



Expanding College Opportunity

More Access, Greater Achievement,
Higher Expectations

"I have something to say to every family listening to us tonight: Your children can go on to college. If you know a child from a poor family, tell her not to give up— she can go on to college. If you know a young couple struggling with bills, worried they won't be able to send their children to college, tell them not to give up— their children can go on to college. If you know somebody who's caught in a dead-end job and afraid he can't afford the classes necessary to get better jobs for the rest of his life, tell him not to give up— he can go on to college. Because of the things that have been done, we can make college as universal in the 21st century as high school is today. And, my friends, that will change the face and future of America."

*President Bill Clinton
State of the Union Address
January 27, 1998*

EXECUTIVE SUMMARY

More and more, college is the gateway to the American Dream. Education may be the most important investment we make in our lifetimes. It holds the key to good citizenship, enriched lives, and economic prosperity— both for ourselves as individuals and for us as a nation.

The economic returns to college are higher than ever before, and more Americans than ever are going to college. In 1998, young men who completed at least a bachelor's degree earned 150 percent the salary of their peers with no more than a high school diploma— and young women earned twice as much if they had graduated from college.¹ A college graduate earns \$600,000 more over a lifetime, on average, than a high school graduate.² And the real rate of return on a college investment is 12 percent— nearly twice the historical average of the stock market.³

Over the past seven years, we have more than doubled our investment in student aid. As a nation, we need to help America's parents pay for their children's college education and their own continuing education. For seven years, President Clinton and Vice President Gore have sought to make colleges and universities, community colleges, and trade schools universally affordable for all Americans. The Clinton-Gore approach is three-pronged:

- **More college scholarships.** The new Hope Scholarship tax credit provides up to \$1,500 in tax relief for the first two years of college, saving 2.6 million families \$2.6 billion in 1998. The Lifetime Learning credit— which provides up to \$1,000 for juniors and seniors, graduate students, and adults seeking job training— gave 2.3 million families \$800 million in tax relief in 1998. Over 3.8 million needy students receive up to \$3,300 in Pell Grant scholarships, a \$1,000 larger maximum grant than in 1993. Since 1994, over 150,000 AmeriCorps members have earned nearly \$400 million for college while serving their communities.
- **More affordable student loans.** This Administration has introduced lower fees and interest rates that have saved the average borrower over \$500; more flexible repayment terms, including the option to repay as a share of income; and a restored tax deduction for student loan interest. The new Direct Student Loan program— established in 1994— bypasses federally guaranteed lenders to deliver loans to students more quickly, simply, and cheaply. Together, students and taxpayers have already saved \$15 billion through student loan reforms.
- **New paths to college and successful careers.** The new GEAR UP initiative raises expectations and helps over 450,000 disadvantaged middle-school students get on track for college success through partnerships between high-poverty middle schools, universities, and communities. AmeriCorps education awards and a one-third increase in work-study jobs have allowed hundreds of thousands of Americans to earn money for college. Our investment in the TRIO program to help low-income, first-generation students succeed in college has increased by two-thirds since 1993, to \$645 million. The School-to-Work Opportunities Act has provided seed money to help every state broaden young people's career options, make learning more relevant, and promote successful transitions to college and careers. And Youth Opportunity grants make possible comprehensive employment and training assistance to 75,000 out-of-school youth in high-poverty communities.

The Clinton-Gore commitment to opening the doors of college is the largest investment in higher education since the G.I. Bill. College is affordable for all Americans, and more and more of us are benefiting from it. The evidence is in:

- **More Americans are going to college than ever before:** Sixty-six percent of 1998 high school graduates enrolled in college or trade school the next fall, compared to only 60 percent in 1990. Although low-income and minority students continue to go straight to college at significantly lower rates than high-income and white students, the gaps have narrowed since the 1970s and 1980s.⁴
- **More high school students are preparing themselves for college:** The percentage of high school graduates who have taken four years of English and three years each of math, science, and social studies increased from 38 percent to 55 percent.⁵ This increasing academic rigor is heartening because the intensity and quality of high school curricula are dominant determinants of degree completion. Also, SAT scores, especially in math, have gone up over the past 10 years, and the number of test takers reached an all-time high last year— even as a larger and more diverse group of students took the test.⁶
- **Fewer students are dropping out of school:** During the 1990s, approximately 11-12 percent of 16- to 24-year-olds had not completed a high school program and were not enrolled in school, compared to 13-14 percent in the 1980s and over 14 percent in the 1970s. Progress has been especially strong among African Americans, whose high school completion rate now slightly exceeds the national average.⁷
- **More Americans are earning college degrees:** Over 32 percent of 25- to 29-year-olds had earned at least a bachelor's degree in 1999, up from 27 percent in 1990. In particular, white and African American women have seen their college opportunities grow.⁸
- **Americans are becoming lifelong learners:** Fifty percent of adults participated in formal learning in the year prior to a 1999 survey, up from 38 percent in 1991.⁹

This report describes President Clinton and Vice President Gore's efforts to expand college scholarships, make student loans more affordable, and close the college opportunity gap. It describes the impact these efforts have had on college preparation, enrollment, and completion. Finally, it outlines the challenges that continue to face all of us who care about expanding and equalizing college opportunity.

MORE COLLEGE SCHOLARSHIPS

More financial aid is available for college than ever before. Since 1993, new college tax credits and national service programs— as well as the greater availability of federal scholarships for low-income families— have opened the door to higher education for millions of students who otherwise could not afford it. The federal government will provide over \$60 billion in 2001 aid, including the Hope Scholarship and Lifetime Learning tax credits, compared to only about \$25 billion in 1993. Today, students are going to college in record numbers.

College and lifelong learning are more important than ever before. One hundred years ago, we passed laws requiring every child to attend school. Fifty years ago, we extended public schools to 12 years and passed the G.I. Bill to open the doors of college to middle-class Americans. Today, as we enter the 21st century— stepping confidently into the Information Age and an era of global economic competition— we must expand postsecondary education opportunities for everyone.

- **President Clinton proposed the Hope Scholarship to make two years of college affordable for all families.** A \$1,500 tax credit for the first two years of college, the Hope Scholarship will pay for nearly all of a typical community college's tuition and fees. When proposing the credit in 1996, President Clinton declared that "our goal must be nothing less than to make the 13th and 14th years of education as universal to all Americans as the first 12 are today." In 1998, 2.6 million families received \$2.6 billion in tax relief for higher education through the Hope Scholarship.
- **President Clinton also proposed the Lifetime Learning tax credit to complement the Hope Scholarship and promote lifelong education and worker training.** The \$1,000 Lifetime Learning credit reimburses families for 20 percent of their tuition and fees (up to \$5,000 per family) for college, graduate study, or job training. Starting in 2002, the credit will reimburse families for 20 percent of their costs up to \$10,000, for a maximum value of \$2,000. In 1998, 2.3 million families saved \$800 million on higher and continuing education through the Lifetime Learning credit.
- **These credits make a difference for American families.** For instance, a family earning \$60,000 with one child at a community college (with a tuition of \$2,000) and another child who is a sophomore at a private college (with a tuition of \$11,000) would receive as much as \$3,000 in tax relief under the Hope Scholarship. An automobile mechanic with an income of \$30,000, taking courses at a local technical college (with a tuition of \$1,200) to upgrade his computer skills would save as much as \$240 using the Lifetime Learning credit.

The Clinton Administration has been dedicated to expanding scholarships for needy students. The cost of college makes a difference for students from low-income families. Some scholars believe, for instance, that a \$100 increase in the cost of college decreases the enrollment of lower-income students by about 1 percent.¹⁰

- **Pell Grant scholarships for low-income students are the federal government's single largest commitment to equalizing college opportunities.** Pell Grants— more targeted to meet financial need than any other of the Department's student aid programs— help ensure

financial access to postsecondary education. Over the past quarter century, 30 million students have used a Pell Grant to help pay for college or career training.¹¹

- **The Clinton Administration restored the financial integrity of Pell Grants.** The Clinton Administration inherited a \$2 billion funding shortfall in the Pell Grant program. During the next several years, this funding shortfall was eliminated— restoring this important program's solvency— even while increasing the amount that the lowest-income students receive.
- **The Clinton Administration has increased the federal investment in Pell Grants by over 40 percent.** Today, 3.8 million students receive grants of up to \$3,300. When President Clinton took office in 1993, the maximum Pell Grant was \$2,300. In contrast to this \$1,000 increase, the maximum grant increased by only \$630 during 12 years of the Reagan-Bush Administrations.
- **Supplemental Educational Opportunity Grants**, which provide scholarships up to \$4,000 to low-income students, have also been expanded under this Administration. This year, 1.1 million students will receive nearly \$800 million in SEOG scholarships.

Since 1994, AmeriCorps has allowed more than 150,000 Americans to strengthen their community while earning help to pay for college. AmeriCorps members tutor children, fight crime, build houses, and do countless other things to improve lives and bring people together. AmeriCorps has made available nearly \$400 million dollars to help participants achieve their dream of a college education while improving their communities.

MORE AFFORDABLE STUDENT LOANS

Many working families could not afford to pay for college without college loans. Although a college education usually pays for itself in higher earnings many times over, immediate liquidity problems may be a major obstacle for many families.¹² As a result, an accessible and affordable student loan program is essential to college access.

In 1993, the student loan program needed serious reform.

- More than one borrower in five defaulted within two years of graduation.
- Subsidies for lenders and guaranty agencies (intermediaries between lenders and the Department of Education) created a large and unnecessary expense for taxpayers.
- Lenders and guaranty agencies faced financial disincentives to prevent defaults or spend taxpayer dollars prudently.
- Different lenders often had different paperwork, procedures, and schedules, causing confusion and administrative burdens for students and schools.
- Lenders and guaranty agencies often reported unreliable financial data to the government.

In 1993, President Clinton revolutionized college loans by championing the Direct Student Loan program. The Direct Loan system applies free-market principles effectively: It raises capital less expensively through U.S. Treasury bond sales and delivers and services loans through competitively awarded, performance-based contracts with top-quality private firms.

For students, reform means more accessible, cheaper loans. Students now can repay their loans as a share of their income and have saved \$9 billion through lower interest rates and fees.

- **New flexible loan repayments.** By allowing graduates to repay their loans as a share of income, Direct Lending allows students to start college without fear of being unable to repay their loans. The “income-contingent” plan also enables college graduates to undertake teaching and other public service careers.
- **Lower interest rates.** Student loan borrowers since 1993 will save \$100 annually for each \$10,000 in outstanding loans— a total of \$5 billion so far— due to reductions in the interest rate formula in 1993 and 1998. The Administration also championed the lower maximum rate paid by students, reduced from 10 percent to 8.25 percent, to protect them against high interest rates.
- **Lower fees.** Thanks to savings from the Direct Loan program, fees on direct and guaranteed loans were reduced from up to 8 percent of loan principal in 1993 to up to 4 percent today, saving students \$4 billion so far. In 1999, in recognition of widespread discounts available on guaranteed student loans, the Administration reduced direct loan fees to 3 percent.
- **Easier to receive and repay.** Direct loans require less application paperwork and, unlike the guaranteed program, all borrowers have just one account with a single point of contact.
- **Favorable refinancing terms.** Loan consolidation allows students to better manage their debt and lock in favorable loan terms. A typical member of the Class of 2000 who consolidates before July 1, 2000, will save over \$1,500 on \$20,000 of debt due to today’s lower interest rates.

For taxpayers, the student loan reform means billions in savings.

- **Direct loans are much cheaper for taxpayers.** By eliminating subsidy payments to lenders, direct lending has saved over \$4 billion over the past five years.
- **Federal costs of guaranteed loans have also fallen.** Federal subsidies for banks and guaranty agencies have also been pared down, saving taxpayers an additional \$2 billion.
- **The default rate has fallen for seven straight years,** from 22.4 percent at the start of this Administration to a record-low 8.8 percent today.
- **Collections on defaulted loans have tripled,** from \$1 billion to \$3 billion, under this Administration.

For schools, student loan reform slashed administrative burdens.

- **Over 1,200 schools chose to leave the guaranteed loan program and join Direct Lending during its first three years.** Direct lending offers one set of procedures, fast and reliable delivery of funds, less paperwork, electronic loan processing, and a customer service emphasis.
- **Schools in the guaranteed loan program have also benefited through competition.** A new and strong competitor in one of the largest financial markets in the world, the Direct Loan program inspired lenders to improve their service.
 - **School satisfaction with the guaranteed loan programs has increased every year since 1994,** according to independent surveys.
 - **A senior banking executive told a trade journal** that “[Direct Loans] have introduced some ways of doing business and some delivery mechanisms that made the private enterprise wake up a little bit. To be perfectly honest, as a private enterprise we thought we were doing almost an A-plus job. When we stepped back a little bit, we saw some of the things the Department of Education was doing and we realized we weren't. . . . It's been relatively good for the industry, particularly for the recipients in terms of students and schools.”¹³
 - **A 1999 independent assessment** concluded, “Virtually no one disputes that the operation of an alternative loan program has produced a competition that inspired innovation and service— to the benefit of all borrowers and schools.”¹⁴

By signing a tax deduction for student loan interest into law in 1997, President Clinton complemented these reforms. This legislation— which reinstated a provision that had been repealed in the 1980s— will, for example, provide \$144 in tax relief to a college graduate earning \$25,000 a year and struggling to repay her \$12,000 debt. This year, President Clinton asked Congress to expand the student loan interest deduction because current law covers only the first 60 months of loan repayment.

In sum, there was little competition in the student loan program in 1993. The Direct Loan program gave students and schools a choice, injecting healthy competition into the marketplace. Students have saved \$9 billion in interest and fees and enjoyed new tools to manage their debt, including income-contingent repayment. Taxpayers have saved an additional \$6 billion. Today we have two leaner, more competitive, customer-focused programs.

NEW PATHS TO COLLEGE AND SUCCESSFUL CAREERS

Student aid matters, but more is needed to expand college opportunities for all Americans. The Clinton Administration has substantially expanded the federal government's investment in student aid through the Hope and Lifetime Learning tax credits, cheaper and more widely available student loans, and larger Pell Grant scholarships for needy students. But too many students still limit their potential by ruling out education beyond high school. Research indicates that financial aid is not enough—we must intervene in the lives of poor and minority youth to raise their expectations and help them prepare for college, and do so early enough to make a difference.

The GEAR UP initiative is raising expectations of disadvantaged students. In his 1998 State of the Union address, President Clinton proposed a new initiative to make a difference for students in high-poverty schools. Ten months later, Congress enacted GEAR UP—Gaining Early Awareness and Readiness for Undergraduate Programs—with broad bipartisan support. This academic year, its first in operation, the GEAR UP initiative is giving hope, raising expectations, and creating college opportunities for over 450,000 disadvantaged children. Next year it will grow to 750,000 students, and President Clinton requested \$325 million to serve 1.4 million students in 2001-02.

- **GEAR UP supports partnerships of schools, colleges and universities, and community organizations** to strengthen academics and tutoring, raise expectations, provide college visits and counseling, inform families about college requirements and financial aid, and often provide college scholarships. It also funds state efforts to promote college awareness and provide scholarships for needy students. Over 1,000 organizations are GEAR UP partners, including colleges and universities, libraries, arts organizations, and chambers of commerce.
- **Developed based upon academic research about college success, GEAR UP has several special characteristics.** GEAR UP partnerships start no later than the 7th grade because research shows that students who take challenging coursework in middle school, including algebra, are far more likely to succeed in high school and college. Second, GEAR UP programs stay with children through high school graduation to provide long-term mentoring over a period of six or more years, helping children stay on track for college, and often providing scholarships when they reach college. Third, GEAR UP partnerships work with entire grades of students to transform their schools. And finally, they provide college scholarships, which research shows to be particularly important in preventing low-income students from dropping out.
- **Research on existing programs demonstrates the value of and the need for GEAR UP.**
 - **The I Have a Dream (IHAD) program** provides an entire grade of low-income students with intensive mentoring, academic support, and a promise of public and private aid for college tuition. Roughly 75 percent of Chicago IHAD students in the class of 1996 graduated from high school, compared to only 37 percent of students in the control group.
 - **Project GRAD** is a college-school-community partnership to improve inner-city education that has produced dramatic results on a large scale: The percentage of middle school students passing the Texas statewide math test has tripled from 21 percent in 1995 to 63 percent in 1998. Five times more students are going to college.

The Clinton Administration has also expanded the TRIO programs to promote college success. TRIO is a network of initiatives designed to help low-income, first-generation college, and disabled individuals achieve academic success beginning in middle school, throughout college, and into graduate school. Since 1993, funding for the programs has increased by two-thirds, from \$388 million to \$645 million. Named TRIO in the late 1960s after its first three programs— Upward Bound, Talent Search, and Student Support Services— TRIO now serves 730,000 students. The eight TRIO programs include:

- **Upward Bound** provides intensive mentoring and academic enrichment throughout high school to primarily low-income or first-generation college-bound youth. In 1999, over 560 Upward Bound projects engaged 42,000 students in demanding coursework and summer residential programs.
- **Educational Opportunity Centers** provide pre-college academic and financial aid counseling primarily for adults seeking to return to school.
- **Student Support Services** provides tutoring and counseling to help students stay in college.
- **Talent Search** provides academic, career, and financial counseling to disadvantaged students with the potential to succeed in higher education.
- **The Ronald McNair Post-Baccalaureate Achievement Program** provides colleges and universities with funds to subsidize research projects by low-income students to prepare them for a doctoral program.

This year, one million college students will have work-study jobs, over 250,000 more than in 1993. Federal work-study funds have increased 43 percent since 1993. Work-study jobs both expand opportunity and teach responsibility and employment skills. And through the America Reads and America Counts initiatives, work-study students at 1200 schools serve as reading and math tutors in their communities.

Other important Clinton-Gore initiatives have helped young people and their parents set their sights high as they plan for the future:

- **Through the School-to-Work Opportunities Act of 1994, the Administration funds state efforts to broaden young people's career options, make learning more relevant, and promote successful transitions to college and careers.**
- **AmeriCorps builds paths to college.** A recent evaluation found that AmeriCorps helped at least three-quarters of members benefit more from school, pursue their careers, and become engaged citizens. The evaluation also found that the education award served as both an incentive and a clear opportunity to further education and skills.¹⁵
- **Youth Opportunity grants are aimed at increasing the long-term employment of youth in high-poverty.** In some areas of pervasive joblessness, the Department of Labor found that only one out-of-school youth in four had a job.¹⁶ Youth Opportunity grants take a saturation approach to bring about community-wide change, promoting economic development, reducing drop-outs, decreasing crime, and increasing post-secondary enrollment. Youth Opportunity grants now serve over 58,000 youth.
- **The Administration's Think College Early campaign provides accessible guidance to students and their families as they plan for college.** The campaign targets the nation's 19

million adolescents, 20 percent of whom live in poverty. Recognizing that disproportionate numbers of low-income students and minority students attend two-year colleges, Think College Early encourages all students to pursue admission to a four-year college. A brochure available at the Department's web site, *Think College? Me? Now?*, emphasizes the importance of college preparatory coursework and early financial planning for college. In particular, the campaign urges students to take algebra by the 8th grade, as students who gain early exposure to high school math are far more likely to go to a four-year college than those who do not.

- **The new College Opportunities On-Line (COOL) web site** at the Department of Education informs students and their families about their college options. By displaying information on 9,000 colleges— from small technical colleges to the nation's largest and most prestigious universities— the COOL site helps families make informed decisions and creates an incentive for colleges to reduce tuition prices. For each college, the web site provides tuition and financial aid statistics, information on the most recent incoming freshman class, a list of the degrees offered, the available fields of study, and contact information for the college's departments. The web site is available through www.ed.gov.
- **To encourage low-income students to take AP classes and tests, the Administration's Advanced Placement Incentive Program** will provide \$15 million in competitive grants this year to 40 states. Schools use the funds to pay test fees for low-income students, tutoring, classroom materials, and other innovative methods to boost the number and quality of AP classes and participation by low-income students. Since 1998, over 92,000 low-income students have benefited from the program, and this year, over 80,000 more students will benefit from funds to offset the cost of AP exams. Federal support has also encouraged many schools that had not participated in the AP program to begin offering AP courses.

These initiatives complement the Clinton Administration's efforts to strengthen elementary and secondary education:

- **Through high academic standards for all children**, President Clinton has sought to raise expectations and measure results over the past seven years — no longer tolerating lower standards for children living in poverty, with disabilities, or with limited English proficiency.
- **To improve teacher quality**, this Administration has invested in the recruitment, preparation, mentoring, and support of new teachers for the first time in 30 years. It has promoted rigorous standards, supported high quality professional development, and vigorously called for a complete reform of the teaching profession at every level. In 1999, the Administration launched its initiative to hire 100,000 teachers for the early grades to reduce class sizes and strengthen reading and early childhood development.

TRENDS IN HIGHER EDUCATION

President Clinton and Vice President Gore have worked hard to expand college opportunity, and our country has seen remarkable results. As the benefits of college, high academic standards, and student aid grow, so too do high school and college completion rates. Although a “college opportunity gap” still faces many minority and low-income students, our society is making headway in promoting equal educational opportunity for all our citizens.

The Benefits of Postsecondary Education

The real rate of return on a college investment is 12 percent— nearly twice the historical average of the stock market. This figure is based on only earnings; the documented benefits of higher education such as job benefits, better health, and more informed investments and purchases might double the value of higher education. Finally, society’s return on its investment in higher education, in higher tax revenues and lower crime and welfare rates, is also roughly 12 percent.¹⁷

The economic power of higher education is growing steadily, especially for women, as technology and knowledge increasingly drive our nation’s economy. Whereas young men and women in 1980 who completed at least a bachelor’s degree earned 19 percent and 52 percent more, respectively, than their peers with no more than a high school diploma, by 1998 the earnings gap had grown to 56 percent among men and 100 percent among women. In other words, women with a bachelor’s or higher degree now earn twice as much as women with no more than a high school diploma. Similarly, young adults with only a high school diploma earned 30 percent more than young adults who dropped out of high school.¹⁸

Jobs that require a college degree are growing twice as fast as others. The 20 occupations with the highest earnings all require at least a bachelor’s degree.¹⁹ The growing importance of education is illustrated by the demand for technology skills: In 1997, for example, information-technology workers earned 78 percent more than workers in all industries combined— up from 56 percent above average in 1989.²⁰

Higher levels of education encourage additional education over a lifetime— an increasingly important activity in an age of rapid technological and economic change.

- Overall, among adults age 18 or older, participation in some type of formal learning activity during the past 12 months rose from 38 percent in 1991 to 50 percent in 1999.
- In 1999, 65 percent of adults with a bachelor’s or higher degree participated in a formal learning activity within the past 12 months, compared to only 41 percent of those with a high school diploma and only 27 percent of those who had finished middle school but not high school.²¹

Finally, higher levels of education are associated with more active citizenship. In the 1998 congressional elections, college graduates between 25 and 44 years old were 77 percent more likely to vote than high school graduates. High school dropouts were 52 percent less likely to vote than high school graduates. Voting patterns in the 1996 presidential election were similar.²²

High School Dropout and Completion Rates

Fewer students drop out of school than in the 1980s and 1970s. During the 1990s, around 11 to 12 percent of 16- to 24-year-olds had not completed a high school program and were not enrolled in school, compared to 13 percent to 14 percent in the 1980s and over 14 percent in the 1970s. In 1998 and 1999, around 88 percent of 25- to 29-year-olds had completed high school.

Progress has been especially strong among African Americans, whose high school completion rate now slightly exceeds the national average. While there has been some progress, the dropout rate among Hispanic youth remains too high. During the 1990s, around 30 percent of Hispanic 16- to 24-year-olds had not completed a high school program and were not enrolled in school, down only slightly from around 33 percent during the 1970s.²³

College Preparedness

Academic intensity of students high school curriculum is a dominant determinant of whether they will earn a college degree, according to U.S. Department of Education research. Rigor of curriculum is a better predictor of college completion than test scores or class rank and GPA, and the positive impact of the high school curriculum is far more pronounced for African-American and Hispanic students than any other pre-college indicator of academic resources.²⁴

So it is heartening that students who finish high school are better prepared for college than they were a decade ago. Between 1990 and 1998, the percentage of high school graduates who have taken four years of English and three years each of math, science, and social studies increased from 38 percent to 55 percent, with large increases across all racial and ethnic groups.²⁵

Advanced Placement test-taking is at an all-time high. In 1999, over 704,000 students took college-level AP exams; 55 percent of the test-takers were women and 30 percent were minority students, including the highest proportions of African American and Hispanic students ever. Fifty-six percent of high schools offer AP classes today, compared to only 40 percent in 1989.²⁶ As a result, more students are entering college with experience in college-level curriculum than ever before.

Scores on the Scholastic Assessment Test are rising. SAT scores, especially in math, have gone up over the past 10 years, and the number of test-takers reached an all-time high last year— even as a larger and more diverse group of students took the test. Average verbal and math scores have risen among all racial and ethnic groups except Mexican Americans and Hispanics/Latinos.²⁷

College Enrollment and Educational Attainment

High school graduates are enrolling in college in record numbers. The percentage of high school graduates going straight to college rose from 60 percent in 1990 to 66 percent in 1998. These rates of college-going exceed comparable rates during the 1980s, when only 50 percent to 60 percent of high school graduates immediately enrolled in college.

Much of this progress is due to substantial increases in college attendance among women, who now go straight to college at higher rates than men. Lower-income students continue to go straight to college at significantly lower rates than higher-income students, and African Americans and Hispanics go straight to college at lower rates than whites. Nevertheless, the gaps have narrowed somewhat since the mid-1980s and, for the first time, a majority of young African-Americans is enrolling in higher education²⁸

More Americans are earning college degrees. The percentage of 25- to 29-year-olds with a bachelor's or higher degree rose from 27 percent in 1990 to over 32 percent in 1999. Progress among white women account for much of this gain; while less than 29 percent of white women had completed a bachelor's degree in 1990, over 37 percent had done so in 1999. African American women have also made substantial progress; around 19 percent had completed a bachelor's degree in 1999, up from 13 percent to 14 percent at the start of the decade. However, African American men and Hispanic men and women have not shown consistently strong gains over this period. The rates of degree attainment for these groups continue to hover at roughly half the rates for whites.²⁹

Educational attainment among women increased rapidly over the past decade, continuing a trend beginning in the 1970s. Their rates of educational attainment have increased more rapidly than rates among men. By 1999, among 25- to 29-year-olds, women had higher rates than men for completing high school and some college, and there were no differences in the percentages of men and women with a bachelor's or higher degree.³⁰

THE ROAD AHEAD

We can all be proud of our colleges and universities. They are preparing more of our youth from more diverse backgrounds for a more challenging future than ever before. Two-thirds of our high school graduates are immediately enrolling in college and trade school, the most ever. And workers with a bachelor's degree earn 50 to 100 percent more than do their peers with only a high school diploma.

Yet as we enter the 21st century, we face new challenges. We must redouble our efforts to help all students who enter college or trade school earn their degrees and certificates. More than one-third of students who enter college or trade school drop out before they earn a certificate or degree.³¹ The problem is particularly acute among minorities: 29 to 31 percent of African Americans and Hispanics drop out of college in their first year, compared to 18 percent of whites.

In his Fiscal Year 2001 budget, President Clinton proposed new critical investments in higher education, training, and youth opportunities as part of his New Opportunity Agenda:

- **The College Opportunity Tax Cut** to allow families to save up to \$2,800 by deducting \$10,000 in college tuition from their taxes. Investments in human capital deserve the same favorable tax treatment as those in equipment. The College Opportunity Tax Cut would save American families \$30 billion over the next 10 years.
- **More student aid, including a \$716 million investment in Pell Grants** to increase the maximum grant to \$3,500, and substantial increases for Supplemental Educational Opportunity Grants and Federal Work-Study.
- **A \$325 million investment in GEAR UP**, a \$125 million increase, to mentor 1.4 million disadvantaged students on their way to college, and an \$80 million increase for the TRIO programs for low-income and first-generation college students.
- **College Completion Challenge grants** to reduce college drop out rates through increased scholarship aid and pre-freshman summer "bridge" programs.
- **The Dual Degree initiative** to increase opportunities for minority students to earn advanced degrees.
- **Critical investments in elementary and secondary education.** The President asked Congress to reduce class sizes in the early grades, modernize our school facilities, provide high-quality after-school and summer school learning opportunities, and invest in quality teachers. All students ought to be held to high academic expectations.
- **Increase economic opportunities for disadvantaged youth.** The President's budget would increase our investment in Youth Opportunity Grants from \$250 million to \$375 million, serving 25,000 more youth in high-poverty areas. The budget would provide funds to employ 3,330 young high school drop-outs to build houses through YouthBuild, increasing employment skills and creating housing for low-income and homeless families. Finally, the President asked Congress to increase our investment in Job Corps—the nation's largest and most comprehensive residential education and job training program for impoverished young people—to nearly \$1.4 billion.

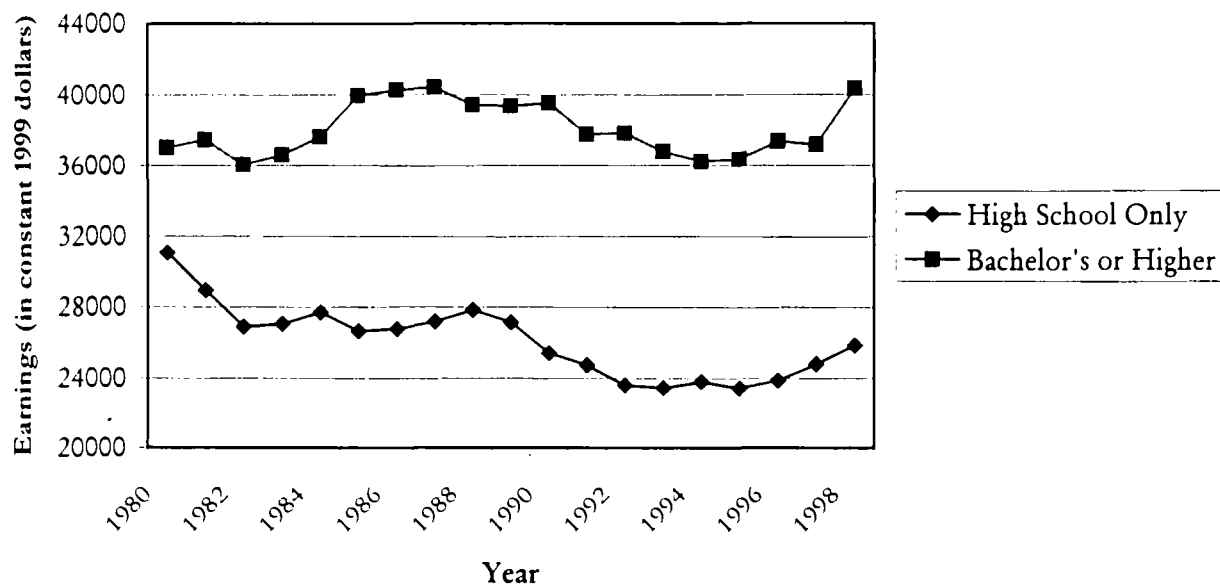
Over the past seven years, President Clinton and Vice President Gore have implemented an unprecedented array of initiatives to expand college opportunities. The new Hope Scholarship and Lifetime Learning tax credits provide \$3.5 billion in tax relief for college. The Direct Student Loan program has saved students and taxpayers a total of \$15 billion. Student loans are cheaper and can be repaid based on the ability to pay.

AmeriCorps has given over 150,000 young people the chance to earn their way through college by serving their country and their communities. The GEAR UP initiative is raising college aspirations for 450,000 at-risk teenagers. And more needy students receive larger Pell Grants scholarships.

We have made great progress toward enabling all of our citizens to achieve the American Dream. All Americans deserve a chance at the economic opportunity, cultural enrichment, and civic engagement that result from higher education. By building upon our investment in education, we can ensure the future prosperity of our nation.

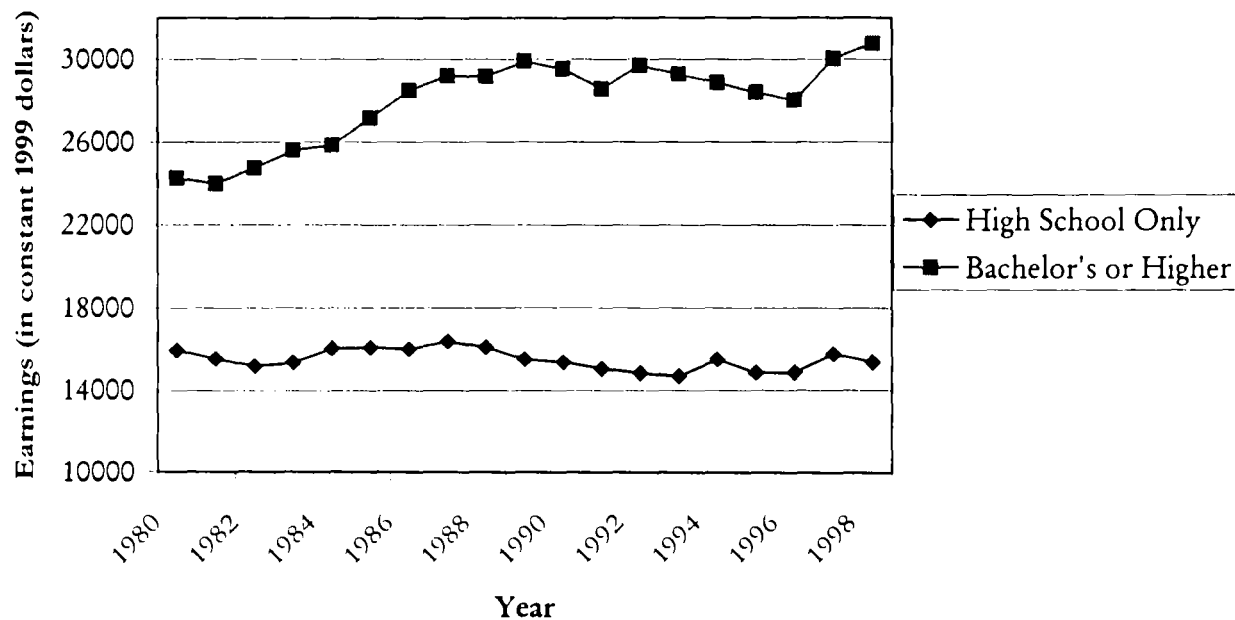
APPENDIX

CHART 1. Average Earnings for Males
(by Educational Attainment)



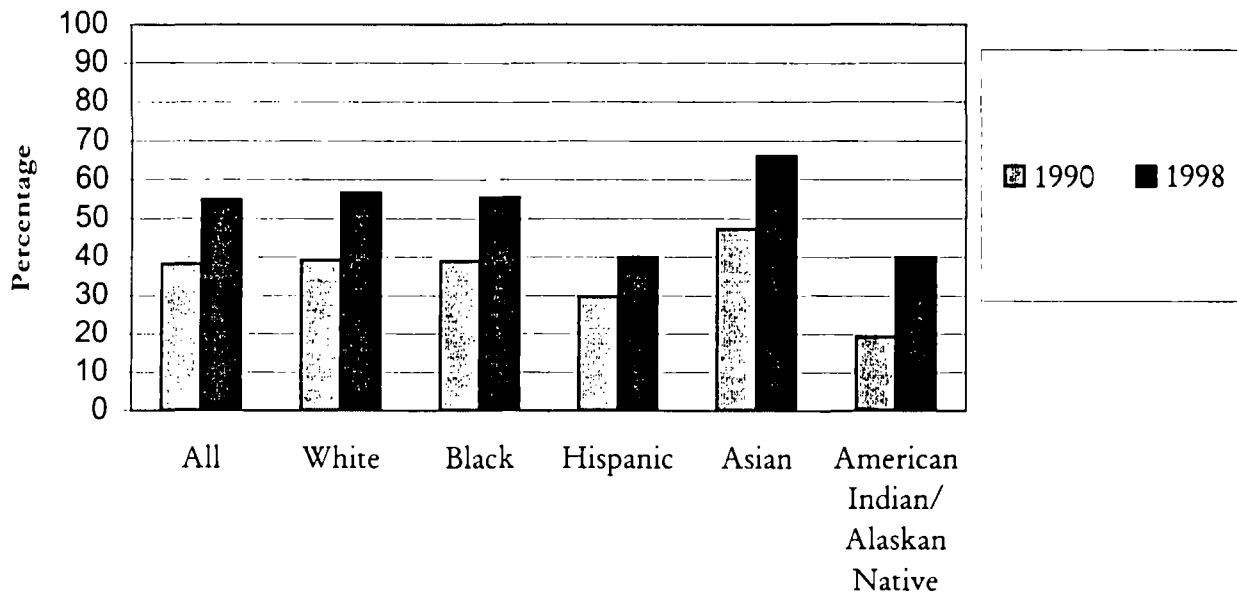
SOURCE: National Center for Education Statistics, *The Condition of Education 2000*, Washington, D.C.: U.S. Department of Education, 2000, p. 34.

**CHART 2. Average Earnings for Females
(by Educational Attainment)**



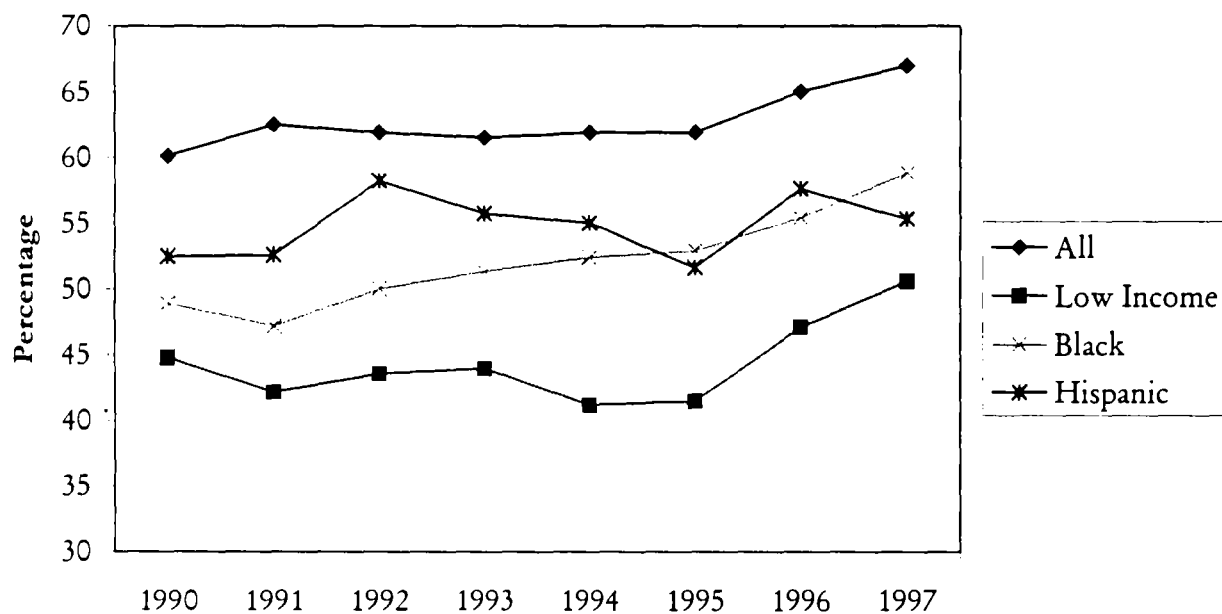
SOURCE: NCES, *The Condition of Education* 2000, p. 34.

**CHART 3. High School Graduates Completing Four Years of English and Three Years of Math, Social Studies, and Science
(in Percentage)**



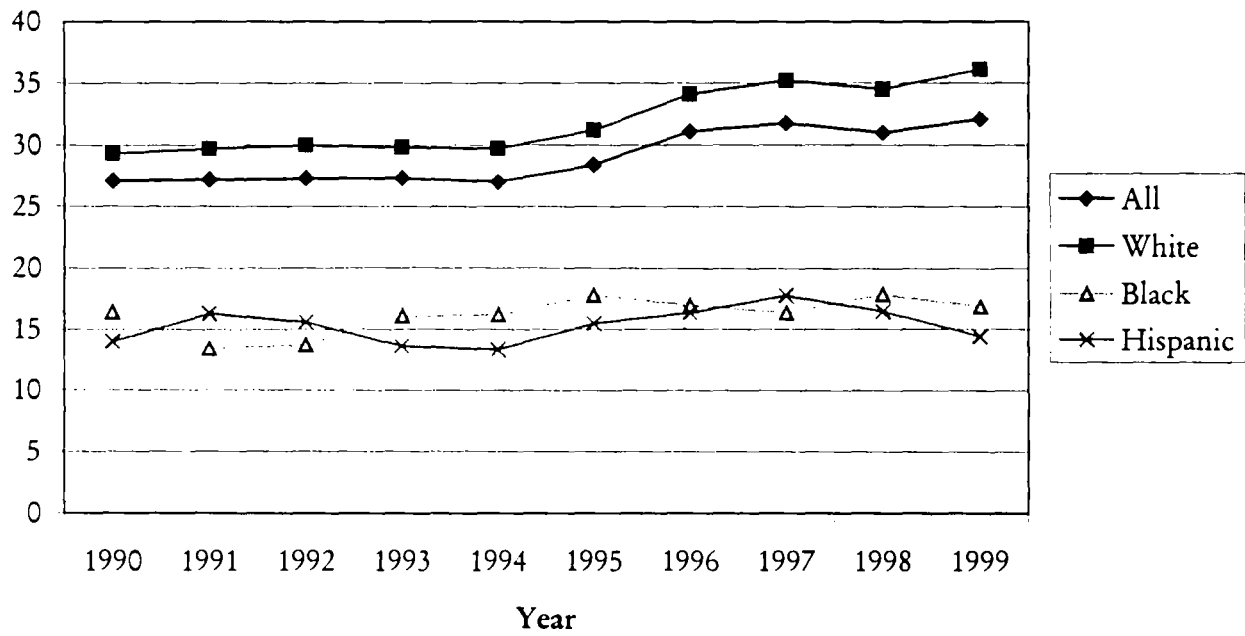
Source: NCES, *Digest of Education Statistics 1999*, p. 156 (Table 142).

CHART 4. High School Completers Immediately Enrolled in College the October after Graduation (in Percentage)



Note: Low-Income, Black, and Hispanic lines reflect three-year averages.
 Source: NCES, The Condition of Education 2000, p. 155 (Table 38-2).

CHART 5. 25- to 29-Year-Old High School Completers with a Bachelor's Degree or Higher (in Percentage)



SOURCE: NCES, *The Condition of Education 2000*, p. 155 (Table 38-2).

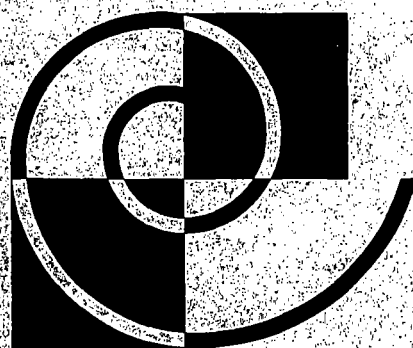
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- ¹³ *Student Lending Update*, "Interview with James Gathard, Senior Vice President for Business Executives for NationsBank Education Loans," January 13, 1998.
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- ²⁰ Council of Economic Advisors (2000), *Economic Report of the President*, p. 137.
- ²¹ *The Condition of Education 2000*, pp. 15, 129 (Table 10-1).
- ²² *The Condition of Education 2000*, p. 33.
- ²³ *Digest of Education Statistics 1999*, p. 127 (Table 108); *The Condition of Education 2000*, p. 154 (Table 38-1).
- ²⁴ Adelman, C. (1999), *Answers in the Tool Box: Academic Intensity, Attendance Patterns, and Bachelor's Degree Attainment*, Washington, DC: U.S. Department of Education.
- ²⁵ *Digest of Education Statistics 1999*, p. 156 (Table 142).
- ²⁶ The College Board, "More Schools, Teachers, and Students Accepted the AP Challenge in 1998-99," August 31, 1999 (available at < www.collegeboard.org/press/senior99/html/990831b.html >); College Board SAT/AP Report.
- ²⁷ College Board SAT/AP Report.
- ²⁸ *The Condition of Education 2000*, pp. 49, 149 (Table 32-1) (using three-year averages for low-income students, African Americans, and Hispanics), 151 (Table 32-3).
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Closing the Gap

**Continuing Higher Education and
The Information Technology Skills Shortage**



UNIVERSITY
CONTINUING
EDUCATION
ASSOCIATION

One Dupont Circle ■ Suite 615 ■ Washington, DC 20036
202/659.3130 ■ Fax 202/785.0374 ■ <http://www.nucea.edu>

ABOUT UCEA

The University Continuing Education Association (UCEA) was founded in 1915 to promote excellence and expanded opportunities in continuing higher education. The Association's some 410 member institutions offer both degree and non-degree instruction at the pre- and post-baccalaureate levels to part-time students. UCEA's membership encompasses accredited, degree-granting colleges and universities, as well as comparable non-profit organizations having a substantial involvement in continuing higher education.

Through its diverse activities, the organization works to:

- * ensure part-time students' access to higher education;
- * foster the development of continuing higher education programs that address diverse constituencies' occupational and intellectual needs;
- * facilitate access to knowledge and practices that can enhance teaching, learning and effective program administration; and
- * support the interests of continuing higher education before relevant legislative, regulatory, and policymaking bodies.

UCEA seeks to exemplify its commitment to ethnic, cultural and gender diversity and fairness in all of its forums, both public and private.

Alabama

University of Alabama
Samford University

Arizona

Arizona State University

California

California State University-Los Angeles
California State University-Northridge
California State University-Sacramento
California State University-San Luis Obispo
San Diego State University
San Francisco State University
San Jose State University
Sonoma State University
University of California-Berkeley
University of California-Davis
University of California-Irvine
University of California-Los Angeles
University of California-Riverside
University of California-San Diego

Colorado

Colorado State University
Mesa State College
Regis University
University of Colorado-Boulder
University of Denver

Connecticut

University of Connecticut
University of Hartford

Delaware

University of Delaware

District of Columbia

George Washington University
USDA Graduate School

Florida

Embry-Riddle Aeronautical University
Florida State University
University of North Florida
University of South Florida

Georgia

Columbus State University
Georgia Institute of Technology
Georgia Southern University
Southern Polytechnic State University
University of Georgia

Idaho

Lewis-Clark State College
University of Idaho

Illinois

Bradley University
Quad-Cities Graduate Studies Center
Southern Illinois University-Edwardsville
Western Illinois University

Indiana

Indiana University

Kansas

Kansas State University

Kentucky

Somerset Community College
University of Kentucky

Louisiana

University of New Orleans

Maryland

Johns Hopkins University
Maryland Institute, College of Art
Towson University
University of Maryland University College

Massachusetts

Bay Path College
Boston University
Harvard University
Northeastern University
University of Massachusetts-Amherst
University of Massachusetts-Lowell

Michigan

Grand Valley State University

Minnesota

University of Minnesota

Mississippi

University of Mississippi

Missouri

Columbia College
Missouri Western State College

Nebraska

University of Nebraska-Omaha

Nevada

University of Nevada-Las Vegas

New Hampshire

Daniel Webster College

New Jersey

Fairleigh-Dickinson University
Rutgers-The State University of New Jersey
Thomas Edison State College

New York

New York University
Pace University
Rochester Institute of Technology
State University of New York-Buffalo
State University of New York-Oswego
State University of New York-Stony Brook
Syracuse University

North Carolina

East Carolina University
North Carolina State University
University of North Carolina-Greensboro
University of North Carolina-Wilmington

North Dakota

North Dakota State University

Northern Marianas

Northern Marianas College

Ohio

Miami University
University of Cincinnati

Oklahoma

Oklahoma State University
University of Tulsa

Oregon

Eastern Oregon University
Portland State University

Pennsylvania

Millersville University
Penn State University
University of Pittsburgh

Tennessee

University of Tennessee-Knoxville

Texas

Alliance for Higher Education
Rice University
University of Texas-Austin

Utah

Utah Valley State College

Vermont

University of Vermont

Virginia

Mary Baldwin College
Old Dominion University
Virginia Commonwealth University
Virginia Polytechnic Institute & State
University
Virginia State University
University of Virginia
University of Richmond

Washington

Central Washington University
Washington State University

West Virginia

Marshall University

Wisconsin

University of Wisconsin-La Crosse
University of Wisconsin-Madison

Alabama

University of Alabama

The University of Alabama provides credit courses in information technology via live, interactive video, the Internet, and via videotape delivery. The School of Library and Information Sciences offers master-level courses each semester. The College of Engineering offers computer science courses at both the undergraduate and graduate level via videotape and interactive video. The College of Education offers graduate and undergraduate computer technology courses via the Internet. These programs have several hundred enrollments each year.

Samford University

Since 1985, Samford University has offered a program of study leading to a B.S. in Computer Science. This program typically has 25 enrollments at a time, and 5 or 6 graduates each year.

Arizona

Arizona State University

ASU's Extended Campus offers a number of computer courses from Introduction to Computers to MS Office and Networking. In addition to regular offerings, ASU develops customized courses for training programs with Arizona businesses. Among these are a long term training program in MS Office and Internet for the Arizona Corporation Commission and a new UNIX training program for Phoenix Newspapers, Inc., Arizona's largest newspaper. Enrollments in these programs during fiscal year 1997 were approximately 1,000. ASU also offers computer science and electrical engineering courses at a distance via interactive television.

California

California State University-Los Angeles

California State University Los Angeles has a number of credit and non-credit courses in Information Technology both for full-time matriculated students, and part-time working adults. These courses are offered for the beginning novice and the IT professional, or those who aspire to become IT professionals. Continuing Education is working in partnership with the School of Business and Economics to ensure a comprehensive array of current certificate and degree courses and programs.

California State University-Northridge

At California State University, Northridge, a number of certificates are offered through Extended Education that provide continuing education to individuals in information technology professions. Among them are Certificates in Programming and Data Management, PC Technical

Support Specialist, Microcomputer Applications, and Computer Graphics. Special programs of study are available in Networking, Object Oriented Programming, UNIX System Administration, and Windows Programming. In all, approximately 900 students are enrolled in these classes.

California State University-Sacramento

California State University-Sacramento's Office of Regional and Continuing Education has offered the following programs to companies and agencies in the information technology area: U.S. Computer Services - C++ and Object Oriented Programming Parts I and II; Tektronix - The C/UNIX Certificate Program (6 courses); McClellan AFB - Intro to C Programming; Intel Corporation - C/Unix Certificate Program; California Division of Forestry - GIS ARCView Programming. In addition to the above classes, many hundreds of information technology employees have taken CSUS/RCE's advertised classes in such areas as: Oracle Programming; Java Programming; Visual Basic, Telecommunications Management, Technical Information Development, Windows NT System Management, Networking, Power Builder, as well as Computer Applications and AutoCAD.

California State University-San Luis Obispo

California Polytechnic State University in San Luis Obispo, California offers courses in the following technology areas: Introduction to Windows 95 I and II -- a two part course focusing on in-depth knowledge of this particular software package; Adobe Workshops I, II, III -- 3 courses for professionals who want special skills in image-editing; Introduction to AutoCAD Creating Web Pages using HTML; Introduction to Internet I and II; and Email for Educators CSU-San Luis Obispo also offer a Technical Communications Certificate Program.

San Diego State University

The Department of Educational Technology at San Diego State University offers certificate and master's degree programs in Educational Technology that synthesize hands-on experience and theoretical knowledge to prepare students for careers in instructional design, educational software development, training, educational product and program evaluation, and performance technology. Graduates pursue careers as employees of or consultants to corporate human resource development and training departments; K-12 schools, colleges, and universities; military and other public organizations; and educational multimedia development companies. Programs are available both on-campus and online.

San Francisco State University

San Francisco State University has one of the largest multimedia training programs in the country. It offers 150 multi-media courses, ranging from computer basics to high-end multimedia production, media theory, and Web design. The 30-credit certificate program includes concentrations in authoring, education and training, business practices, graphics, networked multi-media, writing, and design. SFSU's program participants have access to job contacts and networking with regional companies like Ikonix Interactive and PFMagic.

San Jose State University

Continuing Education at San Jose State University and the SJSU Professional Development Center offer numerous short-term certificate programs for information technology occupations. Among the programs SJSU offers are: Computer Applications Specialist Certificate; Internet Business Specialist Certificate; Microsoft NT Certified System Engineering Certificate; an Internet Achievement Award; a Certificate in Internet Marketing and Communications; and a Certificate in Telecommunications and Network Technologies. To date, there have been over 1,750 enrollments in these programs.

Sonoma State University

Sonoma State University (a campus of the California State University) has a B.S. degree in Computer Science with 200 majors. Sonoma State also has classes and a certificate in Educational Technology for Educators, with some 25 teachers enrolled each semester.

University of California-Berkeley

Each year University Extension, University of California Berkeley offers over 400 classroom courses in the field of information technology, enrolling more than 8,000 continuing education students. Included in these offerings are curricula and certificate programs designed to help people enter the field and update the knowledge and skill of practicing professionals. Berkeley's certificate program in Computer Information Systems: Analysis and Design (a six-course sequence) and many other related courses are now available on-line in a distance learning, self-paced format available to anyone with Internet access.

University of California-Davis

University Extension, UC Davis, enrolls over 4,500 students annually in more than 300 courses in Information Technology. Davis offers 8 certificate programs in topics such as Networking, Computer Office Management and Database Design and Development as well as individual courses and programs. UC Davis also provides customized training opportunities for companies wishing to upgrade technology skills. These programs provide students with skills that can be used immediately in the workplace to fill technology needs.

University of California-Irvine

University Extension at the University of California-Irvine has multiple programs in information technologies and engineering. UC-Irvine maintains education and training partnerships with 12 major corporations such as The Boeing Company, Sony, Rockwell International, and Hughes Defense Communications Systems. Among the programs offered are Certificates in Advanced Software Technologies and Software Engineering Development and courses with emphasis on Oracle applications, MS Office, C++ programming, and web application development. These courses provide an intensive hands-on approach and are taught at the individual corporate sites.

University of California-Los Angeles

The technological leadership of many Southern California-based industries has to a significant degree been supported by UCLA Extension over several decades, both through post-graduate level short courses in engineering, and a broad array of stand-alone classes and seminars, certificated sequences, and articulation with degree programs. Extension's curricula reach into many fields of application, from entertainment, business, design and architecture, to engineering and technology-based instruction in K-12 education. Illustrative certificated programs include: C Programming and Unix, Computer Graphics and Design, Computer Science, Data Communication, Database Management Systems, Digital Signal Processing, Microcomputer and Local Area Network Support, Microprocessor Hardware/Software Engineering, Mini--Micro Programming, Systems Analysis, Systems Management, Systems Programming, and New Media and Digital Image Creation for Entertainment. In 1996-97 alone, these sequences and courses in allied fields generated approximately 15,000 enrollments.

University of California-Riverside

UCR Extension offers over 25 Certificate programs in the engineering and computer science fields. Certificate programs in specific applied technology fields are developed with advisory committees of professionals and often in cooperation with professional societies. Courses in the application of computer technology to geographic information systems, graphic arts, and animation are the fastest growing occupations that demand and can accommodate a trained workforce. Riverside has also begun an innovative regional demonstration program to provide technology training for long-term unemployed or recently laid-off clients with a pre-existing level of computer skills. This program is being done in partnership with the Riverside County Economic Development Agency and the City of Long Beach, and receives funding from the Job Training Partnership Act (JTPA). Over 150 participants have been trained with an 85% placement rate in software development firms, computer programming departments, and other computed related fields.

University of California-San Diego

The UCSD Information Technologies department is the fastest growing department at UCSD Extension. The IT department offers a broad array of courses and curricula aiding professionals who need to upgrade their skills, or those who wish to enter the rapidly expanding fields of Information and Communications Technology. We currently offer 6 major Certificates and 15 specialized Certificates in the broad areas of Communications and Networking, Computer Languages and Programming, Database, Geographic Information Systems, Graphics and Digital Design, CAD, Internet and Web Technologies, Microcomputer Engineering, Microsoft System Engineering, Multimedia, Software Analysis and Design, and UNIX. Between 1996 and 1997, enrollments and courses offered have nearly doubled. The estimated annual enrollments in the IT program for fiscal year 1997-98 are 7,650.

Colorado

Colorado State University

Colorado State University is actively working to meet the information technology needs of American workers. It offers degree programs in computer science (graduate and undergraduate), which may be completed through distance education technology. The information technology major within CSU's business program has resulted in Hewlett Packard's hiring more business grads from CSU than any other university (nearly 700 to date). Colorado State's Denver Center has recently been certified as a Microsoft training facility. CSU computer centers in Denver and Fort Collins offer a variety of software development and applications courses. A course in Java programming is currently being developed for online delivery.

Mesa State College

Mesa State College, Grand Junction, Colorado through the Center for Executive Development, the Department of Continuing Education, and traditional academic programs has begun to address the growing need for information technology personnel. Through a variety of programs, including certificate, fast-track, customized, Associate's and Bachelor's degree courses, Mesa State College is offering both campus-based and off-site training opportunities via traditional (classroom, lecture, lab) and alternative delivery systems (electronic, email, Internet, etc.). These courses include Programming, Word Processing, MS Office, LAN Administration, Internet, Database Applications, Graphics, and Computer Repair.

Regis University

Regis University's School for Professional Studies serves 8,000 adult students in graduate and undergraduate classroom-based, guided independent study and distance learning degrees. In response to the growing information technology fields, the School for Professional Studies is continually updating its curriculum. Currently it offers these degree programs: B.S. in Computer Science; B.S. in Computer Information Systems; B.S. in Management of Communications and Media Technology; M.S. in Computer Information Systems.

University of Colorado-Boulder

The University of Colorado at Boulder, Division of Continuing Education provides two certificate programs in IT related fields, with a third currently in the development stage. The Computer Applications Certificate allows students to choose an area of emphasis. Students complete five required courses, one programming course and four electives from the full range of computer topics (computer graphics, databases, Internet, etc.). The Network Administration Certificate is primarily for individuals responsible for the technical support of local and wide area networks. The program's goal is to provide a comprehensive understanding of the theoretical and practical skills necessary to maintain networked environments. Enrollments in both certificate programs reflect their popularity and applicability. These programs are offered in day, evening, and weekend formats that may be completed within a one-year period.

University of Denver

University College of the University of Denver offers master's degrees and certificates in Telecommunications, Computer Information Systems, Library and Information Services, Technology Management, and Geographic Information Systems. We also offer certificate programs for Women in Computer Science. Since 1995, University College has awarded over 400 degrees and certificates. Currently, these programs have over 1,350 enrollments.

Connecticut

University of Connecticut

The University of Connecticut is working with State political leaders, contingents of the information technology industry, and Community Technical Colleges to inaugurate the Connecticut Information Technology Center. The first programs will be offered in January 1998 in this coordinated push that includes concentrations in the Executive MBA, a new undergraduate general business degree with an IT emphasis, a new professional Master's in Computer Systems and Engineering, a new concentration within the Bachelor's of General Studies in Technical Writing and Communication that is coordinated with the ComTechs, and greatly expanded non-credit professional development programs. This effort has attracted 3.5 million dollars in private corporate support to date. Dr. Norman Gibbs, from Carnegie Mellon University's Software Development Center has just been hired as the new CITI Executive Director. This is a state wide effort housed at the Stamford Campus of the University.

University of Hartford

In addition to its degree programs in computer science, engineering, technology and management information systems, the University of Hartford offers credit and non-credit certificate programs for adult students. Credit program offerings include the computer science, applied statistics and applied engineering math, and several post-B.A. certificate programs. Newly developed non-credit program offerings include the Internet Certificate program, a Microsoft Certified Systems Engineer series for Windows NT 4.0, understanding and using CAD/information technology in design and construction, construction estimating on the Internet, and a computer "boot camp" offering intensive training in essential computer skills.

Delaware

University of Delaware

The University of Delaware Division of Continuing Education has provided continuing education opportunities for information technology professionals for over 25 years. Two non-degree certificate programs of note are a Certificate in Computer Applications - designed to cover concepts, techniques, and operations related to computers and information technology and the Webmaster Certificate - designed to cover issues and applications surrounding the Internet

and the World Wide Web. These two programs have about 1,500 registrations each year. In addition the Division offers a full array of public and customized programs addressing information technology.

District of Columbia

George Washington University

The George Washington University's Continuing Education division offers a master's degree program in Management Information Systems, and non-credit certificate programs in Information Technology, Microsoft Certified Systems Engineer, Networking/IntraNetWare, UNIX/C/C++, Interactive Multimedia, and Web Site Development and Management. Courses are offered in the evenings to accommodate work schedules; some non-credit courses are offered in an intensive daytime format as well. More than 1,000 students register each semester for non-credit courses, and approximately 150 students are enrolled in the master's program at any given time.

USDA Graduate School

The USDA Graduate School has been training individuals in the information systems area for decades. Currently USDA offers 250+ courses in computer sciences, and provide training for about 4,000 individuals annually. Certificate Programs in Computer Programming, Desktop Publishing, and Novell LAN Administration are also available.

Florida

Embry-Riddle Aeronautical University

Embry-Riddle Aeronautical University has three degrees in computer science: a B.S. in Computer Engineering, a B.S. in Computer Science, and an Master's in Software Engineering. Enrollments are growing and all students nearing completion have had multiple job offers prior to graduation. There are almost 400 students in the three programs.

Florida State University

The Center for Professional Development at Florida State University offers four specific certificate programs: Webmaster Certification, Microsoft Certified Systems Engineer, Novell Certified Netware Administrator and Engineer, and A+ Certified Technician training. Nearly 230 students have enrolled in these programs during the last 18 months.

University of North Florida

The University of North Florida offers both a B.S. and an M.S. in Computer and Information Sciences. These degree programs provide advanced knowledge and training based on commonly

employed software environments using both UNIX and NT operating systems. Programming languages employed throughout the curriculum include C/C++, COBOL, Java, and SQL. Networks and communications are emphasized in the curriculum. There are over 600 students in these programs, 70% of them part-time, with 75 to 100 graduates each year. Almost all of them become employed in information technology positions by the time they graduate. During their course of study, many participate in cooperative education with local industry.

University of South Florida

The Division of Lifelong Learning at the University of South Florida has offered a range of computer application and Internet training for professional and personal use for some time. In the past two years South Florida has started offering professional computer certifications. Among these are the Certified Novell Engineer, the Microsoft Certified System Engineer, the UNIX Certificate, an A+ Certificate and a new Year 2000 Programming Certificate.

Georgia

Columbus State University

In 1990, Columbus College, now Columbus State University (CSU), began a partnership with Total System Services (TSYS), the second largest credit card managing company in the United States, to train computer programmers to meet TSYS' needs for expanded operations. Since the partnership began, over 1,000 TSYS employees have completed the 8 week entry level program. Earlier this year TSYS announced an expansion which will increase the staff from 2,500 to 5,000 people over the next five years. CSU will be responsible for training personnel to fill most of the technical positions. The TSYS program has matured into a credit opportunity at the A.A. and B.A. level through the ICPP (Intellectual Capital Partnership Program). Students in ICPP are selected by the employer and usually paid during their training period (5 quarters for the A.A. and 10 Quarters for the B.A.). Students attend instruction 8 or more hours a day, five days a week. CSU has graduated 230 people from ICPP. Currently 150 people are enrolled in ICPP, with expected admissions of 300 students per year in the for the next five years.

Georgia Institute of Technology

Georgia Tech's Continuing Education curriculum contains over 100 non-credit computer and multi-media short courses and certificate programs, ranging from UNIX applications to Internet applications.

Georgia Southern University

Georgia Southern University, located in Statesboro, Georgia has offered over 26 different computer training courses since the summer of 1996. The 1996-97 enrollment for these courses was 224 participants. The Proficiency in Computer Training Certificate offers a wide range of courses such as computer basics, spreadsheets, Internet training, and how to design web pages. It

is a requirement to complete 10 courses in order to receive the Proficiency Certificate from Georgia Southern University.

Southern Polytechnic State University

At Southern Polytechnic State University, academic degrees are offered in Computer Science, Software Engineering and Technical Writing, as well as a Communications options in Electrical Engineering Technology. Continuing Education programs include certificate programs in Computer Service Technical, Help Desk Operator and Office Technology; and short courses in networking, MCSE, CNE/CNA, C++, Visual Basic, UNIX, JAVA, other programming languages, database management including Oracle and DB2, web development and design, AutoCAD, and MicroStation. Between degree classes and Continuing Education offerings, SPSU provides training to more than 6,000 individual per year.

University of Georgia

The University of Georgia Center for Continuing Education offers a full schedule of short courses designed to increase information technology skills. Courses include introductory programs in popular software, Novell and NT Server management, geographic information systems such as ArcView and Avenue, and Unix management. The number of students for each course is limited to 15 to maximize the hands-on, instructional approach.

Idaho

Lewis-Clark State College

Lewis-Clark State College (LCSC) , located in Lewiston, Idaho, provides information technology education and training, encompassing short-term training courses, ranging from beginning computer skills to NT training. Specific certificate (standard and advanced), and degree programs (A.A./B.A.) include office and business technologies, computer systems analysis and repair, drafting technology, electronic communications, electronic imaging, industrial electronics, manufacturing maintenance technology, and video systems repair.

University of Idaho

The University of Idaho provides information technology training through a wide spectrum of channels including degree programs in Computer Science, Management Information Systems, and Industrial Technology. In addition, the University sponsors independent study courses in computer technology and operating systems as well as providing non-credit computer software training courses.

Illinois

Bradley University

In response to the growing demand for technology training and education, Bradley University will offer a Certificate in Programming and an Accelerated M.S. Degree in Computer Science beginning in January 1998. The accelerated courses are equivalent to Bradley's traditional courses but offer participants to complete a five-course certificate or a 36 hour degree in reduced time. Courses meet in the evenings over 7 weeks and make use of a new, state-of-the-art computer lab. Bradley University is a private, comprehensive university located in Peoria, Illinois.

Quad-Cities Graduate Studies Center

The Quad Cities Graduate Study Center, through its eleven member institutions, facilitates the delivery of two master's degree programs and numerous credit and non-credit courses in information technology. These programs and courses are offered during evening and weekend hours, during times which are convenient for placebound working professionals in the area. Programs cover the use of technology in the corporate as well as education setting.

Southern Illinois University-Edwardsville

The Department of Computer Management and Information Systems at Southern Illinois University at Edwardsville (SIUE) trains students through its B.S. in Management Information Systems degree program. Students learn basic computing skills including computer programming, systems analysis and design, database technology, and microcomputer network administration. Additionally the M.S. in Computing and Information Systems offered jointly by the Department of Computer Management and Information Systems trains students at the graduate level to work as generalists in the computing field.

Western Illinois University

Western Illinois University offers a B.S. in Instructional Technology and Telecommunications with approximately 100 students enrolled and the Master of Science in Instructional Technology and Telecommunications with approximately 150 students enrolled. A certificate program is currently being developed.

Indiana

Indiana University

Indiana University through the School of Continuing studies has launched a program which offers technology-based, asynchronous training modules for industry and for continuing professional education in nursing, medicine, law, law enforcement, and environmental and public

affairs. Among the technologies utilized are interactive virtual reality, web linked interactive modules, and streamed audio and video. the modules are designed to the specific needs of the client with assessment and certification built into the software application. The asynchronous nature of the application allows the use of the materials in in multiples sites at times convenient for the trainer and trainee.

Kansas

Kansas State University

Kansas State University offers a Master's degree in Software Engineering to distance learners. A full program of courses is offered, currently by videotape. About 85 students from all over the U.S. participate in this degree program each semester.

Kentucky

Somerset Community College

Somerset Community College provides short-term computer software training using both our on-site computer lab and our mobile/desk-top computer lab. SCC has provided these types of courses to train students for medical technology occupations and for a variety of industrial clients.

University of Kentucky

University of Kentucky and its Community Colleges are advancing technology education in many ways including academic majors, minors, credit and non-credit long and short courses on campus and across the Commonwealth of Kentucky. In addition, through the Advanced Technical Education grant from the National Science Foundation, the UK Mathematics Department has developed a system of networked computer laboratories at the Community Colleges and provides the staff and faculty development needed to develop and use them. Ten credit offerings provided necessary training, including courses in UNIX, Windows NT, Networking, and Mathematics. The courses were televised statewide. Statewide comments and requests have been so positive that these technology support courses will be offered again. Based in two NSF grants, this program is also disseminating free CHISEL CD's--a complete set of tools and accessories for distance learning.

Louisiana

University of New Orleans

The University of New Orleans, through the work of its Metropolitan College and the UNO Research and Technology Park has become a state-wide leader in information technology training. UNO recently announced a partnership with the U.S. Navy that will bring nearly 6,000 jobs to the New Orleans area and is expected to bring \$272 million into Louisiana's economy by

the year 2000. In addition to the new Information Technology Center being built by the Navy, UNO's Research and Technology Park is becoming a destination of choice for technology companies in the south such as Imaging Technology Solutions and Axonn Technologies. Metropolitan College, UNO's continuing education division, will provide education and training to these companies. The University of New Orleans will bolster their current technology training programs, such as their Certificate in Microcomputing, through their participation in Oracle's new Academic Initiative.

Maryland

Johns Hopkins University

The Johns Hopkins University School of Continuing Studies offers a wide array of information technology training ranging from non-credit programs to master's degree levels. Each semester over 65 courses provide students with technology skills in areas such as database management, web design and development, networking, and multimedia. Students can also pursue non-credit Certificates in Applications Software Support, Microcomputer Repair, and Webmaster skills. Credit based certificate programs are offered in Information Systems and Telecommunications. Johns Hopkins also offers an M.S. degree in Information and Telecommunications for Business.

Maryland Institute, College of Art

The Maryland Institute, College of Art, Computer Center offers a Certificate in Graphic and Digital Design and provides an array of art oriented software courses.

Towson University

Through its Business and Industry Outreach programs, Towson University in Towson, Maryland has dedicated significant resources to the task of preparing Maryland's technology workforce. Towson maintains the Baltimore County Technology Training Center and offers computer applications training for multiple skill levels. Towson is also a provider of customized technology training programs to regional business and industry. In addition to these programs, Towson University works in partnership with Innovative Community Technology Services, a private company in Alexandria, Virginia and Old Dominion University in Norfolk, Virginia in providing "Operation Bootstrap", a technology training program for unemployed and underemployed individuals, professionals in career transition, and recent high school graduates. This program provides single courses and industry certifications.

University of Maryland University College

University of Maryland University College (UMUC), one of 11 degree granting institutions of the University System of Maryland, provides access to higher education to the current workforce by tailoring programs and services to the special requirements of this adult student population. UMUC provides a variety of information technology related degree programs at the

undergraduate and graduate levels which are delivered in traditional classrooms and distance formats. Programs at the undergraduate level include computer science, computer and information science, and information systems management. Graduate programs consist of computer systems management, telecommunications management, and software engineering. UMUC provides more degreed IT professionals (bachelor's and master's degrees) to the Maryland and national capital area economy than any other public university in Maryland. Over 700 graduates earned degrees in IT-related fields in fiscal year 1996.

Massachusetts

Bay Path College

Bay Path College has a mission of developing its students to excel in three key areas: leadership, communication, and technology. All the College's courses and co-curricular activities reinforce these three themes. In addition to credit-bearing courses in Information Technology, Bay Path partners with a company called Key-Logic Education Center to offer cutting edge day-long courses to the local and corporate communities. Information technology training is also available through Adult Education non-credit programs.

Boston University

Boston University's Metropolitan College provides a variety of programs aimed at information technologies. At the degree level it provides undergraduate and graduate degrees in Computer Science, Computer Information Systems, and Telecommunications as well as a variety of short certificates. In these programs it served about 800 students annually. Through its Corporate Education Center it provides vocational, seminar, and conference based training in the fields of information technology and management development. The Corporate Education Center is one of the largest vendor authorized technical education centers in New England offering Microsoft (ATEC), Novell (NAEC), Lotus (LAEC) and SCO UNIX authorized training. The Corporate Education Center provides extensive training programs for both the career changer and career enhancer, training in excess of 10,000 students annually through its various programs.

Harvard University

The Certificate in Applied Sciences (CAS) is designed for students with modest academic backgrounds in science or mathematics who need formal training in computer and information technology to further their career goals. The program includes basic courses in computer and information sciences, as well as specialized courses of immediate relevance to today's high-technology industries. It was developed with the support of the Massachusetts High Technology Council in 1982 and has had almost 300 students earn the certificate since that time. During the Fall term of 1997 Harvard enjoyed record enrollments, with over 1,100 student registrations in CAS courses.

Northeastern University

Through University College and Continuing Education programs, Northeastern University in Boston, Massachusetts provides a wide array of credit and non-credit information technology courses, certificates, and degree programs. Some programs focus on entry-level skills and are ideal for adult students in career transition. Other offerings through the State-of-the-Art Engineering program provide high level, "cutting edge" professional development courses and certificates for those already working in the computer and information technology industries. Recently, the curriculum has focused on areas such as networking and communications, Internet/Web technology, software engineering, and microelectronics/computer technology. Credit enrollments in technology subjects total 6,000 annually; non-credit professional development enrollments in information technology total 5,000 annually.

University of Massachusetts-Amherst

The University of Massachusetts Amherst Division of Continuing Education offers one- and two-credit courses in collaboration with the University's Computer Science Department. Recent courses include Programming in C++, Programming in Java, Introduction to UNIX Environment, and Advanced UNIX.

University of Massachusetts-Lowell

The Division of Continuing Education at UMass Lowell offers several certificate programs in information technology such as Computer Proficiency, Data/Telecommunications, Graphic Design & Digital Imaging, Internet Systems Administration, Multimedia Applications, and UNIX Certification. Over 2,000 students are currently enrolled in information technology certificate programs or in courses leading to a B.S. degree in Information Systems.

Michigan

Grand Valley State University

Grand Valley State University offers majors and minors in Computer Science and Information Systems and Computer Engineering at the bachelor's level. At the graduate certificate and Master's of Science level, it offers Information Systems Management, Computer Science, Software Engineering, Distributed Computing, and Object Oriented Technology programs for information technology personnel.

Minnesota

University of Minnesota

University College, University of Minnesota (Twin Cities) offers an accelerated, hands-on, 320-hour, non-credit certificate "UNIX System and C/C++" program. Graduates of the program

gain skills equivalent to one to two years of on-the-job experience, and are being recruited and hired as system administrators and programmers by Fortune 500 companies. There are currently seven sections (24 students each) per year (4 full-time during the day and 3 part-time evenings/Saturdays). In 1993, University College began offering a Bachelor's in Information Networking. This degree was developed in cooperation with several community college in the Minneapolis-St. Paul metropolitan area. The demand for many of these programs is so great that University College has established waiting lists for the courses until offerings can be expanded.

Mississippi

University of Mississippi

The Institute for Continuing Studies at the University of Mississippi offers course on the Fundamentals of Multimedia Technologies (ENGR 597) via compressed video to various parts of the state of Mississippi. The course includes such subjects as multimedia technologies, production techniques, interactive video and imaging, the Internet, and web page design.

Missouri

Columbia College

The Columbia College Computer Information Systems Department provides both associate and baccalaureate degree students a rigorous theoretical background coupled with practical and essential skills for professional success. The computer information systems curriculum is based on recommendations of the Association of Computing Machinery (ACM) and the Data Processing Management Association (DPMA). Columbia College currently has approximately 400 computer information systems majors on its home campus and at 16 academic centers throughout the United States.

Missouri Western State College

Missouri Western State College offers the following training for informational technology personnel: B.S. degrees in Computer Science and Computer Information Systems, a Certificate and an Associate's degree in Health Information Management, and classes in fundamentals of management information systems.

Nebraska

University of Nebraska-Omaha

To help Information Technology professionals stay competitive in the information race and to prepare individuals for a career in technology, the University of Nebraska at Omaha's College of Continuing Studies (CCS) offers: a Bachelor's of General Science Degree with a concentration in computer science; customized on-site training, retraining, and development workshops for IT

professional; and a Certificate in Software Engineering and Management for IT professionals and management. More than 1,400 students enroll annually in the B.G.S. program; over 8,500 people were assisted through more than 300 non-credit courses, workshops, conferences and seminars; and, more than 190 participants have registered for the Certificate in Software Engineering and Management program.

Nevada

University of Nevada-Las Vegas

The University of Nevada-Las Vegas offers courses in information technology from three different perspectives: the College of Business, the College of Engineering, and the Division of Continuing Education's Professional Development Center. The Business College has about 250 majors - undergraduate and graduate - in Management Information Systems. The Engineering College has about 600 majors in Computer Science and Computer Engineering. The Professional Development Center offers non-credit classes and certificate programs in a variety of software applications.

New Hampshire

Daniel Webster College

Daniel Webster College offers six information technology certificates for college credit, as well as an innovative dual-discipline accelerated bachelor's degree in Information Technology Management. In addition, Daniel Webster College is an Authorized Microsoft Education Center (ATEC) and offers all courses for Microsoft's MCSE certification. Daniel Webster has 200-300 three-credit information technology enrollments every 8 weeks.

New Jersey

Fairleigh-Dickinson University

Fairleigh Dickinson University is currently offering undergraduate and graduate degree programs in Computer Science and Information Systems. In addition, The Office of Continuing Education offers six certificate programs in the following areas: Basic Computer Skills, Information Systems, Computer Programming, Advanced Computer Programming, Distributed Systems, and Database Administration. FDU will be offering an additional Web Master Certificate in June 1998.

Rutgers-The State University of New Jersey

Rutgers, The State University of New Jersey, serves the information technology needs of the state of New Jersey through courses, workshops, and certificate programs offered at the three campuses of Camden, Newark and New Brunswick and over seventy off-campus sites. Rutgers

offers a wide range of information technology resources, both credit and non-credit, for a wide range of constituencies. Course topics range from information systems workshops to computer aids for industrial productivity to the use of information technology in solving environmental problems. Constituencies range from computer specialists to government officials.

Thomas Edison State College

Thomas Edison State College offers a number of degree programs that are computer related. Bachelor's degrees include Computer Science, Computer Science Technology, Data Processing, and Management Information Systems. Associate's degrees are offered in Computer Science, Computer Science Technology and Data Processing. Enrollments for 1997 were nearly 750.

New York

New York University

The New York University School of Continuing Education's Information Technologies Institute offers the following short term certificate programs: Certificate in Internet Technologies, Certificate in Interactive Web Programming: CGI and Java; Certificate in UNIX Systems Management, Certificate in Windows NT Programming and Certificate in Database Management (a partial listing). The Institute offers many of these certificates in intensive formats for time pressed students. There is also an M.S. degree in Management Control and Systems, offered completely online. The Institute has 2,000 enrollments per semester.

Pace University

The School of Computer Science and Information Systems (CSIS) of Pace University has a long history of providing short term, non-credit courses, designed for the individual who aspires to or currently works in the field of information technology. More than 50 courses in everything from Introduction to Windows, word processing, spreadsheets, database, presentation graphics, Microsoft Office and Internet workshops - to full programs leading to Certified Novell Engineer and Microsoft Certified Systems Engineer credentials are offered on a continuous basis through the Pace Computer Learning Centers in Manhattan and Westchester County, New York. In addition, the School offers degrees at the bachelor's and master's levels in Computer Science, Information Systems, and Telecommunications and Certificates in Computer Communications & Networks, Telecommunications and Object Oriented Programming. More than 1,000 individuals are trained on an annual basis in the short term courses, and 1,400 are enrolled in undergraduate and graduate degree programs.

Rochester Institute of Technology

R.I.T. offers two degrees in Information Technology as well as traditional computing degrees ranging from Computer Science to Software Engineering. The B.S. in Information Technology is a unique program that produces professionals who can successfully deploy today's computing

technology to meet the needs of end users. Graduates combine a solid core of knowledge and experience in technical areas such as intranetworking, internetworking, training and human performance, multimedia, systems administration and programming with communication skills and a grasp of human issues involved in technology transfer. Co-operative work experience is required. In the M.S. in Information Technology program, students combine specialty areas selected from interactive multimedia development, training/human performance, telecommunications technology/management, software development/management, information technology strategy, and other imaging and technical fields with a solid core in information integration, telecommunications and theories of interactive computing. These two programs have a combined enrollment of about 750 students.

State University of New York-Buffalo

Millard Fillmore College/SUNY Buffalo offers the following certificate programs in computing and network management: Microcomputer Business Applications, Systems Analysis and Design, Network Management, Computing and Information Systems. These programs currently enroll over 400 students.

State University of New York-Oswego

SUNY Oswego's Information science major is structured to provide students with the ability to analyze and respond to computer user needs. While the technical aspect of the program encompasses courses in computer programming, database and text management systems, telecommunications, expert systems and statistics, the human aspect includes assessing people's information needs and exploring the social effects of information systems. Students have the ability to customize their coursework by collaborating with an adviser to develop a learning agreement that fits their particular goals. Recent internships have involved setting up and training people to use databases in city government, in nearby school districts, on campus and in corporations. The minor in computer information systems augments the study of other disciplines by preparing students to analyze and use computer information systems.

State University of New York-Stony Brook

The School of Professional Development (SPD) at SUNY Stony Brook offers a variety of long-term and short-term programs (both credit and non-credit) for information technology professionals. These include Advanced Graduate Certificates in Software Engineering, Educational Computing, and Information Systems Management. Non-credit workshops and institutes address specific training needs that usually include mastery of new software and functioning in a high technology environment. Approximately 1,200 students are currently enrolled in these programs.

Syracuse University

For the past three years, Syracuse University's Center for Business Information Technologies has been providing training and re-training programs for information technology professionals

throughout Upstate, NY. Seven unique certificate programs are currently offered in the competency areas of Client Server Developer, Internet Application Developer, UNIX System Administrator, Webmaster-Web Site Administrator, Network Engineer (Novell&Microsoft), and Microcomputer Repair Technician. Each program is one year in length at night or six months during the daytime. Syracuse has successfully trained over 500 adult students and over nearly 100 students who were previously unemployed have found jobs in IT.

North Carolina

East Carolina University

East Carolina University has an M.S. degree in Industrial Technology, which is available over the Internet. A total of 358 student registrations have been completed by distance education courses through Continuing Studies (TV, Internet, and combinations) at East Carolina University during the 1996-97 academic year. Most of these courses included specialized skills training.

North Carolina State University

North Carolina State University offers information technology skills training in programs that vary from single non-credit courses to an M.S. degree in Computer Science offered in the evening. The Division of Continuing and Professional Education sponsors an annual non-credit series which, in the past fiscal year, impacted approximately 35 companies and 350 professionals. The hands-on and lecture courses are designed for information systems professionals, technical managers, project leaders, and application developers. The Computer Training Unit scheduled approximately 600 day, evening and weekend non-credit courses during the past fiscal year, serving 3,234 end-users and programmers representing 504 different North Carolina businesses and units of state government.

University of North Carolina-Greensboro

The University of North Carolina at Greensboro offers both undergraduate and graduate degree programs in information technology. The Division of Continual Learning and the Joseph M. Bryan School of Business and Economics both offer a variety of non-degree programs to individuals and businesses in the field of information sciences and technology. UNCG is expanding its programs in this area as fast as its resources can allow.

University of North Carolina-Wilmington

UNCW is offering non-credit Internet courses on information technology beginning February 1998. A regional Technology Advisory Council is also being established so that UNCW can help businesses problem solve and design user friendly computer and networking environments. Additionally, a seminar has been scheduled on problems associated with the year 2000 and computers.

North Dakota

North Dakota State University

The NDSU Computer Science Department, College of Science and Mathematics, offers a bachelor's degree in Computer Science that is nationally accredited by the Computer Science Accreditation Board (CSAB), and had 287 majors in the fall of 1997. The College of Business offers a bachelor's degree in Management Information Systems (MIS) that had approximately 140 majors during fall semester 1997.

Northern Marianas

Northern Marianas College

Northern Marianas College offers an Associate of Applied Science degree in Business Administration, with emphases in Accounting, Business Management, Computer Applications, Office Technology Administration, and Sales and Marketing. Short-term employment and personal development training is offered in a variety of computer applications, business communications, and office technology through the Continuing Education Department. Enrollments in the A.A.S. program are approximately 60, including both full-time and part-time degree-seeking students. Over 500 students are engaged in the applicable courses offered through Continuing Education annually.

Ohio

Miami University

The Miami University Department of Systems Analysis provides baccalaureate, master's, associate's, and continuing education programs in areas of information technology. The Hamilton and Middletown Campuses offer associate's degree in Computer Technology and credit and non-credit education in information technology serving 150 traditional and non-traditional students. The master's degree program in Systems Analysis provides a graduate education to 35 people with bachelor's degrees outside of information technology and enables them to enter professions in information technology. Miami University's main and regional campuses also provide non-credit instruction in information technology for several hundred individuals each year through their public subscription courses and customized contract training programs for local companies.

University of Cincinnati

The University of Cincinnati's College of Evening and Continuing Education offers a two track B.S. degree in Information Technology. Students may pursue their degree with an emphasis in the Business Track or in the Technology Track. In addition, the College offers four credit certificates within the Information Technology program. Students may elect to earn their 30

hour credit certificates in the areas of Client Server Technology, Database Management, Networking, or Software Development.

Oklahoma

Oklahoma State University

Oklahoma State University offers multiple academic degree programs in information technology to students at the undergraduate and graduate levels, and also provides continuing education and development programs to non-degree students throughout the state and region. Approximately 350 majors are enrolled in the College of Business Administration in the baccalaureate program in MIS and in the Management Science and Computer Systems undergraduate program. Over 150 students are enrolled in the M.S. in Telecommunications Management program, an innovative new information technology program emphasizing a synthesis of MIS with engineering, computer science, and telecommunications technologies.

University of Tulsa

The University of Tulsa's degree in Computer Science offers a strong foundation in computer science and mathematics with supporting study in the physical sciences. The degree program in Computer Information Systems offers a strong foundation in computer science with supporting study in selected business and management information systems courses. This provides students with an understanding of computer-based information systems in the context of business decision-making.

Oregon

Eastern Oregon University

The New Horizons Non-Credit Program at Eastern Oregon University is offering several short courses for updating workforce computer skills. Winter term 1998 we are offering MS Access, Intermediate Excel, Powerpoint and Internet Basics. Also Eastern is a partner in a five-state project to deliver training to and through economic development districts to rural communities and small businesses. This project is the Northwest Economic Development Network and involves Alaska, Idaho, Montana, Oregon, and Washington.

Portland State University

The Portland State University's School of Extended Studies offers a certificate program for multimedia professionals. This is an evening program designed for working adults. Program areas are Business and Industry, Technology and Programming, and Design and Production. Started in 1995, over 400 students have enrolled. Instructors are professionals in the field. Classes meet for three hours, four evenings per month. The goal is to give aspiring multimedia producers comprehensive knowledge and skills in both the technical and creative aspects of digital media.

Pennsylvania

Millersville University

The Office of Continuing Education at Millersville University of Pennsylvania is providing credit and non-credit training programs to businesses and industries in Fox Pro, Visual Basics, C++ and various other computer fields. Credit and non-credit courses updating librarians in technology are also being offered. Continuing Education also operates an on-line police academy for law enforcement officers around the world.

Penn State University

Penn State University provides opportunities at the associate, baccalaureate graduate and non-credit certificate area in information technology fields that include design and programming, development of applications, and use of software applications for problem solving in various fields. The University currently offers more than 30 programs that are directly involved in educating undergraduate students and more than a dozen graduate programs involving information technology. These programs graduate more than 1,000 professionals each year. In addition, over 3,700 students participate annually in non-credit courses targeted to information technology professionals.

University of Pittsburgh

The University of Pittsburgh offers undergraduate and graduate degrees in Computer Science, Information Science, and Engineering with an emphasis on computers. A number of these programs are available in the day and evening to both full and part-time students. Additionally, the University serves approximately 6,000 individuals a year with non-credit programming in information technology through its Computer Learning Center in downtown Pittsburgh.

Tennessee

University of Tennessee-Knoxville

The University of Tennessee-Knoxville offers a number of degree programs to serve the needs of information technology personnel. The School of Information Sciences offers an M.S. in five different fields: Corporate Information Systems and Services, Electronic Publishing, Information Systems and Technology, Scientific and Technical Information, and Youth Services in Public and School Libraries.

Texas

Alliance for Higher Education

The Alliance for Higher Education, through its TAGER Television Network, has since 1965 provided graduate degrees and short courses in engineering and business to thousands of employees in the Dallas/Fort Worth Metroplex. The Alliance membership currently includes 33 academic institutions in Texas and 35 corporations and hospitals.

Rice University

Through the School of Continuing Studies, the Rice Technology Education Center (RTEC) was developed to meet the advanced computer training needs of individuals and businesses in the information technology community. RTEC offers courses and training leading to certification by major software providers, Microsoft and Lotus. Certification qualifies network managers and administrators to install, configure, and maintain information systems and to develop custom business solutions.

University of Texas-Austin

At The University of Texas at Austin, ongoing credit and noncredit courses and continuing education classes annually enroll over 1,650 students in computer skills and programming. This year Continuing Education and Extension has introduced two new programs to address the shortage of personnel with information technology skills. The Technology Based Training Program offers 400 training modules for learning computer skills ranging from end user products like Microsoft Office to IT skills that prepare students for the Microsoft and Novell certification tests. These courses are offered asynchronously by CD ROM for students to use anytime, any place. And, in partnership with an authorized technology training firm, UT Continuing Education and Extension is offering for the first time this January a sixteen-week Microsoft Certified System Engineer program for individuals at the Infomart in the Dallas-Ft. Worth metroplex. These two new programs will serve an additional 1,500 students this year. Continuing Education and Extension's evening credit course program, University Extension, has helped both degree seekers and practicing professionals with continuing training needs to learn C++ and Java programming at beginning and intermediate levels, as well as basic management information system principles.

Utah

Utah Valley State College

Utah Valley State College offers a degree in Multimedia Communication Technology. The Multimedia program prepares students for multimedia careers in development (design and production) and technical support.

Vermont

University of Vermont

The Division of Continuing Education at the University of Vermont is an innovator in corporate/higher education training partnerships. In 1995, IBM-Burlington outsourced its education functions to the Vermont Education Consortium University. The University of Vermont has played a key role in developing education programs that meet the technology training needs of IBM employees and creating programs that help them overcome process inefficiencies. The Division also offers a Certificate in Computer Software on a regular basis.

Virginia

Mary Baldwin College

Mary Baldwin College, a 4-year, liberal arts college in Staunton, Virginia, offers two computer-science-based majors: computer information systems/business administration and computer information systems/math. In addition to the undergraduate program, the College also has an Adult Degree Program, from where most of the CIS/business administration and CIS/math majors come.

Old Dominion University

Old Dominion University, based in Norfolk, Virginia has become a center for technology training in the new Silicon Dominion. In December of 1997, Virginia Governor George Allen announced that he was proposing over \$12.8 million dollars in funding for the creation of a Technology Workforce Training Center at Old Dominion. This center will be based in Norfolk and will have 4 other regional sites. In addition to the wide array of courses this center will provide, ODU has active training programs on two other fronts. In response to the year 2000 problem, ODU is operating an 8 week "boot camp" in the COBOL computing language that will open doors to good jobs for many dislocated and unemployed workers. ODU is also working in partnership with Towson University in Maryland and ICTS, a private company, to provide a computer skills training program to unemployed and underemployed individuals.

Virginia Commonwealth University

From 1994 to 1997, the Division of University Outreach at Virginia Commonwealth University worked, in cooperation with the Department of Information Systems, School of Business, to offer a Post-Baccalaureate Certificate Program in Information Systems to 3 military bases: Ft. Lee in Petersburg, VA; Ft. Belvoir in Fairfax, VA; and PERSINS D in Alexandria, VA. The Post-Baccalaureate Certificate consists of 10 upper level Information Systems courses for a total of 30 credits. Courses include programming, systems analysis, database management, data communications, object orientated analysis, software engineering, and project management. All students graduated from these programs this past fall. VCU is planning to start a bachelor's degree program in Information System at Fort Lee this coming spring.

Virginia Polytechnic Institute & State University

Virginia Tech is engaged in a number of education, training, and research activities which are directed at information technology occupations. Masters degrees in engineering have been offered via satellite since about 1983 and in Business since about 1987. These degrees include M.S. in Electrical Engineering (Telecommunications, Signal Processing, and Computers [software and networks]) and MBA/M.S. in Business Administration (Management Science & Information Technology). In addition, on-site masters programs are offered in northern Virginia in Master of Information Systems and Computer Science & Application. In addition, Virginia Tech is developing a M.S. Electrical Engineering degree in Wireless Communications that will be delivered on-site. Recently, Virginia Tech's Continuing Education Division completed a national study of the shortage of workers with information technology skills in collaboration with the Information Technology Association of America.

Virginia State University

Virginia State University has several undergraduate and graduate degree programs aimed at providing professional skills to meet the needs of the technology and information science fields. Particularly the Information and Decision Sciences Department in the School of Business; the Administrative Systems Management Department and Computer Science Program within the Mathematics Department; the School of Science and Technology; and Non-Credit Training Programs, School of Continuing Education.

University of Virginia

The University of Virginia Division of Continuing Education, through the work of its regional centers, offers two non-credit certificate programs in information technology. The Business Information Technology Certificate and the Microcomputer Applications Certificate both provide significant training in computer applications and the uses of the Internet. These programs are available to companies for site-based contracted classes. The Division also offers an Instructional Technology Certificate program.

University of Richmond

The School of Continuing Studies at the University of Richmond offers bachelor's and associates degrees and a 30 credit pre- or post-baccalaureate certificate in Applied Studies in Information Systems. Each semester, Continuing Studies offers 10-15 credit courses and 8-12 non-credit courses in information systems.

Washington

Central Washington University

The Department of Computer Science at Central Washington University is the primary focus of high-level computer training on campus, enrolling approximately 100 majors and awarding approximately 25 B.S. degrees in Computer Science. Applications courses are also offered in several other departments as well as through the Office of Continuing Education.

Washington State University

Washington State University's School of Electrical Engineering and Computer Science offers the B.S. in Computer Science. The placement rate for computer science graduates has been 100% since the late 1980s. In addition to degree programs, WSU offers computer applications and skills training in the following areas: computer literacy, PC skills, use of the Internet for research, UNIX system administration, and computer programming in BASIC, C, FORTRAN, Java, Windows, and Perl.

West Virginia

Marshall University

The Marshall Technology Institute will become a leader in applied technology endeavors by building the infrastructure and providing expertise and services for implementing current technology needs for Marshall University's internal and external customers. It will be the gateway for providing expertise and services including: technical training and education; technical workshops and symposiums; and to provide personnel and other resources for executing technology based contracts.

Wisconsin

University of Wisconsin-La Crosse

The University of Wisconsin-La Crosse offers undergraduate degree programs in Computer Science and Management Information Systems. These programs enroll 250 students. A Software Engineering program is currently being developed.

University of Wisconsin-Madison

The Department of Engineering Professional Development offers more than 50 short courses each year in the area of telecommunications engineering and information technology. Topics covered include Digital Cellular, Implementing ATM, Fiber Optic Networking and Basic Telephony.

This annotated listing of information technology education and training programs was compiled through a brief survey of University Continuing Education Association (UCEA) member institutions during December of 1997. This listing is a representative sample of the kinds of programs that are available through continuing higher education. In no way does it represent a comprehensive or complete listing of programs offered by UCEA member institutions.

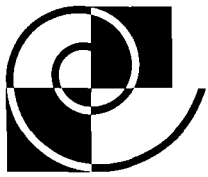
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Booklet, "Gaining a Competitive Edge," 2 pages



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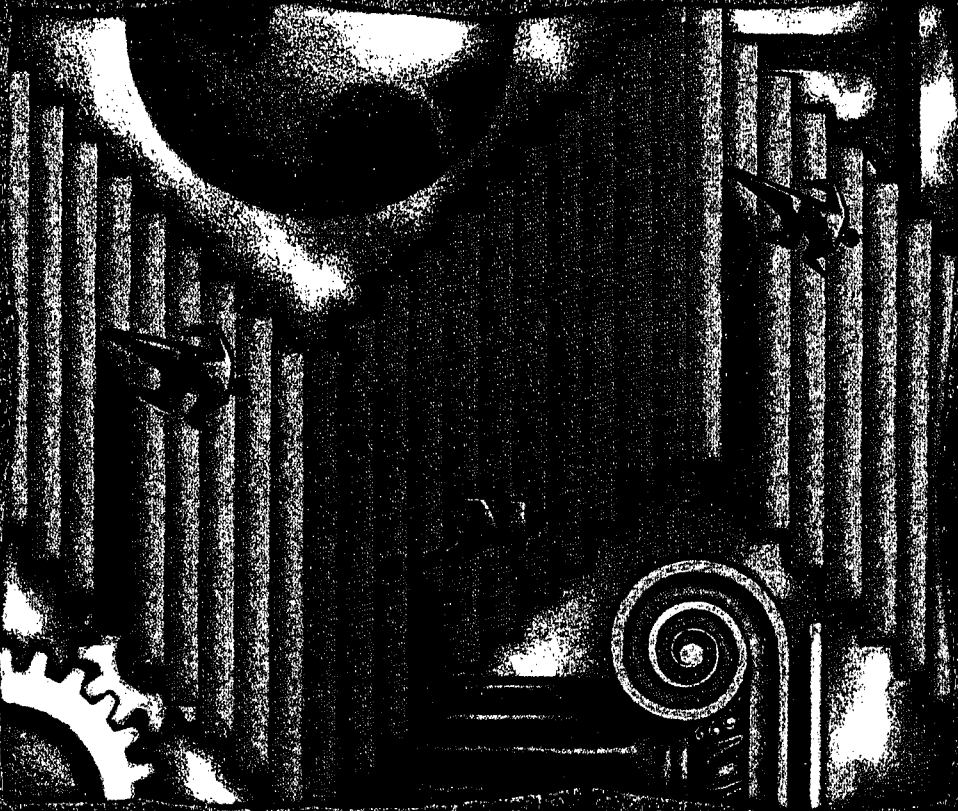
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- Gain *practical skills* you need to compete
- Increase your *value to your employer*
- Learn from the *innovators*



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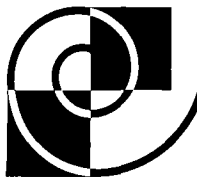
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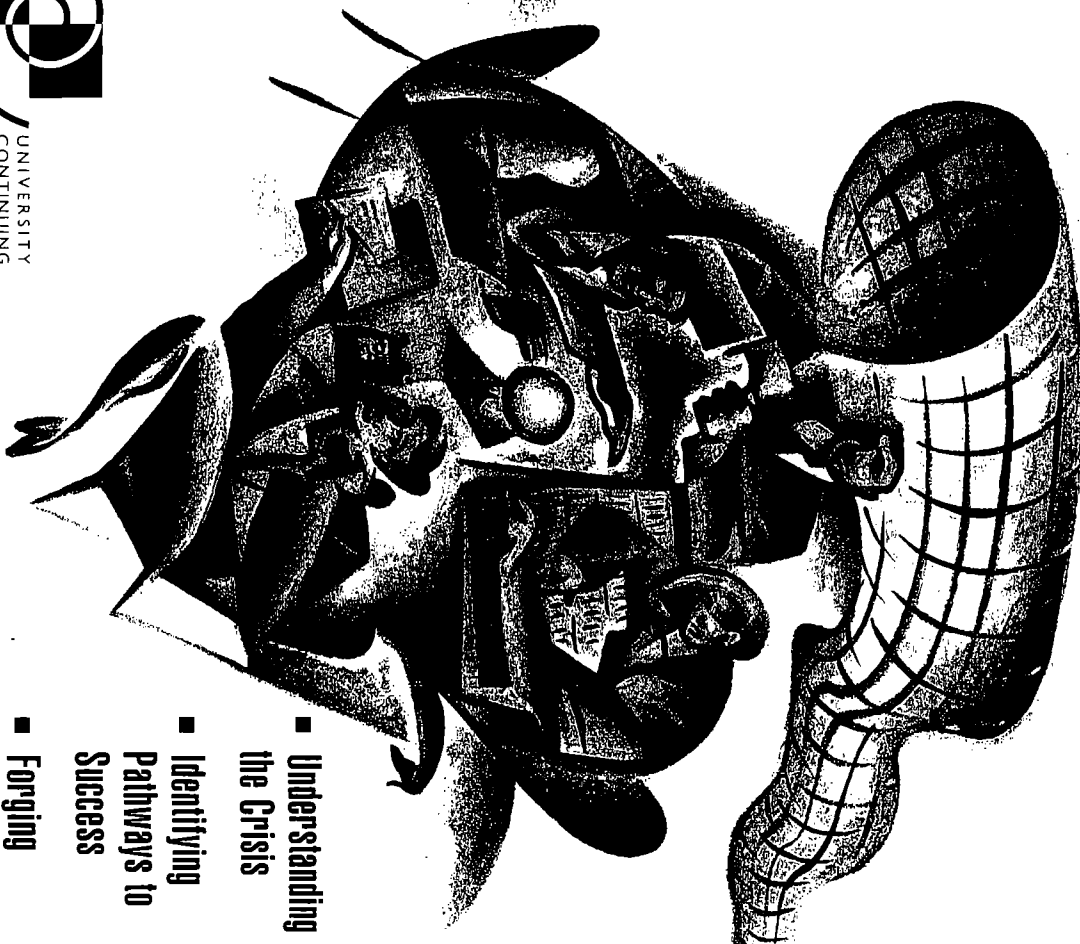
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- Leave with *useful examples*
- *Network* with your peers and potential partners nationwide
- Enhance your *administrative and leadership skills*
- Gain *practical skills* you need to compete
- Increase your *value to your institution*
- Learn from the *innovators*



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A National Forum on

The Information Technology Skills Shortage

January 22-23, 1998 ■ Washington, DC

- Understanding the Crisis
- Identifying Pathways to Success
- Forging Partnerships

CLOSING THE GAP

A National Forum on the Information Technology Skills Shortage

Bob Abernethy

As Oracle's Senior Global Manager for Internet Education Solutions, Bob Abernethy is responsible for Oracle's Distance Learning products as they relate both to Continuing Education and more traditional higher education environments. Abernethy has worked in the software industry for over 16 years in such diverse organizations as Cornell University, Hughes Aircraft, Nissan, and the *Los Angeles Times*. He earned his Master's degree in Management Information Systems attending evening classes while working as a full-time employee during the day.

Robert Baldwin

Robert Baldwin is Interim Dean of the Division of Extended and Continuing Education at the University of Connecticut. Prior to his appointment as Interim Dean, Baldwin served as Associate Dean and as Director of the Office of Non-Credit Programs. He has played an important role in the establishment of the Connecticut Information Technology Institute in Stamford, Connecticut. Baldwin earned his Bachelor's degree in Political Science and his Master's degree in Education from the University of Connecticut.

Laurie A. Broedling

Laurie Broedling is a private human resources consultant who most recently served as Vice President of Employee Involvement and People Systems at the Boeing Company. Prior to her time at Boeing, Broedling was the Senior Vice-President for Human Resources and Quality at the McDonnell Douglas Corporation. In addition she served as Deputy Under Secretary of Defense and as the Associate Administrator for Continual Improvement at the National Aeronautics and Space Administration (NASA). Broedling is a graduate of Brown University and holds Master's and Doctorate degrees in Organizational Psychology from George Washington University.

Lauren Brownstein

As Workforce Education Program Manager for the Information Technology Association of America (ITAA), Lauren Brownstein directs ITAA's initiatives to address the critical shortage of information technology (IT) workers in American industry. This includes bringing together leaders in government, education, and industry to create new paradigms for recruiting and training the IT workforce. She holds a B.A. from the University of Virginia and a Masters in Teaching from the George Washington University.

Kelly H. Carnes

Kelly H. Carnes was appointed by the President in October of 1993 as the Deputy Assistant Secretary for Technology Policy of the United States Department of Commerce where she is responsible for developing policies to increase the role of technology in enhancing the economic well-being and competitiveness of the United States. Carnes joined the Clinton Administration from Shaw, Pittman, Potts & Trowbridge, a Washington, D.C. law firm where she was a member of the Technology Corporate and International practice groups. Carnes received her B.A. from the University of North Carolina at Chapel Hill and her law degree from the Georgetown University Law Center.

Kevin R. Currie

Kevin Currie has been active in the fields of management consulting, sales, and training for more than 20 years. He is the Director of the Corporate Training Group at Boston University's Corporate Education Center. The Corporate Training Group represents to industry all of the management and technical consulting and training capabilities available through the Corporate Education Center. Through these efforts, the Corporate Education Center has grown considerably and currently conducts programs for major organizations throughout the United States, Canada, Europe, and Japan. Prior to joining Boston University, Currie was the Director of the State-of-the-Art Program at Northeastern University where he oversaw the doubling in size of that organization and initiated an Indonesian training program in voice and data communications.

Robert L. Dupont

Robert Dupont is the Dean of Metropolitan College at the University of New Orleans (UNO) where he oversees programs with enrollments of approximately 20,000 each year. Prior to his current appointment Dupont served as Associate Dean of Metropolitan College. He received his B.A. in History from Loyola University in New Orleans and his M.A. and M.P.A. from the University of New Orleans.

Charles L. Geigner

Charles Geigner is the Associate Director of InfoTech in the Department of Applied Computer Science at Illinois State University. Prior to joining Illinois State University, Geigner was General Manager of R & B Services, Inc./Performance Resources in Scranton, PA where he oversaw the development of training programs and media development for Fortune 100 companies. Geigner received his B.S. and M.S. degrees from Illinois State University.

Paul L. Heine

Paul L. Heine is the Associate Dean of the Darden College of Education at Old Dominion University. He is also an Associate Professor of Health, Physical Education and Recreation at Old Dominion. Heine earned his B.S. and M.Ed. degrees from West Chester State University and his Ph.D from the University of New Mexico.

Ronald. F. Jakacky

Ronald Jakacky is the Systems Engineering Process Manager at Raytheon Systems Company in Fort Wayne, Indiana. He is responsible for the facilitation, deployment, and improvement of the system engineering capabilities at Raytheon. This includes process development and training, continuous process improvement, and systems engineering metrics and tools. Jakacky holds a M.S. in Software Engineering and a B.S. in Electrical Engineering Technology as well as Certificates in Systems Engineering, Engineering Management, and Computer Architecture.

Doug Kendzierski

Doug Kendzierski is the Director of Information Technology Management for the College of Graduate and Extended Education at Towson University, focusing on the development of credit and non-credit technology training programs for business and industry. Kendzierski earned his B.S. in Information Systems Management, and his M.S. in Operations Analysis from the University of Maryland, and has spent the last 10 years as a faculty member at several Maryland institutions.

Linda G. Leffel

Linda G. Leffel is Professor and Director of Program Development for Virginia Tech's Division of Continuing Education. As Director of Program Development, she supervises a faculty team which conducts over 420 programs annually involving some 40,000 participants from around the world. Leffel recently supervised a national study on the shortage of skilled information technology personnel that Virginia Tech conducted for the Information Technology Association of America.

Michael Mandel

Michael Mandel is Economics Editor at *Business Week*, where he is one of the nation's leading writers on the New Economy. His recent work includes such stories as "Your Next Job: Is Your Future in High-Tech?" (October 1997) and the widely-cited "The New Business Cycle" (March 1997), which showed how info-tech spending is the key factor driving today's economic expansion. Over the last five years he has written over twenty major cover stories, including the award-winning "The Economics of Crime," (December 1993). Mandel is the author of *The High Risk Society* (Times Business Books, 1996), which deals with worker and business insecurity in the New Economy. Mandel regularly makes radio, TV, and speaking appearances, including in the last year *All Things Considered*, CSPAN, the BBC, and the Democratic Leadership Council Conference. Mandel holds a Ph.D. in economics from Harvard University and has taught at New York University's Stern School of Business.

Fred J. Maryanski

Fred Maryanski is Vice Chancellor for Academic Administration at the University of Connecticut. He has served in the Chancellor's Office since 1989. Prior to accepting his present position, he was the head of the Computer Science and Engineering Department from its establishment in 1986. He has held the rank of Professor of Computer Science since joining the University from Digital Equipment Corporation in 1983. Maryanski received the Ph.D. in Computer Science from the University of Connecticut in 1974 and served on the faculty of Kansas State University and as an affiliate professor at Worcester Polytechnic Institute.

Jim Moore

Jim Moore is currently Director of Executive Development and Director of SunU at Sun Microsystems. SunU provides learning initiatives and education programs ranging from software engineering design to sales training to management and leadership development to 19,000 worldwide employees of Sun Microsystems, and is a leader in utilizing network computing technologies for the desktop delivery of education. Prior to joining Sun, Moore was Vice President - Training and Development for Northern Telecom Ltd. at its Washington, D.C. headquarters, where he was responsible for global education programs. Moore holds a Master's in Electrical Engineering from the University of Louisville.

Joseph McGee

Joseph McGee joined SACIA, The Business Council of Southwestern Connecticut as Vice President of Public Policy and Programs in April of 1996. Prior to joining SACIA, McGee worked with the Management Training Institute at Fairfield University and served as Connecticut's Commissioner of Economic Development under Governor Lowell Weicker. He is a graduate of Our Lady of Angels Seminary in Albany, New York and studied at St. John's University in New York.

Joyce L. Plotkin

Joyce Plotkin is the President of the Massachusetts Software Council, a trade association that represents the software and interactive industry in Massachusetts. Prior to the Software Council, Plotkin served in a variety of positions in state and federal government as well as at the New England Council, Harvard School of Public Health, Blue Shield of Massachusetts and Channel 7 TV News. She is a founding member and past chair of the Coalition of Regional Information Technology Associations. Plotkin received her B.S. in Communications from Ohio University and studied management at Wellesley College.

Irwin Price

Irwin Price is the Executive Dean of the Virginia Campus of the George Washington University located in Loudon County, Virginia. The Virginia Campus offers graduate programs in technology and management to organizations in the region, and Price has created partnerships with industry that have lead to cutting edge research in such areas as telecommunications, information technology, computer graphics, transportation safety, and management of technology. Price holds a bachelor's in Mechanical Engineering from New York University, an M.B.A. from San Francisco State University and a Ph.D. in Economics from Boston University.

Raymond A. Santirocco

Raymond Santirocco is Associate Provost for Outreach Programs at the Rochester Institute of Technology (RIT). Prior to this appointment, he has held other positions including Director of Corporate Training and Education Programs, and Dean of Continuing Education. He is also currently Acting Director of RIT's Center for Integrated Manufacturing Studies, a major outreach organization. Before coming to RIT, Santirocco spent twelve years in R&D and engineering management with General Dynamics and eight years as Monroe County (New York) Public Safety Commissioner. Santirocco received his bachelor's and Ph.D. degrees from the University of Rochester.

Mark J. Schaefermeyer

Mark Schaefermeyer is Assistant Professor and Assistant Director of Program Development for the Division of Continuing Education at Virginia Tech. He is an expert in communication, computer mediated instruction, and management information systems, and provides leadership for disseminating university research and knowledge working with faculty from two major colleges. Schaefermeyer is Project Manager for implementing the University's new certificate programs for Virginia's information technology industry and is a member of the Division's workforce assessment team. He received his doctorate from The Ohio State University.

Girish V. Seshagiri

Girish Seshagiri is CEO of Advanced Information Systems (AIS) in Peoria, Illinois. Seshagiri founded AIS in 1986 after 20 years in the Management Information Systems department at Caterpillar. He serves on the Industry Advisory Board of the Computer Science Departments at Bradley, Embry-Riddle, and Illinois State Universities. Seshagiri received his M.B.A. degree from Michigan State University and a M.S. in Physics from the University of Madras, India.

Roger Stough

Roger Stough holds the NOVA professorship in public policy in The Institute of Public Policy at George Mason University. He also directs the Transportation Policy Program and the Center for Regional Analysis as well as serving as the Associate Director of the Institute. Stough's research interests range from ITS institutional issues to the relationship between technology and economic development. Stough holds a Ph.D. from Johns Hopkins University.

Charles W. Stein

Charles Stein, President of Stein Venture Management, has more than 35 years of experience in the computer and communications industry. He recently retired as President and CEO of Netrix Corporation. He joined Netrix in 1987 when it was a development-stage start-up, backed by venture capital, and led the company through its initial public offering to its position today as a leading supplier of international-wide area networking products. Prior to joining Netrix, Stein was a Vice President with BBN Communications Corporation and was founder of two other start-up companies—Ruben Corporation and DataRoyal. He holds a B.S. in Mathematics from Tufts University.

Nancy Sutherland

Nancy Sutherland is New Initiatives Developer for EIMC: A Distance Education Center at the University of Texas-Austin's Division of Continuing Education and Extension. She is responsible for research and strategic planning of new program initiatives at EIMC. Prior to this position, Sutherland was Assistant Director of the Scoring Center at EIMC. She holds a B.A. in Business Management from St. Edward's University in Austin, Texas and is working towards her Master's in Social and Psychological Services at St. Edward's.

Robert G. Templin, Jr.

Robert Templin joined Virginia's Center for Innovative Technology (CIT) as its sixth President in September of 1994. Virginia's CIT was created by the Virginia General Assembly in 1984 to promote economic growth in the Commonwealth by attracting and retaining technology-related jobs and businesses, and by enhancing Virginia business competitiveness through technology innovation. Templin came to CIT after serving for eight years as the President of Thomas Nelson Community College in Hampton, Virginia, and previously served as President of the Virginia Association of Colleges and Universities. Templin was chosen as "Business Newsmaker of the Year" by *Virginia Business Magazine* in 1996.

Dale Van Blokland

Dale Van Blokland is Manager of Customer Support Services for the City of Austin, Texas. He is responsible for a wide array of technical services for the city, including citywide technology training, management of consulting services to other city departments, and supervision of Help Desk operations. Van Blokland is a Certified Novell Engineer (CNE), and for the past 20 years has been involved in the implementation, training and support of technology and applications.

Louis O. Vescio

Louis Vescio has more than 27 years of government and private sector experience in technology and related fields. He is currently President of Innovative Community Technology Services, an integral partner in the Operation Bootstrap technology training program. Vescio spent 15 years with Texas Instruments Corporation, where he served in a number of capacities including Manager of the Defense Systems Electronics Group where he was responsible for \$70 million in sales. Vescio spent seven years as an active duty aviator for the United States Air Force, and flew in the Reserves for another 14 years. He holds a bachelor's degree in Mathematics from Clarion State College in Pennsylvania and has done graduate work in Economics and Management at the University of Dallas.

Martin Wartenberg

Marty Wartenberg is currently Director of Corporate Training and Development at the University of California, Irvine Extension. He is responsible for developing and managing the delivery of Engineering, Computer Science, Technology, Business and Management courses directly to government organizations and companies such as Raytheon, Boeing, and Sony. Wartenberg has a B.S. in Mechanical Engineering from the City College of New York, a M.S. in Electrical Engineering from Brooklyn Polytechnic University, and an MBA. He is also a licensed Professional Engineer in California, New York, and Ohio.

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***Historically Black Colleges and Universities for
the 21st Century:***

***Annual Report of
The President's Board of Advisors
On
Historically Black Colleges and Universities***

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