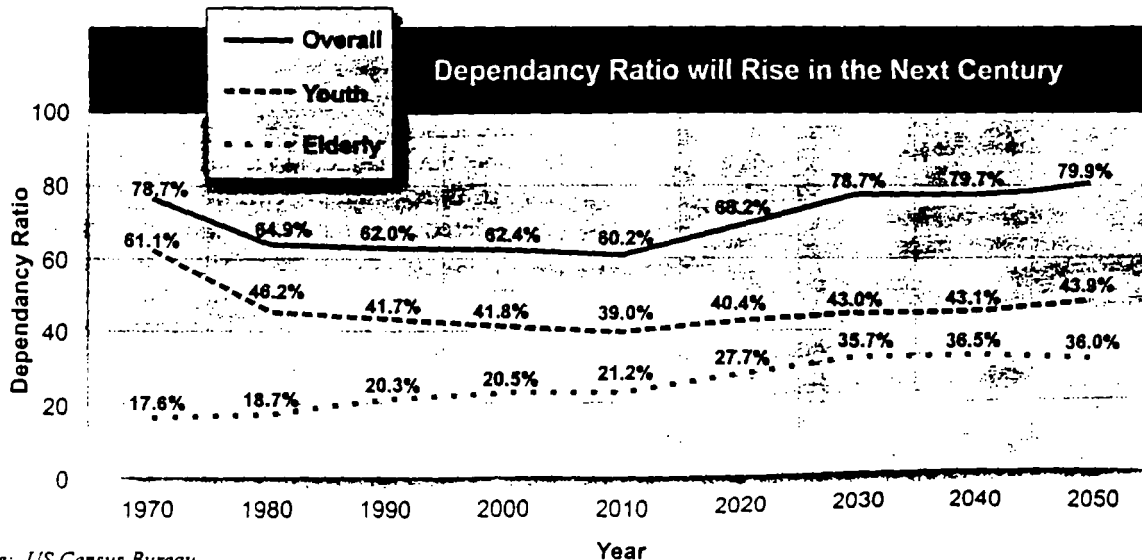
Data on the distribution of the workforce by regions are not available. We can use the median age of the population as a proxy to measure the graying of the workforce across the regions of the United States. The aging of the population across the United States varies. For instance, the Northeast is the region with the oldest median age while the West is the youngest. In terms of changes, the New England region is the region experiencing the most rapid increase in the median age of its population.

Region	Median Age		Absolute Change
	1990	1997	
Northeast	34.0	36.2	2.2 years
New England	33.6	36.1	2.5
Middle Atlantic	34.2	36.3	2.1
Midwest	32.9	35.2	2.3
East North Central	32.8	35.1	2.3
West North Central	33.0	35.3	2.3
South	32.7	34.9	2.2
South Atlantic	33.5	35.7	2.2
East South Central	32.8	35.1	2.3
West South Central	31.2	33.3	2.1
West	31.7	33.6	1.9
Mountain	31.5	33.8	2.3
Pacific	31.7	33.6	1.9

Source: US Census Bureau.

The Dependency Ratio will Rise Significantly in the Next Century...

The dependency ratio will rise significantly into the next century. The dependency ratio indicates how many children (under the age of 17) and elderly (65 years old and over) there are for every 100 people of working age (18 to 64 years old). The dependency ratio will slowly decline from its 1995 level of 63.7 to 60.2 in 2010. Then, as the baby boom ages, the dependency ratio is projected to increase 60.2 in 2010 to 79.9 in 2050. The dependency ratio for children is projected to remain stable between 1995 and 2050. The dependency ratio for elderly persons is already at an all-time high and will increase rapidly between 1995 to 2050.



Source: US Census Bureau.

Changes in Age Structure are Important to Economic Growth...

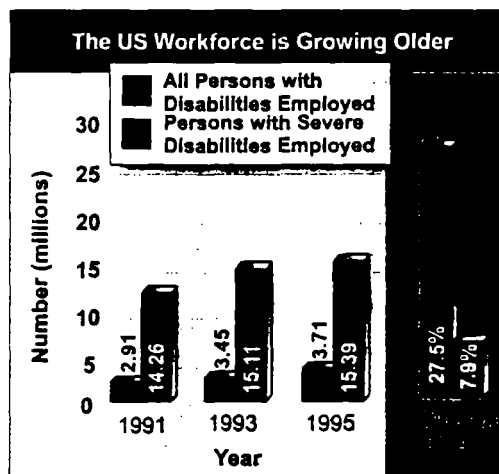
A recent study published by the National Bureau of Economic Research isolated the effects of demographic change on economic growth across 78 countries. The paper found that population dynamics are important determinants of economic growth and that it is through the age distribution -- primarily a sharp rise in the working age population and lower dependency ratios -- by which demographic variables affect economic growth. In many of the fast growing Asian economies, the working age population grew faster than the entire population and had a positive and substantial impact on the growth rate. The authors estimate that population dynamics account for one-third of the growth in per capita Gross Domestic Product (GDP) between 1965 and 1990 and that a one percent increase in the growth rate of the working age population is associated with a 1.46 percent increase in the growth rate of GDP per capita.

Source: David E. Bloom and Jeffrey G. Williamson. November 1997. "Demographic Transitions and Economic Miracles in Emerging Asia." National Bureau of Economic Research, Working Paper No. 6268.

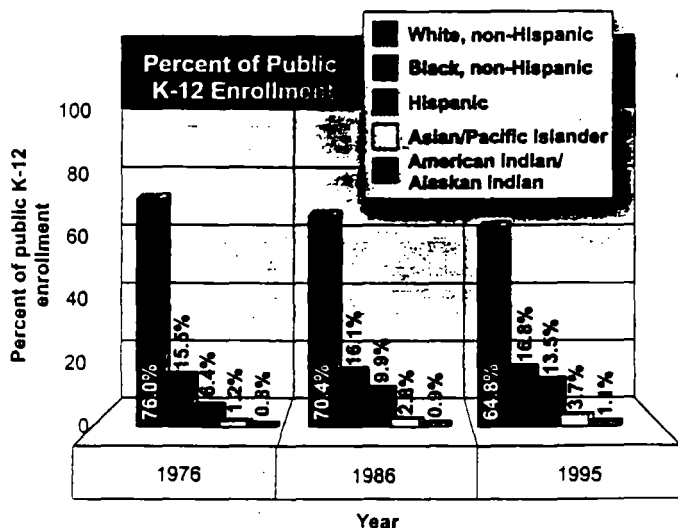
More Disabled Workers Are Now in the Workforce...

The share of the persons with a disability that are employed has grown over the last several years. Between 1991 and 1995, the number of persons with a disability that were employed rose by nearly eight percent (or over one million persons). In addition, the number of persons with a severe disability (defined as person who is unable to perform one or more activities of daily living; or more specific impairments; or is a long term user of assistive devices such as wheelchairs, crutches, and walkers) jumped by over 800,000 or over 27 percent between 1991 and 1995. In 1995, severely disabled persons represented nearly 13 percent of all persons employed while disabled persons represented about 20 percent of the total population.

Source: US Census Bureau.



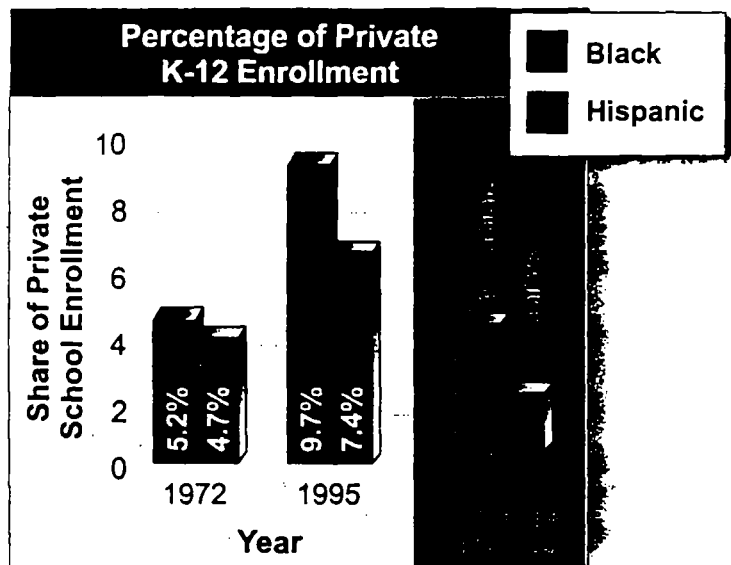
Minorities represent a larger share of K-12 enrollment...



Between 1976 and 1995, the distribution of the enrollment in public elementary and secondary schools has changed dramatically. Currently, over one in three students enrolled in grades K-12 are considered to be part of a minority group. In 1976, three out of every four students enrolled were white, non-Hispanics. Hispanics represent the fastest growing segment of K-12 enrollment.

Source: National Center for Education Statistics.

Minorities Represent a Larger Share of Private K-12 Enrollment As Well...

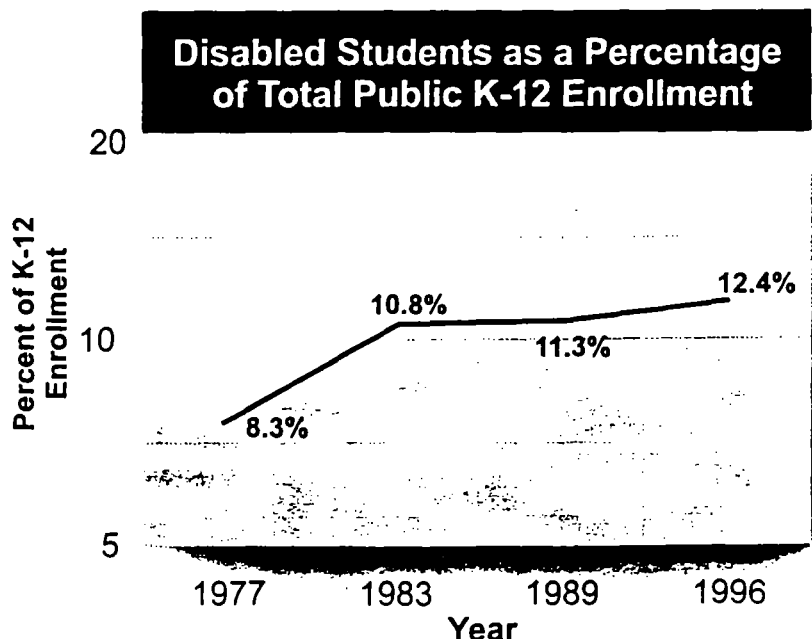


Between 1972 and 1995, the share of private K-12 enrollment represented by students considered to be part of a minority group has increased. In 1972, black and Hispanic students represented less than 10 percent of all private elementary and secondary school enrollment. By 1995, Hispanic and black students represent just over 17 percent of all private K-12 enrollment.

Source: National Center for Education Statistics.

Disabled Students Represent a Larger Share of K-12 Enrollment...

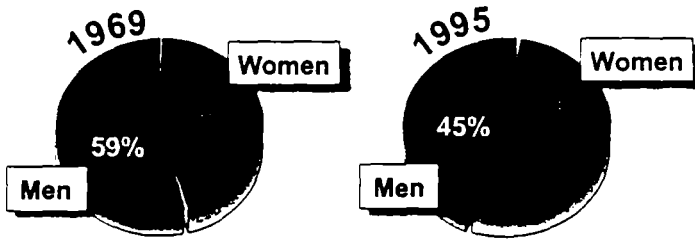
The share of students with disabilities receiving services in federally supported programs account for 12 percent of all public school enrollment while in 1977 students with disabilities represented just over 8 percent of all enrollment. The number of students participating in these programs rose by 51 percent between 1977 and 1996.



Source: National Center for Education Statistics.

Women Now Represent a Majority of All Enrollment in Higher Education...

Higher Education Enrollment by Gender



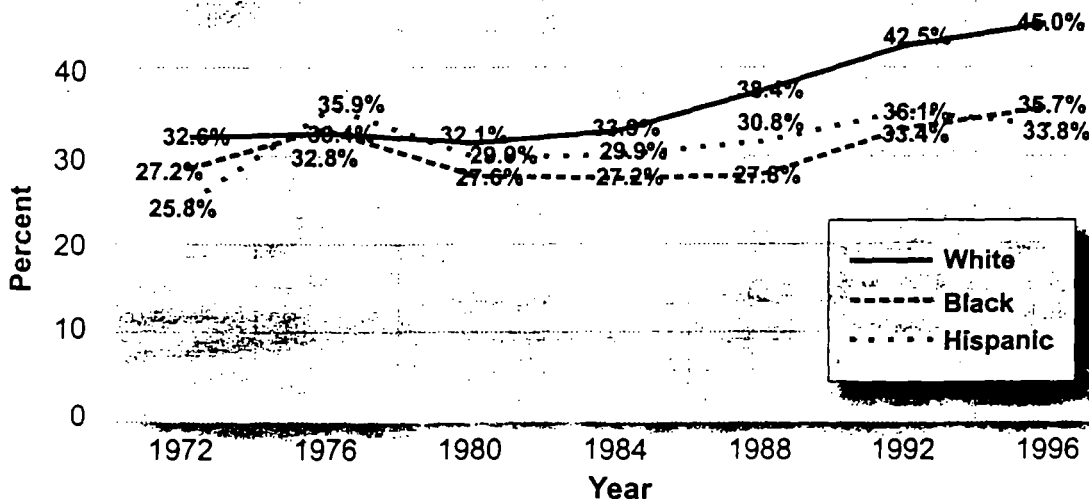
Between 1969 and 1995, the gender composition of higher education enrollment has shifted. In 1969, men represented nearly 60 percent of all higher education enrollment and by 1995 men represent only 45 percent of all higher education enrollment.

Source: National Center for Education Statistics.

College Enrollment Rates Across Racial/Ethnic Groups Are Changing...

White high school completers are more likely to be enrolled in college compared to black and Hispanic high school completers. In 1996, 45 percent of white high school completers were enrolled in college compared to just under 36 percent of black high school completers and nearly 34 percent of Hispanic high school completers. This stands in sharp contrast to the experience in the mid- to late 1970s when college enrollment rates across these groups were similar.

Percent of 18-24 Year Old High School Completers Enrolled in College

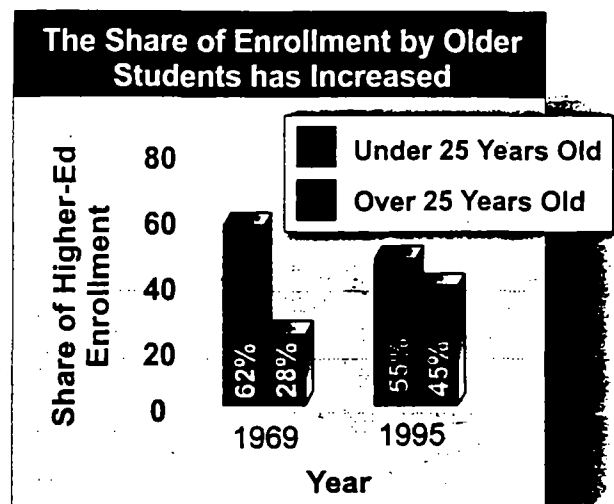


Source: National Center for Education Statistics.

Higher Education Enrollees are Becoming Older...

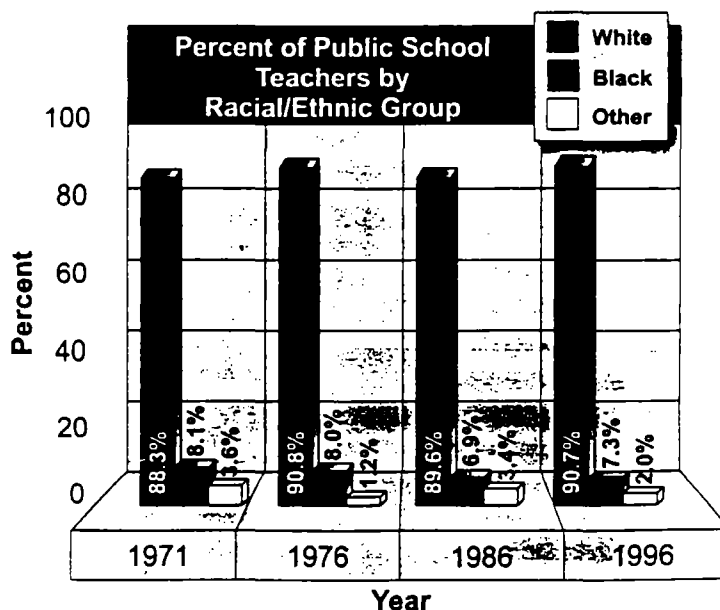
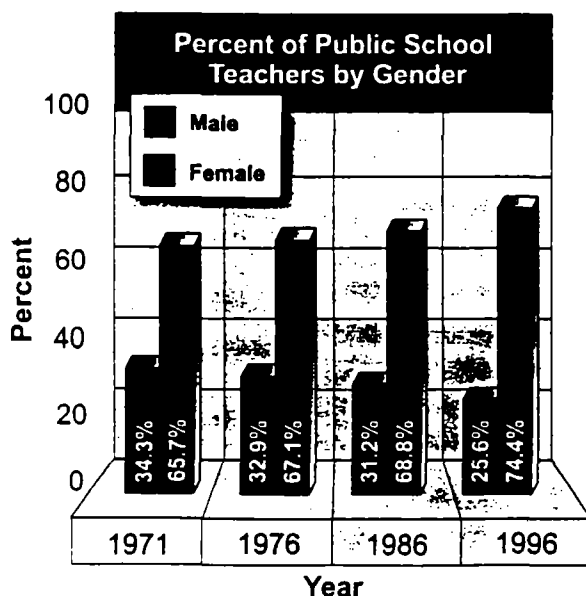
Over the last 16 years, the share of enrollment accounted for by older students has increased dramatically. In 1969, over sixty percent of the students enrolled in higher education were under the age of 25. By 1995, only 55 percent of the students enrolled in higher education were under the age of 25.

Source: National Center for Education Statistics.



Teacher Demographics have not Shifted Significantly...

The gender and racial characteristics of teachers have not shifted significantly. In 1971, women represented nearly two-thirds of all public school teachers while in 1996 women represented nearly three-fourths of all teachers. Between 1971 and 1996, the portion of public school teachers across racial/ethnic groups barely budged. In 1996, nearly 91 percent of all public teachers were white compared to 88 percent in 1971.



Source: National Education Association.

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CHAPTER ONE

TODAY'S FORGOTTEN HALF: STILL LOSING GROUND

Samuel Halperin

As this report nears completion in late 1998, the American people seemingly enjoy an almost unprecedented "boom time." Unemployment and inflation are at near-record lows of the past quarter-century. Stock market averages had reached once-unimaginable heights. Consumer confidence and housing sales are strong. Most new college graduates are being courted with multiple job offers. And a transfer of family wealth — as much as one trillion dollars — to the children of the World War II generation is well underway. National exuberance about the state of the economy — "millennial giddiness," Joel Kotkin and David Friedman call it — carried deep into 1998 as reflected in politics and much of the media.

Against this national backdrop, however, America's underlying social and economic problems are seldom mentioned. Poverty and what to do about it are among the large questions rarely considered. Simultaneously, emerging federal and state budget surpluses fuel politicians' calls in an election year for further tax cuts and still smaller roles for the public sector to deal with persistent social problems.

America's economic gains in the late 1990s are, thus, being recorded in a world apart from, and increasingly unrelated to, the particular world inhabited by The Forgotten Half. Nearly across the board — whether one is looking at the data for education, earnings, social well-being, home ownership, family formations, health insurance, employment, incar-

ceration or almost any other determinant of personal and social progress — those with only a high school education or less than a bachelor's degree have lost considerable ground versus their counterparts only a decade earlier.

THE FORGOTTEN HALF IN 1988

In 1988, The Forgotten Half faced increasingly bleak earnings prospects and serious doubt as to their ability to create and sustain healthy and economically viable families. As the data and analysis that follow reveal, few gains were registered in the last decade and, in many vitally important sectors, we are witnessing stagnation or, worse yet, substantial social and economic regression.

When it issued its two reports on The Forgotten Half in 1988, the William T. Grant Foundation Commission told the nation that, even in a comparatively prosperous time, a huge portion of its young people — specifically those with 12 or fewer years of schooling and high school graduates who did not go on to pursue postsecondary studies — had fallen far behind in the struggle for social stability and economic well-being, and that prospects for improvement were at best uncertain. Heavy media coverage of the Commission's two

major reports focused the public's attention on such disturbing facts of the mid- and late-1980s as these:

- *Unemployment among out-of-school teenagers was 15.8 percent but more than double that for black teens at 32.4 percent.*
- *Inflation-adjusted annual earnings in 1986 for 20-24 year-old male workers had fallen 25 percent during the previous 13 years, from \$12,166 to \$9,027.*
- *Median incomes of families headed by 20-24 year-olds had dropped 27 percent over the same 13-year span.*
- *The proportion of 20-24 year-old males who were married and living with their spouses had plummeted by almost one half, from 39.1 to 21.3 percent between 1974 and 1986.*
- *In 1986, almost one-third of the families headed by a person under age 25 were poor, triple the rate for all American families and more than double the overall poverty rate a generation earlier in 1967.*

In revisiting this scene of the late 1980s, and comparing it with that of the late 1990s, a detailed statistical examination is called for,* and that is the aim of this first chapter of *The Forgotten Half Revisited*.

* Data cited do not necessarily contrast the period 1988-89 with that of 1998-99, but are the most comparable data available at the time of publication. Also, since the transition of many youth into the labor force and family responsibilities is taking longer than formerly, we include data on young adults as well as on teenagers. Much of the data for this chapter, based on official U.S. government statistical sources, were assembled for this volume largely by the professional staff of the Center for Labor Market Studies at Northeastern University (CLMS), including director Professor Andrew M. Sum and senior research associates Drs. Neal and Neeta Fogg.

BAD NEWS

Educational attainment continues to be heavily influenced by family income. High school graduation rates for those in the lowest family income quartile are 25 percent lower than for those in the top quartile, while those in the top income quartile may be as much as ten times more likely to earn a college degree than those in the bottom quartile. (Barton, 1997)

Despite a strong economy and generally rising educational attainment, the full- and part-time employment rates of 16-24 year-olds in 1997 were one to three percentage points lower than in 1989. Minority youth had full-time employment rates 20 to 30 percentage points below their white counterparts.

In March 1997, more than one-quarter of out-of-school youth, although working full-time, were earning less than the poverty line income standard for a four-person family. Young men under age 25 were earning about one-third less (inflation-adjusted) than their

counterparts were earning a generation earlier; young women 16.5 percent less.

Except for children living in families headed by four-year college graduates, poverty rates for children were higher in 1997 than in 1989.

Home ownership among young families fell from 49 percent in 1980 to 38 percent in the 1990s.

The number of incarcerated young men under age 25 doubled between 1986 and 1995. Ten percent of all 20-29 year-old males were either in jail, in prison, on probation or on parole.

Of the four million births annually, one in eight is to a teenager; one in four to an unmarried mother; one in four to a mother with less than a high school education; one in three to a mother living in poverty. (Zill, 1992)

Among teenage mothers ages 15-17, those who are unmarried tripled from 23 percent in 1950 to 84 percent in 1996. Older unmarried teen births (ages 18-19) increased eightfold, from nine percent in 1950 to 71 percent in 1996.

The rate of teen (15-19 years) deaths by accident, homicide and suicide rose between 1985 and 1995 from 63 to 65 per 100,000. (Kids Count, 1998)

The juvenile violent crime arrest rate (ages 10-17) rose from 305 to 507 per 100,000 between 1985 and 1995. (Kids Count, 1998)

The teen birth rate (per 1,000 females ages 15-17) rose from 31 to 36 between 1985 and 1995. (Kids Count, 1998)

The percentage of families with children headed by a single parent rose from 22 to 26 between 1985 and 1995. (Kids Count, 1998) Black children are three times as likely as whites to live in a single-parent family.

BETTER (AND MIXED) NEWS*

The percentage of Americans age 16 or over who completed a high school diploma or GED rose from 28.3 percent in 1990 to 31.4 percent in 1997, while those earning a bachelor's degree or higher rose from 17.4 to 20.7 percent.

The nation's annual dropout rate for youth age 16 or over fell from 9.5 percent in 1985 to six percent in 1991, then rose again to 7.3 percent in 1996. The Forgotten Half (those adults with 12 grades of schooling or less) fell from 51.2 percent in 1990 to 48.2 percent in 1997. The "dropout pool" — 18-24 year-olds who did not graduate from high school and who are not currently enrolled in school — still exceeds 3.1 million, or one of every eight persons in this age group.

Among 16-24 year-olds, those beginning a postsecondary education program leading to a degree rose from 35.5 percent in 1983 to 47.4 percent in 1996, a one-third increase in only 13 years. The high school graduating class of 1996 enrolled in two- and four-year colleges at a record 67 percent.

However, among 25-29 year-olds, graduation rates varied widely: half of all Asians had earned a bachelor's degree, one in three whites, one in seven blacks, and only one in ten Latinos. Overall, only 32 percent of this age group had earned a bachelor's or higher degree.

Parents' educational levels rose sharply from 1970 to 1990: The percentage of fathers with less than a high school education declined from 43 to 19; mothers with less than a 12th grade education fell from 38 to 17 percent. Fathers with a bachelor's degree or higher rose from 13 to 23 percent. (Condition of Education 1997)

African American students today are almost as likely to earn a high school diploma as are white students. The percentage of blacks ages 25-29 who completed high school rose from 58.8 percent in 1971 to 86 percent in 1996. But only 42.5 percent of graduates earned an educational credential beyond high school within ten years of their graduation, compared with 52.7 percent of whites. (Nettles, 1997)

Annual earnings for African Americans who earned associate's, bachelor's and advanced degrees were comparable to whites, but those with only a high school diploma earned less than their white counterparts.

* Unless otherwise indicated, these data derive from tabulations of the Center for Labor Market Studies, Northeastern University. See Sources at the end of Chapter One.

WHO ARE THE FORGOTTEN HALF TODAY? THE CHANGING PROFILE OF AMERICA'S YOUTH AND YOUNG ADULTS

This chapter reviews a variety of statistical sources describing the condition of young Americans, age 16 and older. Although many youth experience difficulties in the labor market well into their late twenties, we focus first on 18-24 year-olds and, more particularly, on *The Forgotten Half*, those approximately ten million young people who neither complete high school nor continue their formal education beyond high school graduation.

Upon reflection, the reader of this re-analysis and update will note that *those young people who have earned only a high school diploma, and even those who have completed some college but have no degree past high school — 20 percent of the workforce — are experiencing serious difficulties in the labor market and in providing a decent quality of life for themselves and their families.*

Between 1988 and 1997, the number of 18-24 year-old civilians fell 3.8 percent, from 25.8 to 24.8 million. As Americans generally increased their rate and longevity of school attendance, the number who could be termed part of The Forgotten Half fell even more sharply: from 12.4 million in 1988 to 9.7 million in 1997, a decline of 22 percent. Thus, today's Forgotten Half is comprised of about 40 percent of the nation's young, noninstitutionalized civilian population. Adding members of the armed forces and inmates of jails and prisons would probably

raise the total proportion to 42 percent of all 18-24 year-olds.

As Figure 1-22 (at the end of this chapter) shows, the sharp decline in the size of The Forgotten Half over the past decade is due entirely to

* About ten percent of 18-24 year-olds earn the GED, up five percentage points from 1993. However, youth earning regular high school diplomas declined by an almost identical five percentage points.

American Educational Attainment Continues to Climb

Still Losing Ground

Figure 1-1: Highest Level of Educational Attainment of the Adult Population (Age 16 and Over), March/April 1990 and March 1997
(numbers in percent)

	1990	1997	Change
Total	100	100	
Still a Student	9.0	8.8	-0.2
8th Grade or Less	9.1	6.9	-2.2
9th-12th Grade, No Diploma	13.8	9.9	-3.9
High School Diploma or GED	28.3	31.4	3.2
Some College, No Degree	16.9	15.7	-1.2
Associate's Degree	5.5	6.4	1.0
Bachelor's Degree	11.4	14.1	2.7
Master's Degree	3.9	4.5	0.6
Professional Degree	1.5	1.2	-0.2
Doctoral Degree	0.6	0.9	0.2

SOURCE: 1990 Census Public Use Microdata Files and March 1997 Current Population Survey; tabulations by Center for Labor Market Studies at Northeastern University (hereafter CLMS).

declines in the number of whites and non-Hispanic/Latino blacks. By contrast, Hispanics, Asians and American Indians in The Forgotten Half rose sharply to the point that Hispanics now outnumber African Americans.

Statistics on educational attainment — i.e., years of formal schooling completed — are a universally-accepted proxy for the economic and

Still Losing Ground

social health of a nation. Looking in Figure 1-1 at the educational breakdown of Americans age 16 and over from 1990 to 1997, we note significant increases in the percentage of the population earning a high school diploma or GED (General Educational Development certificate) and of those earning bachelor's, master's and doctor's degrees, accompanied by a substantial decline in "dropouts," that is, those without a high school credential of any type. That is certainly good news.

Adjusting the educational data for age subgroups, Figure 1-2 also shows definite if slow progress in raising overall educational attainment. Rising participation rates in postsecondary education are particularly striking (as discussed in Chapter Six, below.) Young Americans and their parents are far better educated (some would rather say "credentialed") than earlier generations.

Figure 1-2: Highest Level of Educational Attainment of the Adult Population (Ages 16 to 44), by Age Subgroup, March 1997
(numbers in percent)

	All Ages	16-24	25-34	35-44
Total	100	100	100	100
Still a Student	8.8	54.9	—	—
8th Grade or Less	6.9	2.5	3.7	4.0
9th-12th Grade, No Diploma	9.9	9.2	8.9	8.0
High School Diploma or GED	31.4	19.6	31.6	34.5
Some College, No Degree	15.7	8.0	19.8	18.9
Associate's Degree	6.4	1.8	8.8	8.9
Bachelor's Degree	14.1	3.8	21.2	17.9
Master's Degree	4.5	0.1	4.1	5.5
Professional Degree	1.2	0.0	1.2	1.6
Doctoral Degree	0.9	0.0	0.7	0.8

SOURCE: CLMS from March 1997 Current Population Survey.

Chapter One The Forgotten Half Revisited

Improvement in American educational attainment is a long-term and rather remarkable trend. From 1971 to 1997, the percentage of 25-29 year-olds who had completed high school rose from 77.7 to 87.4 percent; those who had attended "some college" rose from 43.6 to 57.1 percent; and those who had completed four or more years of college rose from 22 to 32 percent.

During the years emphasized in this report, 1989 to 1996, high school graduation rates rose 1.8 percentage points; the one-or-more-years-of-college rate rose 13.4 percentage points; and the four-year college completion rate rose 3.8 percentage points. The high school graduation rates of blacks rose from 82.8 percent in 1989 to over 86 percent in 1997; their "some college" rate rose from 42.1 to 55.9 percent; and their college graduation rates rose from 15.4 to 17 percent. Latinos or Hispanics, on the other hand, made scant progress: their high school graduation rate rose from 61 to only 61.1 percent; the "some college" rate rose from 44.3 to 50.9 percent; while their college graduation rate actually fell slightly, from 16.5 to 16.4 percent.

Equally striking, however, is the revelation that our population as a whole is not as educationally well credentialed as many Americans assume. Excluding young adults under age 25 who are still in school, *almost half of all adults (48.2 percent) either did not complete high school or terminated their formal education after graduation.* Fewer than 15 percent earned only a bachelor's degree, while 6.6 percent received a degree beyond it. Obviously, then, the widely-encountered stereotype