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CONNECTION

THE JOURNAL OF THE NEW ENGLAND BOARD OF HIGHER EDUCATION

Trends & 2006 Indicators IN HIGHER EDUCATION

DEMOGRAPHY

K-12 ENROLLMENT & PREPARATION

HIGHER EDUCATION ENROLLMENT

GRADUATION RATES & DEGREES

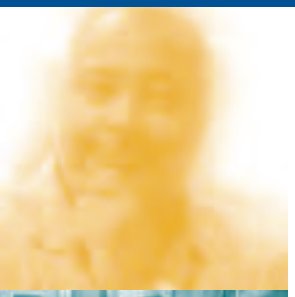
FINANCING HIGHER EDUCATION

UNIVERSITY RESEARCH

VOLUME XX
NUMBER 5
SPRING 2006

Also inside:

- CONNECTION Interviews Historian Douglas Brinkley
- Coming Soon to a College Near You: Accountability
- A Plan to Build Regional Success on Innovative Individuals
- Tufts President Lawrence Bacow on the Problem with Early Decision
- Trends in Education Philanthropy: A Roundtable



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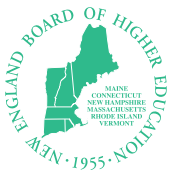

Trendspotting

In this 20th anniversary year of CONNECTION, there could hardly be a more pervasive trend in higher education than the ever-growing tension between market impulses and social equity—between corporatization and public purpose.

Exhibit A: When taxpayers skimp on funding their state universities, those universities tend to respond by turning their backs on lower-income state residents and importing more affluent out-of-state students who can pay the substantially higher out-of-state tuition. Everyone knows that shift has been on for a decade or more. Now, Iowa higher education analyst and Pell Institute senior scholar Thomas G. Mortenson has had the nerve to quantify it.

According to Mortenson's analysis, public four-year colleges and universities in 28 states, including three New England states, have been dealing with their budget problems by increasing enrollment of out-of-state residents and decreasing their share of enrollment of lower-income Pell Grant recipients since the early 1990s.

It's "enrollment management at its worst," Mortenson writes in his February 2006 *Postsecondary Education Opportunity* newsletter, which is devoted to the analysis.

The campuses don't bear all the blame. They dig for gold in the applicant pool as a direct reaction to disinvestment by state governments. Nationally, state support of higher education per $1,000 of personal income declined by 34 percent between 1980 and 2006. The New England states are particularly notorious for their low public funding of higher education, with all but Maine among the 10 stingiest states in the nation by this measure.

Mortenson's analysis suggests that the lower-income state residents shunned by four-year institutions, if they go to college at all, are tracked to for-profit colleges and underfunded community colleges, where the share of Pell Grant recipients rose in 39 states, including all six New England states. There's nothing wrong with community colleges; they are responsive, proactive institutions offering cutting-edge job training and, when good transfer policies are in place, a bargain entrée into higher education. But they weren't meant to be higher education's overflowing public housing projects.

"Most states are well on their way to building public systems of class-based higher educational opportunity," Mortenson says. But his blistering critique is not limited to public universities. In an earlier analysis, he writes of higher education's "gated communities," including more than a dozen selective New England private institutions from Fairfield to richly endowed Harvard and Colby where Pell Grant recipients now represent less than 12 percent of students.

The disappearance of Pell recipients from these campuses suggests another grim new reality: the lower-income students who are eligible for Pell Grants can't cobble together enough additional financial aid from others sources to cover tuitions that are streaking through the stratosphere. Many of them just stay home.

As always, the figures in this annual "Trends & Indicators" issue of CONNECTION paint the picture of a stunningly powerful higher education sector. We only wish it were for everybody.

* * * *

Undergraduate students may be the coin of the realm in New England higher education, but what has made the enterprise the envy of the world is just as much the knowledge residing in the region's faculties and research labs—indeed, its fabled capacity to generate new ideas. Yet New England's share of all U.S. university research and development has been shrinking, from well over 10 percent in the mid-1980s to well under 8 percent today—representing the loss of hundreds of millions of dollars in hard cash and who knows what discoveries.

What if the six New England states made a concerted effort to reinvigorate that sagging research enterprise with some specific New England policy problems in mind? Energy woes? Set our world-class physics and biology departments loose developing biofuels. Transportation bottlenecks? Get engineering faculty working on high-speed rail. Health information systems, promising nanotechnologies, education reforms ... Hard sciences, soft sciences ... A *new* New England research agenda could juice the region's academic labs while the best minds get to work solving New England's most pressing policy problems. A win-win. More on this in future issues of CONNECTION.

John O. Harney *is executive editor of* CONNECTION. *Email: jharney@nebhe.org.*

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Demand for Tribal College

American Indian students east of the Mississippi River want an intertribal college that serves their needs, according to a federally funded study released in January by the New England Board of Higher Education and the United South and Eastern Tribes Inc. (USET), which represents 24 federally recognized tribes from Maine to Florida to Texas.

The study, funded by the Office of Minority Health in the U.S. Department of Health and Human Services, examined the feasibility of establishing an intertribal college to serve the tribes in the USET region. Initially focused on health sciences, technology and pre-medical education, the new institution could include a physical hub campus with satellite-learning centers located on reservations and in urban centers.

The study combined a quantitative analysis of tribal demographics and resources with tribal "talking circles" and focus groups to glean opinions from tribal elders, health and education directors and students about the need for an intertribal college.

There are currently 35 tribal colleges in the United States. But only two are located east of the Mississippi River and they are in the upper reaches of Michigan—far from most of the USET Tribes.

Among the study's findings:

- There is high demand for trained tribal members to staff tribal health clinics and provide health services in a culturally sensitive manner.
- There are enough potential students, both young people and adults, among the tribal populations in the East to sustain the development and ongoing operation of an intertribal college.
- Tribal members in the East have strong desire to pursue higher education and college degrees, including degrees in medicine and health sciences professions.
- The overwhelming majority of tribes have sufficient resources to help establish satellite-learning centers where tribal members could engage in face-to-face instruction and distance learning.

Tribal elders say an intertribal college must have culturally relevant education as its core mission to help preserve the culture, history and languages of Eastern tribes, while preparing students to be competitive in their careers.

"The tribal leadership and elders are committed to developing a higher education institution that meets the highest academic standards while incorporating the unique history, culture and languages into the curriculum," said USET President Keller George.

The study suggests that USET begin designing operational, financial and curricular plans for an Eastern intertribal college and researching the best location for the intertribal college.

Breathe

Could tougher environmental policies help New England solve the problem of slow labor force growth?

University of New Hampshire professor of economics and natural resources Richard England suggests it could. "Metropolitan areas with lower air pollution levels tended to attract a net flow of migrants from 1990 to 2000," England writes in a recent paper arguing for increasing gas taxes. "Hence, if a region were to improve its relative environmental quality by restraining its motor fuel consumption, it could expect a positive effect on labor supply growth, especially for more educated labor."

In addition, notes England, reducing automotive emissions could help prevent tighter federal regulations on factories, power plants and other polluters which he says could threaten a region's industrial competitiveness.

And if several New England states raised their fuel taxes together, they could function as a buying cartel and thereby lower the import price of refined oil products shipped into the region even as they reduce the quantity of fuel consumed.

England proposes that a rebate system be introduced to eliminate any regressive features of his gas tax proposal.

Comfortably Numb

Twenty percent of four-year college seniors and 30 percent of two-year college seniors lack basic quantitative skills such as those needed to estimate whether their car has enough gasoline to get to the next gas station, according to a national survey conducted by the American

An Early Lead

How much advantage do intensive preschool programs bestow on at-risk children? A study of 40-year-old African-Americans who passed through the High/Scope Perry Preschool Program in Ypsilanti, Mich., in the 1960s, shows a major benefit. The study authored by economist Clive R. Belfield of Queens College, City University of New York, Milagros Nores of Columbia University Teachers College, Steve Barnett of the National Institute for Early Education Research at Rutgers University and Lawrence Schweinhart of the High/Scope Foundation appears in the Winter 2006 *Journal of Human Resources*, published by the University of Wisconsin Press. The study shows the following differences between preschooled and non-preschooled 40-year-olds:

	Preschooled	Non-Preschooled
Involved in crime	32%	48%
In jail	6%	17%
Women with college degrees	12%	8%
Men with college degrees	6%	3%
Ever received social services	71%	86%
Deceased	3%	7%

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The study found no significant differences in literacy among public vs. private college seniors, part-timers vs. full-timers or men vs. women. Literacy skills do correlate, however, with race, income and parents' educational attainment. White students, students with higher-income backgrounds and students whose parents graduated from college did better than their peers.

Curriculum appears to play a role as well. Literacy levels are significantly higher among students who say their coursework places a strong emphasis on applying theories or concepts to practical problems, compared with students who say their coursework rarely touches on these skills.

Home

New England colleges are victims of the region's affordable housing crisis, as when they can't lure top faculty from lower-cost regions—and contributors to the problem, as when they send dormless students spilling into the community and driving up rents. They're also trying to solve the problem one house at a time.

Last fall, Amherst College announced it would donate three acres of college land and volunteer labor to build four new affordable housing units through Habitat for Humanity. Amherst students, faculty, staff and alumni will work alongside families in need building one new Habitat home at the start of each of the next four academic years. The contemporary-style houses will incorporate features that reduce energy consumption and environmental impact.

Georgia-based Habitat for Humanity International has built 200,000 affordable homes for needy families who invest sweat equity and pay zero-interest mortgages.

Wesleyan donated a four-bedroom grey colonial along the edge of its campus to Northern Middlesex Habitat for Humanity where faculty, staff and students volunteered alongside the first-time homeowner, Wal-Mart department manager Jennifer McNeil, and her five children.

Meanwhile, Middlebury College sold the 30-acre former site of a local motel for $1.1 million, partly on the basis that the site will include affordable housing. The development will include commercial space as well as 30 townhouse apartments and 56 single-family homes. The developers say more than half the townhouse apartments will be rented at rates that are considered affordable to families with annual household income of just under $36,000—60 percent of the median income in Addison County. Many of the single family homes will be priced at or below $230,000.

Lecture Hall

A sampling of spring commencement speakers at New England college campuses announced as of early March:

- **U.S. Sen. Barack Obama** (D-Ill.), University of Massachusetts Boston
- **Emily Rooney,** host and executive editor of Boston public television's public affairs program "Greater Boston with Emily Rooney," New England Institute of Art
- **Wangari Maathai,** Kenyan veterinary science professor and 2004 Nobel Peace Prize winner, Connecticut College
- Sportswriter and National Public Radio commentator **Frank Deford,** Daniel Webster College
- **Gustavo Esteva,** advocate for education, human rights, democracy and economic justice for Mexico's poor, University of Vermont
- **Chuck Davis,** founder and artistic director of the African American Dance Ensemble and Dance Africa, Williams College
- **John O'Hurley,** actor known for role as J. Peterman on the "Seinfeld" show, Providence College

SNIPPETS

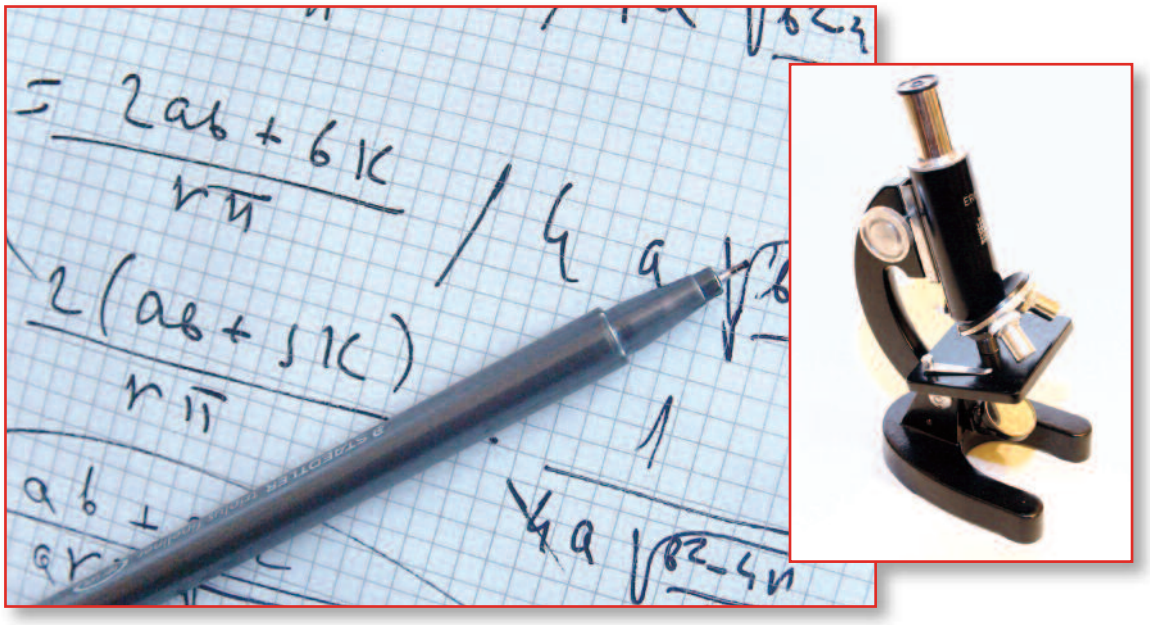
Report: Our High Schools May Not Adequately Prepare Dropouts For Unemployment

—Headline describing fictitious Labor Dept. report in the satirical publication The Onion

"We lose about $200 a day in just sushi! … However, sushi is just a small part of the problem. The grill and pizza line also have a great problem. There is a lot of loss there. I would encourage everyone to talk about it."

—Wellesley College Director of Dining Services Phil Harty describing the problem of food theft at the prestigious college, which many students attribute to confusion over which dining hall food is provided free and which requires payment.

Most New England parents believe their children are studying enough math and science...



...do they need a Reality Check?

A survey of New England parents and students - conducted by the nonpartisan research organization Public Agenda for the Nellie Mae Education Foundation - found that most of them do not share the concerns of business and government leaders, who fear that flagging math and science skills are a threat to the future of the region and its students.

The regional results complement those from a national survey which is the first in a series of public opinion tracking reports on important issues in public education from Public Agenda. The first report, ***Reality Check 2006: Are American Students Ready for More Math and Science?***, and the companion New England survey, can be viewed at **www.nmefdn.org**.

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Seeking New Measures of Higher Education's Health

EVAN S. DOBELLE

How do you measure the health of New England higher education? Each year, CONNECTION's "Trends and Indicators" issue tracks statistics like college enrollment and graduation rates, average tuition, demographic trends, and research funding, reflecting—and indeed shaping—a consensus on the important criteria for institutional and regional success.

As the economic and civic demands on higher education grow, however, we need new ways to measure our effectiveness. We need to promote how well our colleges and universities fulfill their obligations to their students, their graduates and their communities over the long term.

We know, for instance, that the average college graduate can expect to earn 80 percent more per year than the average high school graduate. She will also live longer and have a better overall quality of life.

That fact tells us little though about how well today's college graduates are doing compared with graduates 10, 20, or 30 years ago. Thanks to stagnant wages and exploding personal debt—much of it acquired to finance their education—more and more young New Englanders cannot afford to buy homes or start families. Many must forgo dream jobs in lower-paying fields like public service and the arts in order to meet loan payments. The burden falls especially hard on students from low- and middle-income families, threatening college's traditional role as a path to a better life.

We must get a better grasp on how the return-on-investment in a college education is changing over time. We should develop new indicators to move beyond popular college ranking systems, which focus on admissions "inputs" data like SATs, and instead emphasize "outputs," like whether an institution's graduates find success and contribute to society in later life. Neither families nor policymakers and funders will continue to accept claims of higher education's benefits on good faith alone. But new, meaningful metrics could provide an accurate picture of the strengths and weaknesses of our higher education system.

We need to know not only if graduates get their money's worth, but also if communities and employers do. How well are students learning, and how long do they retain what they have learned? When they accept their diplomas, are they ready to step into the world of work and civic responsibility? More to the point, which graduates are ready, which are not, and what accounts for the differences?

We should look at the benefits higher education brings to our local communities and to our region as a whole. How engaged are students with the towns and neighborhoods around them? What about with the world beyond our borders? Are spare hours filled with volunteering? What balance of civic and academic life do faculties model for their students?

Who is going to sustain a vibrant democratic society? Some colleges have begun to boast rightfully about how many of their students join the Peace Corps. Why not develop an indicator to measure community service locally and globally on every campus?

How well are we measuring demographic aspects of higher education? When graduates leave campus, do they stay in New England, or are they taking their skills and energy elsewhere? If they stay in the region, how long do they remain? How many start families? We know that New England's future demands a well-educated workforce, but do we know how well the region's colleges and universities are supplying that needed talent?

Research and development (R&D) is another area that we know instinctively has an impact on the condition of New England higher education. But is every R&D dollar spent as good as the next? Which research is leading to new medical breakthroughs or creating new companies or enriching undergraduate experiences? It is one thing to track funding levels or the number of patents, but new indices are needed to gauge how well university research improves lives.

None of these measurements will be simple to develop. Most of the relevant information exists, but it is scattered among alumni relations and registrars' offices, department records and public sources. By identifying meaningful outcomes and applying the latest analytical tools, we will gain much needed understanding of not only the health of our higher education system, but also of the condition of our changing public mission.

The idea here is not to propose more onerous requirements for colleges and universities. Rather, by quantifying our effectiveness in these areas, we can better articulate our contributions, better understand our challenges and enhance the perception of higher education's economic impact.

Evan S. Dobelle *is president and CEO of the New England Board of Higher Education and publisher of* CONNECTION. *Email: edobelle@nebhe.org.*

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Re-Dedicate New England to Opportunity

MARY R. CATHCART AND LOU D'ALLESANDRO

As we mark this transition in the chairmanship of the New England Board of Higher Education, we urge all our colleagues in education, business, government and the civic sector to redouble their historical commitment to accessible and affordable higher education for all New Englanders.

We urge our friends who lead New England's college and university campuses and systems to re-dedicate themselves to the powerful idea of expanded educational opportunity through regional cooperation. Their service to the students, families and communities of New England must transcend the short-term competitive concerns of "enrollment management" and embrace the mutual advantages of collaboration.

NEBHE's founders and their contemporaries understood this when they created the Regional Student Program (RSP). The RSP allows students to attend out-of-state colleges in New England at reduced tuition when they pursue certain programs not offered at colleges and universities in their home state. The RSP has saved students in all six New England states millions of dollars in tuition. Just as importantly, the six states save untold millions of taxpayer dollars because by sharing programs, they avoid having to start up and develop on their own campuses, every single academic program that is sought by state residents and demanded by the new global economy.

We must continue to work together to change the notion that higher education is a privilege only for those with the means to afford it. We need to make going to college a realistic and attainable goal for everyone with the desire and drive to further their education and better position themselves for success in life. If our region and our nation are to compete effectively in this new global economy, we must focus our time, attention and energy on creating the most highly educated workforce possible and alleviating the costs associated with an uneducated society. The demands of the new economy are great. They can only be met through the extension of the cooperative spirit that NEBHE has fostered for the past 50 years.

As people who have benefited from the dream of educational opportunity, we believe there is an obligation to ensure that the future holds as much promise for the next generation of New Englanders, both youngsters and adults, who want to improve their lives. At a time when the federal government is backing away from its support of higher education and when tuition costs are rising, it is imperative that NEBHE strengthen its commitment to students seeking a college education.

NEBHE is a credit to the visionary New England governors of the mid-1950s who had the great idea to collaborate in pursuit of excellence; it is up to all of us to continue to carry this idea into the future.

Mary R. Cathcart, *a senior policy fellow at the University of Maine's Margaret Chase Smith Policy Center and former four-term Maine state senator, became NEBHE chair on Feb. 25, 2006. Email: mary.r.cathcart@umit.maine.edu.*

Lou D'Allesandro, *chair of the New Hampshire state Senate Ways and Means Committee, was NEBHE chair from February 2004 through February 2006. Email: dalas@leg.state.nh.us.*

Former Sen. Mary Cathcart of Maine Becomes NEBHE Chair

Former Maine state Sen. Mary R. Cathcart became NEBHE chair on Feb. 25, 2006, succeeding N.H. state Sen. Lou D'Allesandro, who had served in the post since 2004. Cathcart is a senior policy fellow at the University of Maine's Margaret Chase Smith Policy Center. She served three terms in the Maine House of Representatives and four terms in the Maine Senate representing communities in Penobscot County before she was term-limited in 2004. In the Senate, Cathcart chaired the Joint Standing Committee on Appropriations and Financial Affairs, the Joint Select Committee on Research & Development and the Joint Standing Committee on Labor. She was a member of the Joint Standing Committee on Education and Cultural Affairs.

Cathcart has also chaired a variety of other bodies including the U.S. Commission on Child & Family Welfare. "I am honored to chair NEBHE as it begins its second half-century," said Cathcart. "We must continue to expand educational opportunities for all our citizens and show the world that New England higher education is ready for the challenges of the global economy."

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The Flood of History

CONNECTION Interviews Historian Douglas Brinkley

Douglas Brinkley is an award-winning author and historian and director of Tulane University's Theodore Roosevelt Center for American Civilization. His wide-ranging portfolio includes books on John Kerry and the Vietnam War, Ronald Reagan and D-Day, Rosa Parks, Henry Ford, Dean Acheson and Jimmy Carter. He is also editing Jack Kerouac's diaries, Hunter S. Thompson's letters and Theodore Dreiser's travelogue.

Brinkley's latest book, *The Great Deluge: Hurricane Katrina, New Orleans and the Mississippi Gulf Coast*, is a narrative of the crisis before and after the monster storm, which he experienced firsthand.

Before joining Tulane, Brinkley was a professor at the University of New Orleans and at Hofstra University, where his American Odyssey course took students across the United States to visit historic sites and meet figures in politics and literature. His 1994 book, *The Majic Bus: An American Odyssey* chronicled his first experience teaching the on-the-road class which was the model for C-SPAN's School Bus.

Brinkley is a contributing editor for the *Los Angeles Times Book Review* and *American Heritage* and a frequent contributor to the *New York Times*, *Rolling Stone* and *The Atlantic Monthly*.

Brinkley was the keynote speaker at the New England Board of Higher Education's 2006 New England Higher Education Excellence Awards celebration held in February in Boston. NEBHE President Evan S. Dobelle and CONNECTION Executive Editor John O. Harney took the occasion to ask the historian about Katrina, history and higher education.

CONNECTION: You've written eloquently about Generation X. What do you make of the Katrina/Iraq War generation entering college right now?

Brinkley: I'm teaching three classes at Tulane and I'm amazed at how much curiosity students still have. These are the children of those counterculture parents who went on to the business world and they are now kind of rebelling. But instead of hitchhiking like Jack Kerouac did, these young people do things like "couch surfing" where they look on the Internet for free places to stay around the country. So if you're a college student living in Boston and you want to go to Santa Fe, you can get on the couch and can find someone on the Internet who's in college in Santa Fe and will let you stay there.

The difference between this generation in college now and Generation X is that technology has become such a huge part of their lives. Cell phones and the Internet are almost attached to them. That's the new way of meeting people whether it's to go to a picnic or a political rally or a sporting event. You used to see a lot more kids with books; now you see them wandering around with their laptops; they feel like they have books at their fingertips on their screens. And it's harder to get kids into libraries because they feel they have a library under their arm in their laptop.

CONNECTION: How does the new connectedness via the Internet color efforts like your "American Odyssey" course, in which you brought students physically to historic and literary sites across America?

Brinkley: I'm a real boot heel-on-the-ground person. I like to go to what I'm writing about. I'm writing about Hurricane Katrina right now so I go and look at the cracks in the 17th Street Canal in New Orleans. I go to see the barge that crashed into the Industrial Canal and take notes. Even if I'm writing about long-ago American history like Gettysburg, I go to the battlefield. When I was young, we used to take family vacations and I would love to visit historic sites. It's like the Walt Whitman poem, "When I heard the Learn'd Astronomer," where the student learns more by looking up at the stars in the mystical air than by listening to the learned astronomer's lecture and reading his diagrams. You can sit in a classroom and learn history, which is great, but you can also get out there and do and see things.

CONNECTION: Where did your "American Odyssey" bus trips stop in New England?

Brinkley: We'd go stay with Arthur Miller in Connecticut and students would read *Death of a Salesman.* Then we'd go down to Hartford to the Mark Twain House and the Harriet Beecher Stowe House. We'd go out to all the Revolutionary War sites. We'd read *Walden* at Walden Pond. We even went out to the Cape Cod National Seashore with the poet Lawrence Ferlenghetti. We'd go up to Lowell and do the Jack Kerouac walking tours and learn about 19th century industrialization.

CONNECTION: One way the post-Katrina generation of college students is going out and experiencing the world is through community service …

Brinkley: I don't think there is an epidemic of voluntarism sweeping over colleges though students may like to perceive it that way. Like adults, young people always find volunteering very exciting for the first week. But going down to the Gulf for a Habitat project for four days is one thing; volunteering for eight months is another. Everybody has a heart and when they see fellow Americans suffering, they want to do something. But they get fatigued or pulled away by money or family obligations or their love lives. So what was going to be six months helping after Katrina often turns out to be six days, which is fine because for six days, they did something.

CONNECTION: Are there new opportunities for higher education in the Gulf region and beyond as New Orleans rebuilds from Katrina?

Brinkley: Tulane wasn't hit that hard but her sister schools like Dillard and Xavier were just whacked off the grid. Their future is undetermined. There's still a sense of mourning going on in the Gulf Coast. Only if you're in the casino culture of the Mississippi Gulf Coast are you perceiving opportunities. It's really about downsizing—cutting funding, laying people off, having to consolidate programs.

CONNECTION: Is there a parallel between the everyday tragedy of lagging educational attainment and the tragedy revealed in New Orleans in the aftermath of Hurricane Katrina?

Brinkley: We've de-prioritized education to the point where we have a real underclass struggling with rudimentary reading and arithmetic. The education crisis starts in kindergarten. We're not teaching literacy. We're not teaching history; people have no sense of their past. There's a concept that college is an honor or a perk—that you're lucky if you get that far.

CONNECTION: And for those who do get that far … how do you see the state of higher education today?

Brinkley: The universities are becoming too much like businesses, and faculty are being neutered. We need faculty who are in charge of the university, instead of trustees.

Everybody's worried about their specializations to the point where they're not communicating with people. History should be alive and flying in the street, not lying behind college walls because people are worried about interdepartmental squabbles and tenure. And university professors should be frontline people on the issues of our day. For New Orleans, to have a historian like John Barry talk about the Great Flood of 1927 was very important to understand Katrina. In the same way, to understand the AIDS epidemic, you can look at America's terrible flu epidemic. To look at the birth of hydrogen fuel cells for automobiles, you can look at Henry Ford's experiments with ethanol.

Just as we created housing projects that didn't work, we've created a bizarre system in our universities called tenure that works against great teachers if they happen not to be publishing anything. Why are you forced to write in an arcane journal article to show you know how to teach a 19-year-old about history? The best history professor I know at Tulane writes very little but he's very engaged with the students and the community. If there's going to be such a thing as tenure, people like him should be the gold standard. The proof of your legitimacy shouldn't be an article in some obscure journal out of Texas A&M or somewhere; it should be making your topic sing in class and getting students interested in books.

In fact, I find the best teachers today are people who come into the university and talk about real experiences. My students learn as much about music from a blues singer from New Orleans as they could from someone from Harvard with a Ph.D. in music. I'm not saying you can't learn from both but we seem to have gone very far into this esoteric elite, and it becomes clubbish and cloistered instead of out-front and open. We should be communicating with citizens, not hiding what we learn.

CONNECTION: Which leads to this term "popular historian" that's been used to describe you …

Brinkley: I'm not big on labels. Like Sartre said, I am not a waiter! I don't want to live my life being a "popular historian" or an "academic historian." It's more like what Elvis Presley said, "I just do what I feel like doing." I've loved history since I was a kid. I love traveling to historic sites. I like engaging in the big

issues of my time. I love teaching. I have a wonderful life because I get to write about things that interest me and I try to share that. I don't understand why if you were a great opera singer, you would want to share that with just three other opera singers instead of sharing it with the general public. To me that smacks of elitism, smugness and condescension and ultimately insecurity.

Instead of petty bickering over all these academic rules and regulations, we should be celebrating books. The most important thing you can do in a university, in humanities at least, is to get kids interested in books. Don't worry about what their reading, just get them addicted to books; let them realize reading is fun. Reading is also an important part of being a citizen. If they tend to like horror stories, let them read Stephen King. If they love history, let them read David McCullough, but get them hooked on reading a book from cover to cover. There are great lessons to be learned from dime novels to pop songs to heavyweight boxing bouts … you can take things from popular culture and upgrade them and take them seriously. Kurt Vonnegut learned how to write good fiction from reading bad fantasy.

CONNECTION: One of your books is on Henry Ford … how profound is his impact on educational aspirations today in terms of his bringing us the world of assembly lines and well-paying jobs for non-college graduates?

Brinkley: Henry Ford never believed in college. But today we've got a lot of opportunities with state universities and private colleges and, particularly in New England, the best graduate programs in the world. We should also keep an eye on people who are doing carpentry and sheet metal and electrical work. What we need in New Orleans right now is a battalion of people trained in the mechanical arts and from community colleges to come and rebuild. Unfortunately, we see these people looked down upon by people from Harvard and Yale and the like just because they don't develop their lives as intellectuals. But somebody who works hard and makes it through community college turns out many times to add a lot more to our nation's welfare than people who are professional critics.

At the same time, the concept of just throwing money at kids so they get an undergraduate education as a rite of passage has limitations. They don't always get that great an undergraduate education unless they're serious. They may slip by with Bs and come out with an English degree and have no idea what they're doing and no skills.

There also needs to be more connection between colleges with huge endowments and community colleges so they can work together. Just like Katrina reminded us how good the Coast Guard can be, you've got a lot of community colleges in New England but often people will roll their eyes when they come up. It would be great if a lot of the people who are giving money to universities, which are essentially corporations with access to billions of dollars, would start adopting a community college or two because that's where you're going to get the skill sets for jobs in the future, not out of university philosophy departments.

It's not OK anymore to be a super-rich Ivy League citadel when you've got squalor surrounding you. You're teaching your students a very bad lesson—that you are privileged and you can turn your back on the poor.

CONNECTION: Is there new room for that kind of collaboration as New Orleans rebuilds?

Brinkley: In the mind of the university, that becomes philanthropy … and they're the ones who are looking for the money now. But it's not OK anymore to be a super-rich Ivy League citadel when you've got squalor surrounding you. You're teaching your students a very bad lesson—that you are privileged and you can turn your back on the poor. That's what happened in New Orleans with Katrina: the haves were not taking care of the have-nots.

If you're Trinity College in Hartford or Boston University, look at where your school can start interacting with a community college and create programs together.

If there's a crisis in this country with senior citizens, why aren't colleges interacting with senior citizens' homes? Many elderly people who are lonely, living in nursing homes, could enjoy communicating on a laptop, and their teachers could be 20-year-olds. You have to get colleges to create programs to care about the senior home which may a block away from the gold-domed president's office. But you don't see that instinct. Most presidents have a more miserly idea that they'll be judged on how fat their coffers are, not the creativity of their interactions with the community in which their school is simply a business.

A lot of colleges wall themselves off from the community. They're protecting their resources and assets. The question is how can you make interacting with the community part of the college experience?

Higher Education Trends and Opportunities

JOSEPH M. CRONIN

Most people in higher education believe in continuity, in respecting traditions. That makes it easy to miss the startling changes and compelling opportunities that confront the academic enterprise. Here are a few trends that are dramatically altering higher education in New England:

More women than men attend college. Women began outnumbering men on U.S. college campuses in 1979. Over the past decade, the number of women seeking and completing degrees has increased steadily to the point where women now account for 60 percent of college enrollment in New England. By 2003 New England colleges enrolled 498,000 women to 365,000 men. Title IX, the 1972 federal law prohibiting sex discrimination, has encouraged women athletes, and welfare reform has sent adult women to college. Where are the men? More than a million serve in the military and another million are in prison. A million more feel unprepared or not persuaded that college would serve them well.

What can colleges and universities do about this? We need men in public education, including more male teachers of color. We need men in health and human service careers, at all levels. We need more engineers and scientists. We need colleges and universities to keep in touch with National Guard and Army Reserve units, and the recently retired military people who have accumulated funds to attend college.

Hispanics are the most rapidly growing ethnic and racial minority in New England. The number of Hispanic students attending New England colleges has grown by more than 50 percent over the past 20 years. By 2015, they will outnumber African-Americans on the region's college campuses. Many come from countries where they suffered from poverty and inferior education or experienced political upheaval. They need summer programs, outreach to high schools, Spanish-speaking advisers and Hispanic faculty role models, as well as administrators and trustees willing to advocate for their needs. Reading lists should include great Latin American and Spanish literature. College dining halls should offer more culturally diverse food choices. (See "Does the Cafeteria Serve Rice and Beans?" CONNECTION, Fall 2002.)

The number of college students taking at least one course online jumped from 1.6 million nationally in 2000 to 2.6 million in 2004. And the number will keep rising. An entrepreneurial New England college, Endicott, is considering requiring all students to take one course online to prepare them to be lifelong learners. Are the region's campuses ready? Personal computers are as essential as pen and paper once were. But only 7 percent of four-year universities require students to own computers and less than half explicitly recommend that students bring their laptops to college. And community colleges are much less likely than their four-year counterparts to require or recommend that students have computers.

U.S. students shun science and engineering. America's leaders from corporate employers to U.S. senators, including Ted Kennedy, voice great alarm over the recent increases in Chinese and Indian students in science and engineering. Sixty percent of GI Bill recipients earned science or engineering degrees. Just 20 percent of today's college students do, and the engineering percentages declined from 13 percent in 1980 to under 10 percent in 2004. Perhaps the role models of presidents Susan Hockfield at MIT, Shirley Ann Jackson at Rensselaer Polytechnic Institute and Zorica Pantic-Tanner at Wentworth Institute will attract more women, as well as more men, to these demanding and important fields.

For-profits are gaining market share. Today, the University of Phoenix is showing New England how large the untapped higher education markets in the United States really are, online and on the ground. That's another megatrend: aggressive for-profit universities now claim 5 percent of the academic marketplace, up from 2 percent, while traditional public and nonprofit colleges seek more selectivity and pursue higher rankings.

Who needs to be discussing these significant trends? First of all, faculty members through their departments, academic senates and planning committees. Also, every New England college or university should be tuning up its strategic plan, not just for accrediting agencies who will look for it, but also to encourage growth in quality and relevance. Finally, trustees need to know where higher education is going and how their institution will respond to these megatrends.

Academics are expert at thinking about and debating priorities. It is time to look closely at the obvious opportunities presented by these trends and develop distinctive strategies for the future.

Joseph M. Cronin *is president of Edvisors. He is the former president of Bentley College and former Massachusetts secretary of educational affairs. Email: Edvisors@aol.com.*

Coming Soon to a College Near You: Accountability

S. PAUL REVILLE

A "new accountability era" is descending upon the heretofore resistant domain of higher education, according to a Feb. 9, 2006 *New York Times* story headlined, "Panel Explores Standard Tests for Colleges." The story describes the deliberations of a Bush-appointed commission considering imposition of standardized tests on college students. Ten days earlier, the *Boston Globe* reported that Massachusetts community colleges have a dismal three-year graduation rate of 16 percent. Last year, the Education Trust launched a website (www.collegeresults.org) devoted to reporting graduation rates at all U.S. colleges, disaggregated by race, ethnicity, gender and income.

An unstoppable movement is underway to impose more rigorous accountability on colleges and universities. This is not to suggest that higher education has been an accountability-free zone. There's already the annual accountability report on higher education called *Measuring Up* and "report cards" issued by publications such as *U.S. News and World Report.* But two features distinguish the new accountability movement: first, the focus will be more on educational outcomes (as measured by such indicators as standardized tests and persistence in graduation rates) and second, there will be significant consequences based on performance.

Astute observers have long predicted that this accountability movement, which has pervaded the world of K-12 education in the past decade-and-a-half would arrive at the doorstep of postsecondary education. For most policymakers in the K-12 world, strengthened accountability has become a precondition for funding increases. A similar political logic is now creeping into higher education funding debates. Any higher education institution seeking increased funding will have to accommodate the demands of the new accountability.

It is inevitable and unavoidable that the rigorous accountability of the kind applied to K-12 schools will now be applied to higher education. If the K-12 field's overemphasis on testing is to be avoided, leaders will need to embrace the new accountability movement and help shape it. Those who resist it will suffer its imposition upon them.

What are some of the implications of this accountability movement for postsecondary education?

Clarify mission. Higher education in general and specific institutions will be challenged to clarify their vision, mission and strategies for educating young people. These stated plans will need to be more than the lofty marketing pronouncements of college catalogs. Rather, they will be *binding* descriptions of institutional intent against which educators will be held accountable. The problem in K-12, prior to the recent systemic reforms, was that schools were multi-purpose institutions with such "mission creep" that they sought to accomplish "everything" necessary for a child's well-being, but were accountable for nothing. If community colleges are multi-purpose institutions but their national graduation rate is just 25 percent, then what's their mission? For what are they willing to be held accountable?

This will be a major shift from the current "black box" culture of many postsecondary institutions where what goes on within the institution is a mystery to the public, and performance results are seldom discussed.

Set standards and clarify expectations. Once the mission is clear, standards can be developed in an inclusive process to reflect each institution's aspirations for what its students should know and be able to do as a result of the education they will be receiving. These standards will more clearly define their respective institutions, help to guide the work of the faculty, shape the development of performance indicators and assessment mechanisms and send signals to students about what is expected. The key question of the new accountability movement is: *What specifically should students know and be able to do as a result of their education?*

As for student expectations, parents and educators have done a good job encouraging most youngsters to consider college. Nearly nine in 10 eighth-graders (including eight in 10 African-American and Latino eighth-graders) intend to attend some form of postsecondary education, according to Stanford University's Bridge Project. After all, future jobs will require postsecondary education and the economic value of a college degree is increasing. However, schools and colleges have not done a good job at setting expectations for what kind of educational preparation students will need to be successful in college. Policymakers need to develop social

marketing messages and programs to improve college preparation, but they also should require closer collaboration, data sharing and curricular alignment between secondary schools and postsecondary institutions.

Colleges will also have to do a better job establishing standards and expectations, and unabashedly aligning them with the entry-level requirements in the world of work. This does not mean that college is only about career preparation. Indeed, more and more employers are demanding general skills and knowledge rather than vocationally specific training. Yet if our economy requires students better educated in math and science, then school and college leaders need to figure out how to bolster curriculum and instruction in these areas so the economy will thrive and students will be prepared for the remunerative jobs of the future.

Usher in transparency. The accountability era will require unprecedented transparency in higher education. The ratings exercises of *U.S. News and World Report* and similar publications relate to inputs and processes. The new coin of the realm is "outcomes." Once performance indicators are set and assessments conducted, the public will demand to know the results. This will be a major shift from the current "black box" culture of many postsecondary institutions where what goes on within the institution is a mystery to the public, and performance results are seldom discussed. Strong leadership and a new infrastructure will be required to usher in practices that support full transparency.

Close equity and achievement gaps. The coming of more rigorous accountability has already begun to yield disturbing data on indicators like students' need for remediation upon entering college (53 percent of college students need remediation, according to Washington, D.C.-based Achieve Inc.) and the widely varying levels of college completion (just 60 percent of whites and 41 percent of African-Americans who enroll at four-year colleges actually earn degrees within six years, according to The Education Trust). If there is a significant difference between males and females in college entrance rates, then both secondary school and college leaders must address this issue. Likewise, on remediation. The college completion rates overall and the gaps between groups will require urgent action by college officials.

Build instructional capacity. One logical consequence of increased accountability is that postsecondary institutions, like elementary and secondary schools, will ultimately need to respond to disappointing educational performance data by conducting a deep analysis of the quality of their curricula and instruction, then taking deliberate action to improve both. This will require unaccustomed systemic action rather than leaving curriculum and instruction up to each faculty member or fragmented departments to determine. Data on student performance drives the new accountability. Educators need to have incentives, training and support to gather, analyze and act on student learning data in order to improve instruction.

The only way to meet standards and the growing student and societal expectations for improved postsecondary performance is to systematically build the capacity of educators to excel at their "core business" of teaching. This kind of shift in focus to teaching will represent a major change in priorities for some institutions.

It took elementary and secondary reformers too long to realize that accountability alone was insufficient to improve performance. As my Harvard Graduate School of Education colleague Richard Elmore has said about accountability, "For every increment of performance I demand from you, I have an equal responsibility to provide you with the capacity to meet that expectation."

K-12 reformers failed to perceive the importance of capacity-building as an essential ingredient in the early stages of standards-based reform. Now, more than a decade-and-a-half from the inception of K-12 systemic reform, that movement is sharply focused on creating the structure and support necessary to improve curriculum and instruction. Postsecondary institutions would do well to learn from this experience.

The new accountability will have significant consequences for postsecondary institutions, probably in direct proportion to the amount of public funding they rely upon. Institutions will certainly feel financial consequences in relation to performance. But in instances of underperformance, they are likely to see other constraints on their freedom to operate as well.

Leadership will make all the difference in responding to the new accountability movement. Accountability can be a threatening external intrusion that, poorly managed, subverts educational values, diverts institutional energy and depletes morale. Properly managed, accountability becomes a rare opportunity to clarify institutional mission, to focus strategies and to improve performance, morale and recognition. In addition, such success ultimately translate to public confidence and a prosperous "bottom line."

S. Paul Reville *is the president of the Rennie Center for Education Research and Policy and a lecturer at the Harvard Graduate School of Education.*
Email: preville@renniecenter.org.

Opportunity New England

A Plan to Build Regional Success on Innovative Individuals

KIP BERGSTROM AND LOUIS SOARES

In a knowledge- and innovation-based economy, human capital—the education, skills, creativity and mobility of individuals—is the key to innovation, productivity and thus wealth creation. The basic unit of production is now the singular individual, not a factory or a machine. In New England, a growing proportion of those individuals will be Latinos. In a strange geocultural twist, the region's competitiveness with the roaring economies of China and India will be determined in the Spanglish-speaking neighborhoods of Providence, New Haven, Brockton, Manchester and other New England cities.

Emphasis on the individual is reshaping the business models of today's firms, large and small, as they gear up to compete not on products and services but through innovation and the insight of individual workers. (Perhaps the only thing more powerful than individual insight is a *network* that harnesses the insight of many individuals—the idea behind "open platform systems.") Innovation-driven business models, in turn, require large numbers of technically proficient, scientifically literate, knowledge workers who can collaborate across disciplines.

In the coming decade, meeting the human capital development needs of these firms and individuals will challenge New England's education and workforce development institutions. And indeed, education institutions need to likewise refocus on enabling the insight of individual learners.

A few transformative strategies will help our education and workforce institutions navigate the gravitational pull that is molding all resources to the needs of the individual.

Transforming our education/workforce system into one that successfully gets the right skills to the right person at the right time will require networked resources with a radical focus on the individual. Currently, our education and workforce development systems are designed around faculty, curricula and programming to deliver a standard product to passive students. A radical focus on the individual would aim to shatter the walls of these institutions and reorganize the resources across them all to deliver customized experiences so that learners get education that is content-rich and timely, and helps them become better learners as a result. We need a new model for "adult education" that is lifelong and that provides deeply integrated academic and experiential learning and sophisticated education/job search tools. This new model would empower individuals as the drivers of innovation.

The individual era

First, it is important to understand the following forces that are driving the focus on the individual.

Globalism. Twin revolutions in technology and information have made it possible to distribute production, work, capital and ideas worldwide. This globalization of all aspects of production has caused a transformation in the skills that both firms and individuals must have to be successful.

In coming years, New England firms will face increasingly intense global competition, which creates an imperative for innovation. Much of what is done today by existing firms in our labor market, even firms which primarily serve local needs, will be done as well or better within 10 to 15 years by China and India.

Our firms need to re-invent themselves over the next decade, or face decline. While they need specialized labor for the work they are currently doing, it is even more critical that they find the highly innovative and flexible talent that will help them invent and perform the next generation of work. Innovation is the new differentiator. We need to move from engineers and chemists who work on technologies and processes to individuals who design customer solutions using engineering and chemistry and who can adapt these skills to emerging customer challenges.

In an interesting paradox to the phenomenon of globalization, the individual worker, manager, entrepreneur, researcher and low-skilled or highly educated person has become the single most important resource for competitive advantage. Those individuals with discrete subsets of innovation skills, as measured by college degrees, are able to benefit from this paradox, seeing increased returns on their human capital investments while those yet to engage must be provided opportunities to do so. Moreover, those firms and regions that have many innovation-ready workers will have a competitive advantage; those that do not will face a tough challenge. And all individuals will need to focus their work and learning experiences on acquiring the necessary skills for the innovation economy.

Human capital and innovation. Researchers at the Society of Human Resource Management estimate that 65 percent of a firm's value is generated by the knowledge, skills and networks in its individual employees. For example, Microsoft's ratio of intangible to book (tangible) assets is 11 to one. This human capital realizes its value in knowledge work that yields innovation. For knowledge to yield innovation, an individual must possess baseline technical expertise,

engage in constant learning and collaboration across disciplines and teams, and generate projects that produce insights regarding customer needs, organizational assets and market tools, according to research on knowledge networks by Melissa Schilling of New York University. Proctor & Gamble's "Connect and Develop" initiative opened up its R&D infrastructure to scientists, suppliers, customers and even competitors all over the world. It was a technology entrepreneur in Japan who came up with the idea for Mr. Clean Magic Eraser which came to market within a year.

All evidence indicates that the pace of this cross-discipline innovation is increasing in scale and scope. The years ahead will not be marked primarily by a slow, steady stream of sustaining innovation by large, established firms. We should instead expect constant and accelerating "disruptive innovation," much of it driven by networks of collaborating firms that create whole new business models, rather than just new products or technologies, as the basis of competitive value. Individuals will need to be global and flexible in their skills set to effectively engage emerging networks.

Further, knowledge work for all individuals increasingly requires an integrated understanding of science, technology, engineering and math (STEM). This, of course, alludes to our need for people trained in the hard sciences and engineering but also speaks to a broad need for "scientific literacy" on the part of those in other disciplines. According to the OECD, in member countries, high- and medium-high-technology manufacturing and knowledge-intensive service industries now account for 38 percent of economic value added.

In the innovation economy, work and learning are simultaneous events. Individuals and firms are constructing the knowledge they need for tomorrow's work today from colleagues, web-based resources, formal learning and available best practices. Competitive economies recognize that learning cannot be separated, spatially and temporally, into a place and time to acquire knowledge (a school) and a place to apply knowledge (the workplace).

Innovation skills

If the human capital embodied by individuals is the key to innovation, which skills are the most important? Our emerging understanding of global production and innovation, thanks in part to work by economists such as Frank Levy of MIT and Richard Murnane of Harvard, suggests that individuals need the following set of innovation skills:

- **Learn-on-demand**—the ability to construct new knowledge from work activities and apply it. Example: Cisco's Ecosystem connects more than 40,000 partners with on-demand resources (people and technology) to learn how to deliver new solutions to customers.
- **Expert thinking**—the ability to generate solutions that are not rules-based from technical knowledge. Example: diagnosing the illness of a patient whose symptoms are strange.
- **Complex communication**—the ability to adapt communication skills to multiple situations and cultures. Example: an engineer describing to a marketing team why a new design for a DVD player is an advance over previous designs.
- **Scientific literacy**—the ability to understand fundamentals of STEM. The U.S. Labor Department projects demand for occupations requiring science and engineering skills to increase three times faster than all other occupations.
- **Mobility**—the ability to transition across projects, firms, disciplines and work/learning experiences. Eli Lilly and Proctor & Gamble are among companies that deploy informal open innovation platforms that call for individuals to work outside firm boundaries.

These skill needs apply to *all* individuals—low-skilled or highly educated, rank-and-file worker, manager, entrepreneur or researcher. While each person may have different levels of need for each of these skills based on their current work and education, those individuals who wish to be successful increasingly will seek to develop all of them.

Innovation skills are developed through individual experiences that deeply integrate formal or academic training with applied knowledge, and are reinforced by movement between work and learning, and from one workplace to another. For firms, regions and nations to be successful in the global, innovation economy they must pursue public and private initiatives in education and workforce development that produce workers with these skills across many disciplines.

New England's innovation gap

New England faces unique challenges in developing these innovation skills in its workforce. Currently, we cannot even fill demand for skilled STEM workers, never mind develop workers with the innovation skills necessary for future competitiveness. Based on current and future vacancies and projected job growth, Massachusetts needs to increase the number of STEM degrees completed by 300 percent, according to a comparison of college production versus industry need conducted by Metro South/West Regional Employment Board and based on an analysis by Northeastern University economists W. Neal Fogg and Paul E. Harrington. But simply increasing the number of STEM professionals is not enough.

New England needs STEM workers with strong innovation skills. These are engineers with MBAs, mathematicians with MFAs, scientists with MPAs … people who can communicate across disciplines and innovate. Of particular concern are the work and learning preparation of soon-to-be high school graduates, low-skill immigrants and native-born New Englanders, and current college students. These individuals are actively

engaged in making decisions about work and learning. They are focused on human capital development in a way that bridges the worlds of work and learning. Where should they work? Where and what should they learn? How will they pay for learning?

One thing is certain: the jobs that once provided the stepping-stones for upward mobility are rapidly disappearing. There has been a fundamental shift in the composition of the New England economy toward higher-wage, knowledge- and innovation-focused jobs over the past 10 years. In every industry cluster that is heavily dependent on a highly educated workforce, New England has a larger share of jobs than the U.S. average. These include: financial services, innovation services, biotech, electronics, software and communications, health, and postsecondary education.

Structural shifts in job mix in New England have displaced workers with no education beyond high school from the full-time workforce, leaving them underemployed, unemployed and increasingly outside the labor force. The loss of one in three New England manufacturing jobs since 1990 is a highly visible signal of change.

A less visible sign of crisis is the steep decline in labor force participation and full-time employment rates among working-age adults with no more than a high school education. This shift is seen in native-born and foreign-born workers of all ages. As of 2000, only 38 percent of adults, ages 25 to 64, without a high school degree work full-time, compared with 60 percent or more of people with some college or more.

The growth in knowledge and innovation jobs is concurrent with two other key New England trends: 1) growth in immigrant populations, in particular, native Spanish speakers with low levels of literacy and 2) lackluster performance by high-schoolers in applying their academic knowledge to real-world situations (we suspect the same would be true of college students if it were measured).

Latinos represented 43 percent of New England's net population growth in the 1990s, and 100 percent of net population growth in 15 of the region's 20 cities with populations of 75,000 or more. The National Center for Public Policy and Higher Education projects that the Latino population of southern New England (Massachusetts, Connecticut and Rhode Island) will grow to between 11 percent and 14 percent of the working-age population by 2020, up from less than 3 percent in 1980. Latinos must become a part of New England's future skilled workforce if the region is to prosper.

Yet the educational attainment of New England's Latino population is significantly lower than that of its Non-Latino, white population. Among people age 25 and older in New England, 42 percent of Latinos had less than a high school education, compared with 13 percent of Non-Latino whites, according to the U.S. Census Bureau.

These numbers are even more striking when we examine New England's limited English-proficient population. Of 341,070 individuals ages 18 and older who spoke English "very little" or "not at all," 39 percent had less than a ninth-grade education, and 59 percent had less than a high school credential, according to the U.S. Labor Department.

The following figures illustrate the collision course between employment demands and demographic trends in selected New England states.

Figure I: Change in Education Levels of Working-Age Population (ages 25 to 64) in Massachusetts

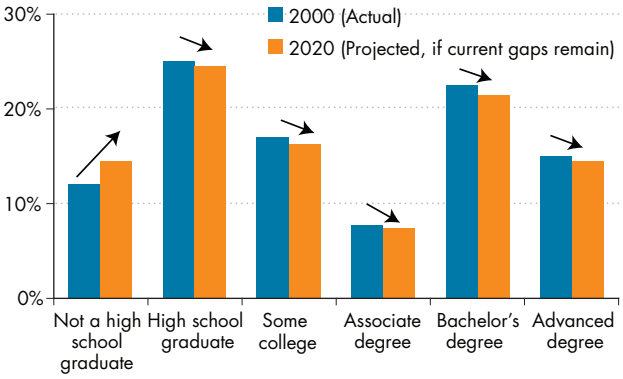


Figure 2: Change in Education Levels of Working-Age Population (ages 25 to 64) in Rhode Island

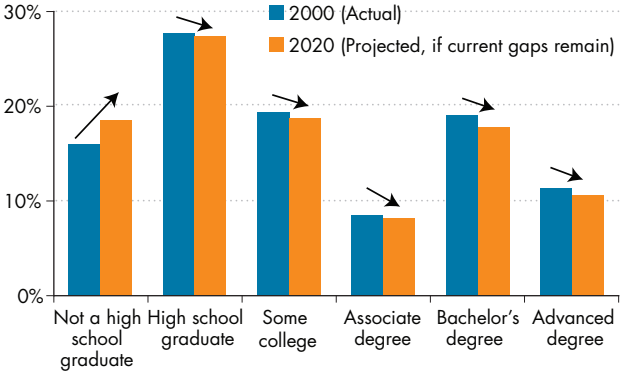
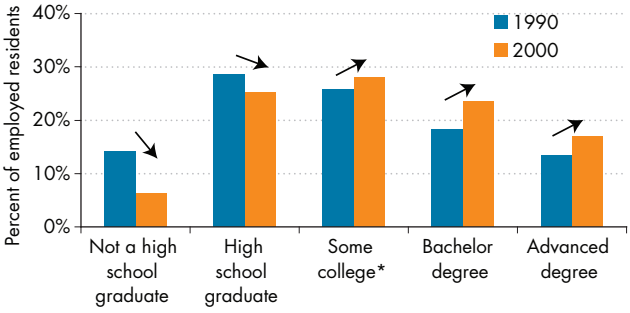


Figure 3: Change in Job Mix by Education Level of Workers in Southern New England (CT, MA & RI)



** Includes associate degrees and non-completers.*
Source: U.S. Census Bureau.

Despite decades of state and national reform efforts, our K-12 system is still preparing students for an industrial economy of managers and semi-skilled workers that no longer exists. We are currently failing to prepare high school students and undereducated adults for further education and the workforce. For every 100 ninth graders in New England, 23 never finish high school and only 29 go on to complete a college degree, according to the National Center for Public Policy and Higher Education.

In addition, we know that many of our high school students lack the ability to apply their knowledge in critical ways. Recent achievement scores illustrate that even when high school students have basic math and reading skills, they lack the ability to apply these skills to problem-solving or analysis.

In fact, even New England's best suburban high schools and most selective colleges are not for the most part producing talent that is innovation-capable. Most high school and college grads cannot apply their knowledge. They are not good problem-solvers or decision-makers. They do not communicate well orally or in writing. They have limited experience in working and thinking across disciplines and are generally weak in STEM skills.

New model

We need to align our education and training continuum to include integrated high standards and experiential learning for all of our potential workers—low-income/low-skill workers, soon-to-be high school graduates and current college students.

We propose three catalytic strategies to create a new model of education: transformation of the senior year of high school (as a first step in comprehensive reform of the high school); better integration of adult basic education, skills training and community college; and new tools to customize and navigate the higher education experience as a lifelong learning resource integrated with the workplace.

Learning Through Internship. A radical focus on soon-to-be high school graduates would transform the senior year of high school. As demonstrated by low performance scores in applied knowledge, high school students require a framework for learning innovation skills in context. Some of the best work in high school reform is being done by the Big Picture Company, which operates 24 model high schools at sites around the country including six in Providence.

The focus of the model is something Big Picture calls *Learning Through Internship.* Each student, beginning in ninth grade, spends two days a week in an internship with an adult mentor who shares with the student a passion for a particular type of work, igniting a love of learning that will last a lifetime. All the academic work in the other three days of the school week is structured on a project basis around the internship. Every 12 weeks, students defend their project work before a team consisting of their mentor, their advisor (Big Picture's name for a "teacher"), other Big Picture Company advisors and students, and a parent or guardian. The student is responsible for the development of the internship, with support from his advisor.

Placing the primary responsibility for the development of the internship on the student instills the principle that students are responsible for their own learning. Consistency in the application of this principle is one of the reasons Big Picture schools graduate students who are self-directed learning machines, the prime talent for an innovation economy. Big Picture students go onto college in higher percentages than their peers and demonstrate an ability to apply knowledge to new situations. While it will be difficult to quickly change the traditional high school, with its rigid schedules, to this model, elements of it could be incorporated into the senior year—currently a time of coasting for many students. A focus on *Learning Through Internship* in the senior year could transform this often wasted time into one which allows the student to deeply explore career and life interests. Clearly, the integration of academic and experiential learning needs to begin much earlier; the transformation of the senior year is simply a logical starting point.

To begin to address the growing need for both STEM knowledge workers and STEM-literate peers, a first phase of the project could focus on students with STEM interest and engage industries with STEM workforce needs.

The Learning Network. A radical focus on low-income/low-skill workers, would create new ways to access knowledge careers and wages. As noted, the labor market has a very large and growing pool of adults with low literacy and numeracy skills, and/or limited English proficiency, who cannot access public and private education and training resources, most of which presume at least high school literacy. While there are significant efforts underway in all New England states to expand the capacity and quality of their systems of adult basic education, the alignment and integration between adult basic education and job skill training and higher education remains problematic, and there are very few efforts to integrate innovation skills.

The conventional approach to the linkage of adult basic education and job skill training and higher education is to think of them as a sequence, with a smattering of supportive services intended to ensure a successful transition from one system to the next. This creates a bottleneck in our workforce system because most of our displaced workers do not have the credentials or basic skills to participate in most of our workforce system interventions. The problem is a focus on the system rather than the worker. A worker-focused

approach would integrate adult basic education with skill training, because it is a more effective way to learn and because it provides the worker with an immediate return on investment in their own learning as they acquire the skills to move up job ladders.

We propose a new program, *The Learning Network*, to integrate classroom training, workplace learning and career management skills through a partnership among workers, educators and managers. The heart of this program would be a mentored internship approach that uses the workplace as the hub of learning and is supported by integrated, research-based adult basic education, skills training classes and community college instruction. Managers and workers would act as facilitators of worker learning based on company needs and worker aspirations. Workers, managers and educators then would act as a team to contextualize skills achievement, learning and job ladders. This would create an integration of what workers can do, what companies need them to do and what community-based and higher education providers need to offer. Job ladders would develop organically and dynamically.

A logical place to pilot *The Learning Network* is in the health care industry because it is has long job ladders that reach to the bottom of the workforce and it is facing acute labor shortages in the middle of the ladder—among nursing and other technical and semi-technical positions in allied health fields. The health care sector needs to transition low-skilled workers up job ladders to fill those positions in the middle. These mid-level jobs are also morphing into the hubs of patient care and will increasingly require the core innovation skills, expert thinking and complex communication, to transform the health care delivery system.

Opportunity New England. A radical focus on college students and lifelong learners will customize learning experiences and simplify career transitions. This strategy puts all New England's higher education resources at the fingertips of the individual learner, creating one big college campus from our 270 institutions. Economic changes and the increasing importance of "innovation skills" require education (pre-K-12 and postsecondary) and workforce systems to dramatically decrease the time and transaction costs involved in education-to-work and work-to-work transitions. Accordingly, we suggest the need for a groundbreaking, technology-enabled model called *Opportunity New England (ONE)*.

Conceptualized by journalists Neal Peirce and Curt Johnson of the Citistates Group in their work for the New England Futures Project, *ONE* would offer an integrated web portal, providing "one-stop" shopping both online and in person to prospective college students, adult learners and professionals—allowing them to prepare, plan, apply and learn online to acquire the vital competencies of innovation workers. The *ONE* model would include up to four potential elements.

A *Gateway* would provide a web-based directory of online courses and degree programs drawn from New England's 270 college and universities, with a strong emphasis on developing competencies associated with the innovation worker. The *Gateway* would also link students to online "mentor" systems that provide databases of colleges and universities, courses and degree programs and information on tuition and fees, as well as state-specific occupational data on emerging job needs.

Second, a *Negotiation Center* would review student needs/preferences and negotiate learning plans with one or more colleges. *ONE* would link potential students to college admissions officers and registration sites,

as well as to online applications for state and federal financial assistance. *ONE* would also pioneer a *Passport* program, streamlining online application processes and allowing students to apply to multiple institutions via a single online application—saving time and money for students and institutions and speeding institutional responses. *Online Portfolios* would facilitate ongoing counseling and career placement.

Third, a *Coaching Center* would provide online and in person financial aid consultations and link students to counseling resources relating to enrollment, transfer options, innovation worker competencies, course selection and institutional choice. This "high-touch" component would be provided by counselors or advisors assisting students in achieving goals and would be accessible online and on partner campuses.

Finally, a *Career Center* would provide career exploration tools that are integrated with the competencies and academic preparation required of innovation workers, as well as links to businesses, employment needs and occupational outlook resources. *ONE* would be available to act as career counselor, placement agent and host for job fairs online. Using students' online portfolios, the Career Center could be an ongoing job broker.

Moving forward

To create the innovation-capable workforce that will enable New England to succeed in this new century of global competition, we need to help Latino immigrants and their children to join the knowledge workforce, because this is where most of our population growth will be concentrated. But our challenge is much more than simply upgrading the skills of immigrants and native New Englanders with low literacy levels. Very few of our high school and college graduates, even those from the best schools, have the ability to apply knowledge in a way that results in innovation.

The challenges we face require a radical reconfiguration of our education and workforce system to produce from an increasingly diverse population a workforce composed of individuals who are passionate, empowered lifelong learner/innovators. In making this transformation, we will be playing to our strength. America's— and New England's—current education system, flawed as it is, is better at producing innovators than any other system in the world, in part because it puts more emphasis on encouraging critical thinking and because it is less structured. We need to do what we do well much better, and do it for a much broader group of learners.

If we fail, we will not just miss an opportunity; we will face a decline in our standard of living and quality of life. In a world where human capital is the key to innovation, economic development is workforce development.

Kip Bergstrom *is executive director of the Rhode Island Economic Policy Council. Email: kip@ripolicy.org.*
Louis Soares *is associate director of business services of the Rhode Island Economic Development Corp. Email: lsoares@ridec.com.*

The Downside of Early Decision

Choosing Early Doesn't Always Mean Choosing Right

LAWRENCE S. BACOW

For most high school seniors in America, choosing a college is the single most important—and most difficult—decision they've ever had to make. So why are we rushing them?

The increasingly popular option of applying "early decision" (ED) requires a student to make a binding commitment that, if admitted to a particular college, she or he will enroll. Early action (EA) applicants, in contrast, must declare their first choice without making a binding commitment. In both cases, applications typically are due one or two months before the regular-decision deadline, and the college communicates its decision to admit, reject or defer the student before considering the main pool of candidates.

Now offered by184 U.S. colleges and universities, according to the College Board, ED is a highly effective—and therefore highly seductive—tool for managing enrollment. But it's not necessarily in the best interest of most students or their parents. In fact, our experience at Tufts University suggests it's not necessarily in the best interest of colleges either.

Not best for students or parents

Recent research by Harvard professors Christopher Avery and Richard Zeckhauser and former Wesleyan admissions officer Andrew Fairbanks suggests ED is equivalent to a 100- to 150-point boost in SAT score. Amid all the buzz about how hard it is to get into a good college and the purported advantages of applying early, many applicants fail to recognize that ED is a Faustian bargain. Sure, it's nice to have all the stress of the application process over and done with by November and to receive a decision before the winter holidays, but the allure of ED compels too many seniors to declare their commitment to one college before they're ready.

Most 17- or 18-year-olds simply have not had time to consider a broad range of alternatives before making a thoughtful decision about what's best for them. ED encourages students to act strategically. Because of the perceived admissions advantage of applying early, students who do not have a clear favorite still are encouraged to narrow their focus to one school and to set their sights higher than they might otherwise do. The pressure to apply early may come from peers, parents or even secondary schools seeking to optimize placement of their own students in prestigious institutions.

While most students can be happy at a variety of places, the early-decision process sends a very different message. When students do not get into their ED choice, they often feel like failures, and then must scramble to complete applications for other schools. Anxiety increases.

Moreover, senior year of high school should be a period of intellectual discovery and maturation. But ED has a way of turning it into a relentless rollercoaster ride with students hurtling toward application deadlines and then coasting until graduation.

Even for students who have considered their options carefully and are ready to swear by their first choice, ED has drawbacks. A successful ED application commits a student to a particular school without knowledge of the likely financial aid package. The reality is that schools use different criteria to determine financial aid awards. Students who apply early sacrifice their ability to compare offers from multiple schools.

Not ideal for colleges either

From a purely economic perspective, ED is a splendid tool for colleges to manipulate the overall percentage of admitted students who choose to matriculate and thereby ensure high admissions "yields." The larger the percentage of students admitted early, the greater the yield and the more selective the school appears to be in the eyes of *U.S. News & World Report*, for example. ED also allows a school to reduce uncertainty in its financial aid budget by admitting full-pay students who are certain to matriculate.

But ED is not all it's cracked up to be for institutions. Tufts has discovered over the past two years that its regular-decision applicant pool is stronger academically and more diverse ethnically, geographically and economically than its early-decision pool. As a result, we've made a conscious decision in recent years to roll back the percentage of each class that we've accepted during the ED process. In the 2000 to 2004 admissions years, ED admits made up an average 40 percent of Tufts' incoming freshman classes. In 2005 and 2006, we scaled that back to 33 percent, and we intend to keep it at or below that mark in the future.

In terms of academic prowess, the average combined SAT math and verbal score for Tufts regular-decision applicants in the last two years was roughly 30 points higher than for ED applicants. And 74 percent of the Tufts Class of 2009 ranked in the top 10 percent of their graduating class, up from 67 percent the previous year, when 42 percent of our freshmen came in through the ED process. Overall, average SAT scores for entering freshmen have increased by 90 points for enrolling students over the past five years. We could not have strengthened the class this much without cutting back on ED.

Q. Why is early decision so attractive to colleges and universities?

A. Because the more students an institution admits early, the more selective it appears and the higher its "admissions yield."

ED admits as percentage of entire class	Number of ED admits	Number of slots remaining for regular-decision applicants	Number of regular-decision admits*	Total admits (ED + regular decision)	Overall admissions rate (selectivity)**	Overall yield***
50%	750	750	2,273	3,023	20%	49%
40%	600	900	2,727	3,327	22%	45%
30%	450	1,050	3,182	3,632	24%	41%

For a hypothetical college with 15,000 applicants per year and a target freshman class size of 1,500 students.

Assuming yield of 33%; in other words, one in three students admitted will choose to matriculate.

*** Number of admitted students divided by number of applicants.*

**** Number of students who choose to matriculate divided by the number of admitted students.*

From a diversity standpoint, early decision also falls short. Students of color make up 18 percent of Tufts' 2006 ED candidate pool, compared with 24 percent of our regular-decision pool. For Tufts, and most other colleges, the vast majority of ED applicants come from wealthy and upper-middle-class suburban communities and private schools in the Northeast and Middle Atlantic states, where guidance counselors and parents tend to be savvier about early admissions strategies.

Meanwhile, ED combined with the electronic application is contributing to an admissions process that's less predictable overall. The growing popularity of ED forces admissions offices to start processing applications much earlier in the year. The admissions cycle is necessarily compressed, and committees have less time to be thoughtful and deliberate if they are to respond by the ED deadline.

At the same time, the increasing ease of researching schools on the Internet and applying online—along with the peak of the echo baby boom—is fueling a dramatic rise in the number of applications filed. Applications to Tufts have more than doubled since 1990. Few schools, I suspect, have scaled their investment in admissions staff with the rise in applications, meaning that they are probably spending less time, on average, considering each application. The result: less predictability about who's apt to get admitted and who's not. Given greater uncertainty, students are likely to apply to even more schools in order to feel confident about getting in somewhere. The number of applications rises at each school, and the cycle continues.

If we are sincere about broadening access to higher education for all, we need to lessen our reliance on early decision. Far from being a competitive game, college admissions should encourage students, parents and institutions to act thoughtfully and always in the best interest of the student. While any reform may require institutions to take on more risk, that's a risk well worth taking if it benefits our students.

Lawrence S. Bacow *is president of Tufts University. Email: bacow@tufts.edu.*

Trends in Education Philanthropy

A Roundtable with Foundation Leaders

In February 2006, Nellie Mae Education Foundation President and CEO Blenda J. Wilson convened an exclusive CONNECTION *roundtable discussion on trends in education philanthropy. Wilson's guests were Ron Ancrum, president of Associated Grant Makers, which serves grantmaking members in Massachusetts and New Hampshire; Nancy P. Roberts, president of the Connecticut Council for Philanthropy; and Wendy L. Ault, executive director of the MELMAC Education Foundation in Maine. Following are excerpts from their conversation.*

Wilson: What is the biggest barrier to increasing college graduation in New England?

Ancrum: One issue is that college tuition continues to rise at a faster rate than almost anything else—at least 5 percent annually for public institutions; more for the privates. The real burden falls on the student's family. And though colleges are fundraising, it's for things other than helping families pay tuition. So, many students who want to go to college can't afford it or they go but have a hard time staying because of the cost.

Ault: In Maine, we learned through a statewide focus group process that students had learned the socially acceptable excuse for not going to college or not staying in college is financial. Not to diminish the finance piece, but if you really ask deeper questions, you will find it's more often social barriers that stop students from actually going to college or staying once they are there.

Wilson: What do you mean by social barriers?

Ault: Maine is a state full of first-generation college students. A boyfriend or girlfriend saying, "I'm going to break up with you, if you go to college," makes a difference. We also have pockets in Maine where families worry that if their children go off to college, they are never coming back, and they may not because there are limited job opportunities in the state.

Ancrum: I agree. When you get underneath what students are saying, the first reason is social.

Roberts: The other issue especially in the inner city, is that students are not "ready" for college. Students are using up their scholarships before they even get into real college work. We have a collaborative in Hartford where one goal is to get more kids into four-year colleges. The mayor of Hartford said recently that 70 percent of nine-year-olds in Hartford will never graduate from high school. You don't ever see that figure. Nearly half the students in Hartford are Latino; nearly half are black.

Ancrum: There is a higher percentage of students enrolled in colleges and universities now than there was say 30 years ago, but the preparedness issue is troubling.

Wilson: Yes, a higher percentage are going to college, but it's more segmented because the cost increases have much more impact on low-income families than on middle- or upper-class families. At the same time, the consequences of poor education affect some populations more critically than others. So, it's really a triple-barreled problem based on social-cultural and economic issues as well as the readiness question. Now, what role can foundations play in addressing these problems?

Ancrum: Universities are not necessarily seeking foundation dollars to support any one of these three areas. There are scholarship and pre-college programs funded by foundations, but most of that is paid for by federal programs, which are now being slashed. Universities and colleges don't necessarily approach foundations to fund student support services. They see greater priorities for foundation money to support their research, their libraries and their capital interests.

Roberts: A number of funders in Connecticut give scholarships and two are putting out directories of where to find scholarships. They are more sophisticated about how much they give to students, but not to colleges. I don't see that as a priority for foundation funding.

Wilson: One unhelpful trend in recent years has been colleges putting a lot of money into merit-based scholarships as a means of competing for high-scoring students. That's another drain on financial aid for low-income students. State and federal grants and low-interest loans used to fill the college cost gap for poor students and families, but not anymore.

Ault: MELMAC has targeted $3.4 million over seven years to 18 Maine colleges to help them improve graduation rates. We convened a group of college administrators to help us shape grantmaking that would have meaning to them. As a result, we identified some best practices out there that were helping similar institutions across the country retain and graduate more of their students in a timely fashion. I believe that's what foundations can do really well—to identify best practices and put some money behind them.

MELMAC has moved from celebrating college enrollment to now celebrating college graduation. We recognize that we need to get more Maine kids to go on to higher ed and actually persist and graduate.

Ancrum: If the foundation community had the level of interest that MELMAC did, universities would definitely respond, but I don't see them initiating it on their end. That's the way colleges have always behaved. They step to the plate when they know that money will be there. But they're not addressing the true barriers that we talked about earlier.

Wilson: Particularly not the cost barrier problem. Much of our grant money—about $12 million a year—goes to what most people would call college readiness programs. We believe the preparation issue is an even larger barrier than cost.

Roberts: You can find organizations that help students pay for college, but if the students aren't prepared, they're not going to graduate. I don't think we have had as much of a commitment or maybe even knowledge about how to deal with the social and economic issues. I do think we presume that higher ed or the federal government ought to be the source for solving the barrier of cost.

Ault: In Maine, there has been little communication between K-12 and higher ed. It's not that they don't want to talk to each other, but everyone is so busy that they never have that opportunity, unless it's required. That opportunity to talk is another thing MELMAC can provide.

Wilson: I think we all need to do that—to give educators an excuse to step back from the day-to-day concerns and meet with peers and have an honest and authentic conversation about the issues they are trying to deal with. We provide this for our grantee organizations and there is never a time when grantees get together that they don't want more time with one another … How do you see foundations helping ensure that New England students, especially those who are underserved, are not just ready for college but also achieving at high levels?

Roberts: In Connecticut, we've begun to look at the importance of the immigrant population, whom we depend upon for growth. Everyone is looking at the importance of the demographics, but I don't think states have really begun to address it.

Ancrum: A study on the immigrant population in Massachusetts suggests the key issue is making sure that immigrant workers have the language skills to find jobs that will allow them to provide for their families. Yet most efforts on behalf of immigrants have been focused on human rights, justice and employment issues rather than education.

Wilson: The Nellie Mae Education Foundation supports adult literacy programs that are "intergenerational"—the idea being that when parents or grandparents go to an adult literacy program to learn to speak English and they have their child or grandchild with them, you are actually impacting an entire family. What other programs are targeted specifically on access for immigrants?

Roberts: Our schools have never done well at educating populations that don't assimilate.

Wilson: This has to be a higher priority, particularly for our urban populations. If people care about their own self-interest, they should make sure these younger populations are, in fact, educated. … But other than money, where's the leverage? Do we see convening stakeholders as the role for foundations to play in raising these issues and funding programs to demonstrate effective approaches to change?

Roberts: One problem we have in New England is we don't have a lot of big players, so you have to get a lot of smaller foundations together if you want to have any impact. There are some passionate foundations who led that charge for education in Hartford and a few passionate corporations that brought it together in Boston. However, you need to have the leadership coming out of the foundation field.

Ancrum: Projects like the one in Hartford seem to only happen in large enough urban centers, while some small cities that also have very diverse populations, such as Holyoke, Mass., don't attract much philanthropic attention.

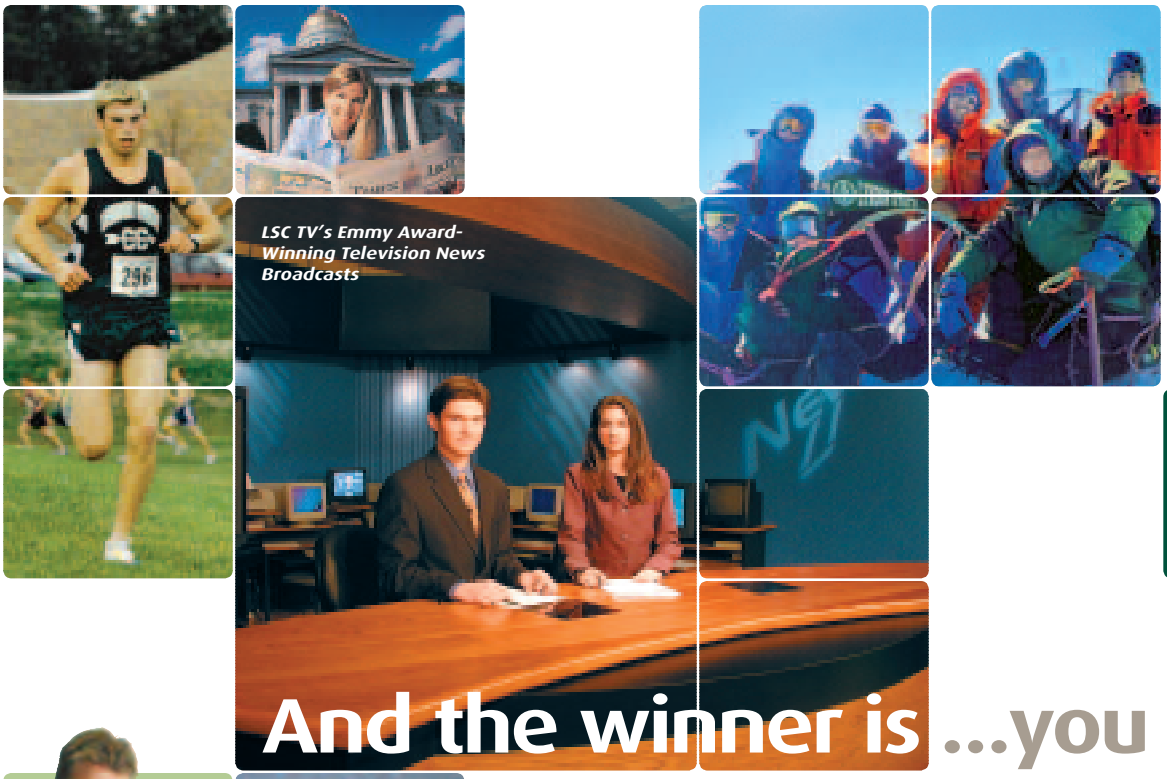
Wilson: Are foundations in New England too disparate in the way they approach education funding to have an impact collectively on education issues?

Ault: I don't think so. I'd use the example of MELMAC working with the Gates Foundation. MELMAC's goals are very simple and straightforward: to help more Maine kids aspire to and actually go to college and to help Maine colleges ensure that the students graduate in a timely fashion. The Gates Foundation's goals are much more broadly about education reform. But the goals of MELMAC fit very well with the goals of the Gates Foundation in Maine.

Ancrum: Another geographic distinction is that Massachusetts has very few foundations with a statewide interest, so it's difficult to propose an initative and get a lot of communities involved. Here in Massachusetts, the focus tends to be around Boston. I think the rest of our state actually suffers as a result of it.

Wilson: Let's make the question harder. What evidence is there that philanthropy has added value in promoting success in our schools? Many education funders would say they are in the college-readiness or access arena—that they are trying to help more students be prepared for the college, get to college, succeed in college. Are you persuaded that on a collective basis we are succeeding in this?

Roberts: We have lots of people funding education in



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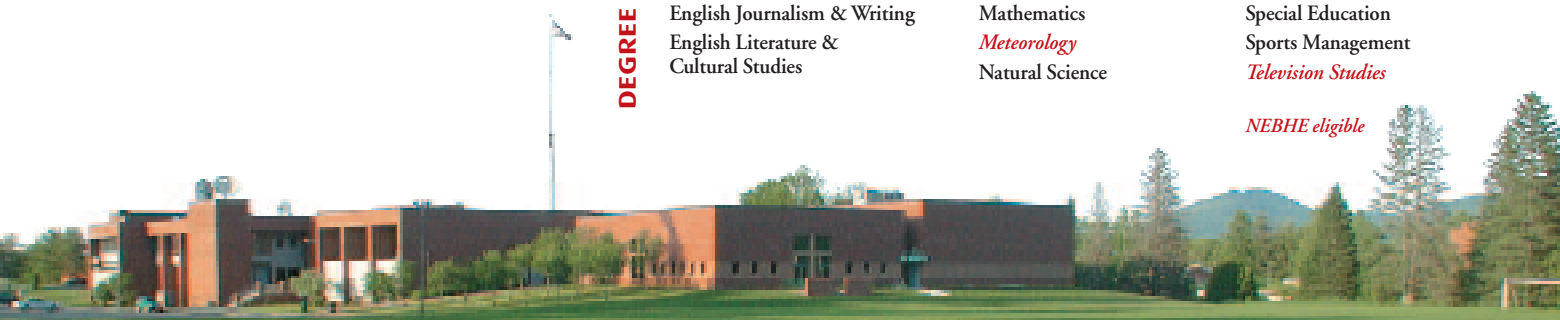

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Connecticut but they are all funding it at different places.

Wilson: If all that money were going into the same place, would it have a greater impact?

Roberts: Probably, but private philanthropy is very individual, and we have a lot of very individual approaches within Connecticut and across the country.

Wilson: There are success stories out there, but are they really making a difference for our kids?

Roberts: We are making a difference for some kids. There are kids who are getting prepared for college and getting into college who wouldn't have if these projects weren't supported by corporate and foundation dollars.

Ancrum: Some initiatives make small impacts but not systematic change. Many foundations, particularly in the Boston area, have shifted to supporting after-school programs. It's the new big thing, but after-school doesn't always mean academic preparation. Many of the dollars pooled for the after-school population are not going directly to school programs or programs specifically addressing college preparedness.

Wilson: Right. We spend $2.7 million a year on our out-of-school initiative, which is our version of after school, but regionally not just in Boston, and our emphasis has been to make sure that programs are evaluated in terms of improving students' readiness for college, engagement with learning or school performance. And the objective we're pursuing is greater than making it possible for middle-school kids to get after-school programs. We need to demonstrate enough impact on academic achievement that systems will change. Currently there is state-level interest in Massachusetts and a state appropriation for "extended time," which will enable selected school districts to pilot extending the school day. And it's exciting to think that something that seemed to be unrelated to the regular school program could be used to convince educators to really work differently. There is just no logic anymore behind 180 days of school, six hours a day. So in short, programs created outside schools can nevertheless bring systemic change to education.

Roberts: Everyone is so local. When people ask me about a state organization supporting education, I say, "Well, you've got the banks, and you've got maybe four foundations that are funding statewide and they are funding very specific areas, and then you've got the utility company." Once you get beyond that, there is not much doing statewide.

Wilson: We are creating a regional landscape that no one else can visualize. Our after-school efforts include Boston, but we have created a statewide initiative in New Hampshire called *Out-of-School Time! New Hampshire*, in which we've been the major funder. In Rhode Island we are funding *Community Schools Rhode Island* with the United Way being the major purveyor. So, after school programming is happening beyond Boston. … Speaking of states, how can foundations support enlightened government education policies at the state or local school board levels to make sure residents are better educated for work and life?

Roberts: I'm amazed at how much private philanthropy in Connecticut has been able to get in front of legislators and the governor, and it was the nonprofits who really pushed the governor to move the whole early childhood agenda.

Ault: Foundations can lead by example and through grantmaking. We can require data collection, analyze the results for grantees and then very publicly celebrate success. It's amazing to me how energy and enthusiasm just follow success. You profile what's working—you identifiy best practices.

Wilson: And government policy will be influenced?

Roberts: Just by identifying best practices and putting money behind them, you have tremendous leverage with the policymakers.

Wilson: What is it that higher education ought to do to tap into the potential of philanthropy or to create a better understanding among philanthropic leaders of what is needed to increase college attainment?

Ault: Philanthropy is not very good at engaging colleges and universities in our states to even work with us around the data collection. When I think of philanthropy on campuses in Maine, it's building a science building or a new field house. What MELMAC is trying to do is create a cultural shift so we're broadening the discussion about graduation rates, beyond the president's office and, providing professional development for the people who work on the college campus so that they recognize they're all part of the solution.

Ancrum: And some of our *public* institutions don't think about approaching philanthropy for much, because they are spending most of their time battling with government for increased appropriations.

Ault: If higher education sees foundations only as a checkbook, that's probably not the best approach. And since most local and regional foundations are interested in community, how does higher education begin to help solve those community problems that are playing out in schools, before students even get to the college. If colleges participate in solving those problems, a partnership may develop based on positive solutions, and money could start coming to them as part of that solution.

Wilson: Excellent point, and I think there is more recognition by many colleges that they are citizens of their community and neighborhoods and need to reflect that as much as being part of the higher ed establishment. Effective philanthropy, likewise, means working collaboratively with colleges, communities and other funders. ■

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CONNECTION'S Trends & Indicators in Higher Education, 2006

CONNECTION's "Trends & Indicators in Higher Education, 2006" features more than 60 tables and charts exploring the state of higher education in New England.

This issue helps answer the weighty questions: Where have we been? Where are we today? Where are we headed? And in light of the region's projected decline in high school graduates, high and rising college tuitions, declining share of student enrollments and "old and cold image," can New England adapt and compete in a changing higher education marketplace? Or will its colleges price themselves out of the market? Will the region's university labs lead the way in medical, environmental, engineering breakthroughs? Or will their tradition of discovery follow the talent and money south, west and overseas? Can New England regain its reputation as the world's academic hub?

CONNECTION's "Trends & Indicators" focus on demography; K-12 enrollment and preparation; higher education enrollment; graduation rates and degrees; financing higher education; and university research. Some highlights:

- New England college and university enrollment grew to a record 868,220, but the region's once-disproportionate share of total U.S. enrollment has eroded.
- Nearly half of New England college students attend private institutions compared with about one quarter of college students nationally.
- More than a dozen New England "college towns" host 10,000 students or more, led by Boston with its 131,000-plus collegians.
- More than 42,000 foreign students are enrolled on New England campuses—nearly half of them at just nine of New England's 270 colleges and universities.
- New England's high school graduating classes will shrink over the next 10 years, dropping by roughly 126,700 graduates due to relatively low birth rates and slow immigration.
- Fewer than half of New England students who do finish high school have completed the necessary courses and mastered the skills to be considered "college-ready."
- Only 21 percent of students graduate from New England community colleges within three years of enrolling—and substantial gaps exist among racial and ethnic groups.
- New England's already-low number of associate degrees awarded declined slightly in 2004, while the number of bachelor's degrees awarded inched up. At both levels, significant gaps remain between different racial and ethnic groups
- Women earn more associate, bachelor's, master's and first-professional degrees than men. Men earn more doctorates.
- Three in 10 doctorates awarded by New England universities go to foreign students, while just one in 10 go to U.S. minority students.
- Total yearly charges for resident students, including room and board, average nearly $39,000 at New England's private four-year institutions and $17,000 at the region's public institutions—far above national rates.
- Americans pay an average of $225 each in annual state taxes to support public higher education and student aid in their states. New Englanders, however, pay just $159.
- New England universities performed $3 billion worth of research and development in 2003, but the region's share of all U.S. university R&D has fallen over the last two decades from well over 10 percent to 7.6 percent.

The data presented on these pages are collected and analyzed annually by the New England Board of Higher Education's (NEBHE's) Department of Policy and Research. The data are drawn from a variety of sources, including the U.S. Department Education, the National Science Foundation, the College Board, the National Center for Higher Education Management Systems, and NEBHE's own Annual Survey of New England Colleges and Universities.

"Trends & Indicators" represents an overview of the key education indicators impacting higher education in New England. More comprehensive and detailed figures are available online through the NEBHE Department of Policy and Research at www.nebhe.org/research.

CONNECTION and NEBHE's Department of Policy and Research welcome comments and suggestions on "Trends & Indicators."

Data compiled by NEBHE Director of Policy and Research ***Jamie E. Scurry.*** *Special thanks to former NEBHE research analyst* ***Sue Klemer,*** *now with North Shore Community College's Department of Planning and Research.*

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New England's population is growing by less than 1 percent per year. The region's minority populations grew faster than the white population.

Fig. 1: Change in Population, 1990 to 2005, New England States and Other Regions

	1990	2000	2003	2004	2005	% Change 1990 to 2005	% Change 2004 to 2005
Connecticut	3,287,116	3,405,565	3,483,372	3,503,604	3,510,297	7%	0.2%
Maine	1,227,928	1,274,923	1,305,728	1,317,253	1,321,505	8%	0.3%
Massachusetts	6,016,425	6,349,097	6,433,422	6,416,505	6,398,743	6%	-0.3%
New Hampshire	1,109,252	1,235,786	1,287,687	1,299,500	1,309,940	18%	0.8%
Rhode Island	1,003,464	1,048,319	1,076,164	1,080,632	1,076,189	7%	-0.4%
Vermont	562,758	608,827	619,107	621,394	623,050	11%	0.3%
New England	13,206,943	13,922,517	14,205,480	14,238,888	14,239,724	8%	0.0%
Middle Atlantic	37,602,286	39,671,861	40,225,598	40,332,259	40,402,171	7%	0.2%
East North Central	42,008,942	45,155,037	45,842,992	46,031,860	46,156,447	10%	0.3%
West North Central	17,659,690	19,237,739	19,585,918	19,697,992	19,815,527	12%	0.6%
South Atlantic	43,566,853	51,769,160	54,310,395	55,182,959	56,179,519	29%	1.8%
East South Central	15,176,284	17,022,810	17,349,717	17,480,032	17,615,260	16%	0.8%
West South Central	26,702,793	31,444,850	32,831,282	33,281,974	33,710,634	26%	1.3%
Mountain	13,658,776	18,172,295	19,387,045	19,798,992	20,291,305	49%	2.5%
Pacific	39,127,306	45,025,637	47,055,375	47,610,448	47,999,817	23%	0.8%
United States	248,709,873	281,421,906	290,793,802	293,655,404	296,410,404	19%	0.9%

Note: Middle Atlantic includes New Jersery, New York, Pennsylvania. East North Central includes Ohio, Illinois, Indiana, Michigan, Wisconsin. West North Central includes Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas. South Atlantic includes Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida. East South Central includes Kentucky, Tennessee, Alabama, Mississippi. West South Central includes Arkansas, Louisiana, Oklahoma, Texas. Mountain includes Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada. Pacific includes Washington, Oregon, California, Alaska, Hawaii.

Source; New England Board of Higher Education analysis of U.S. Census Bureau data.

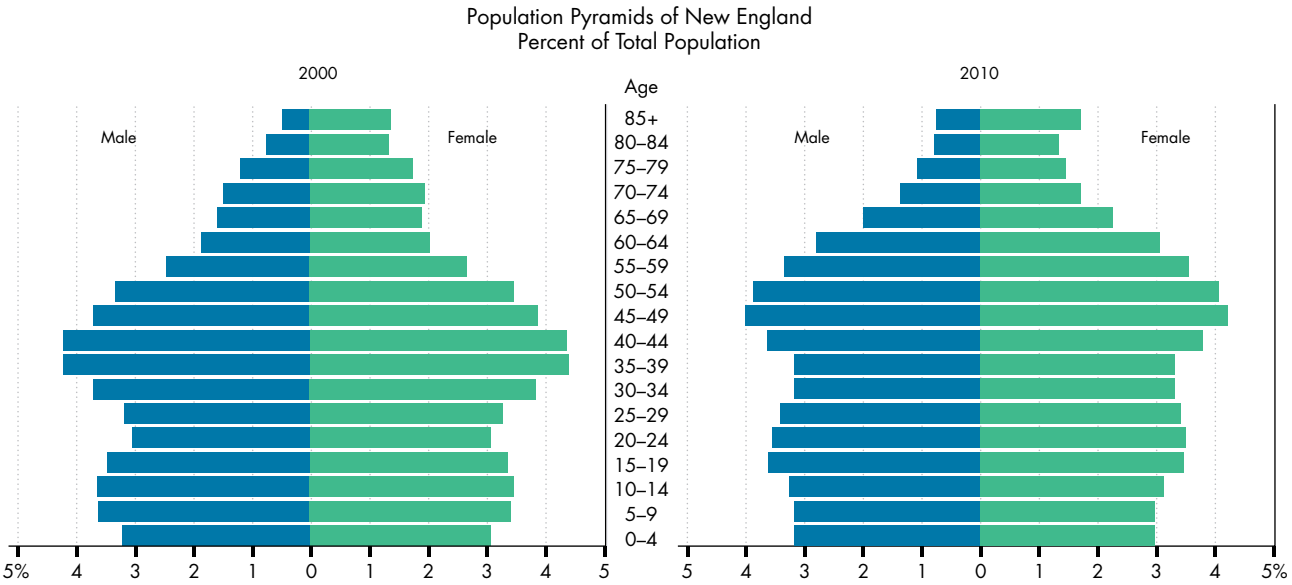
Fig. 2: Population of New England by Race, 2004

	White alone	Black or African-American alone	American Indian and Alaska Native alone	Asian alone	Native Hawaiian and Other Pacific Islander alone	Two or more races	Total
Connecticut	2,983,059	352,272	11,812	107,762	2,648	46,051	3,503,604
Maine	1,277,026	9,560	7,454	10,854	459	11,900	1,317,253
Massachusetts	5,581,053	434,545	18,404	294,701	5,223	82,579	6,416,505
New Hampshire	1,249,579	12,263	3,214	21,824	520	12,100	1,299,500
Rhode Island	962,437	65,958	6,366	28,763	1,275	15,833	1,080,632
Vermont	602,311	3,704	2,326	6,311	166	6,576	621,394
New England	12,655,465	878,302	49,576	470,215	10,291	175,039	14,238,888

Note: The above categories reflect the U.S. Census Bureau Guidance on the Presentation and Comparison of Race and Hispanic Origin. For additional information, see www.census.gov.

Source: New England Board of Higher Education analysis of U.S. Census Bureau data.

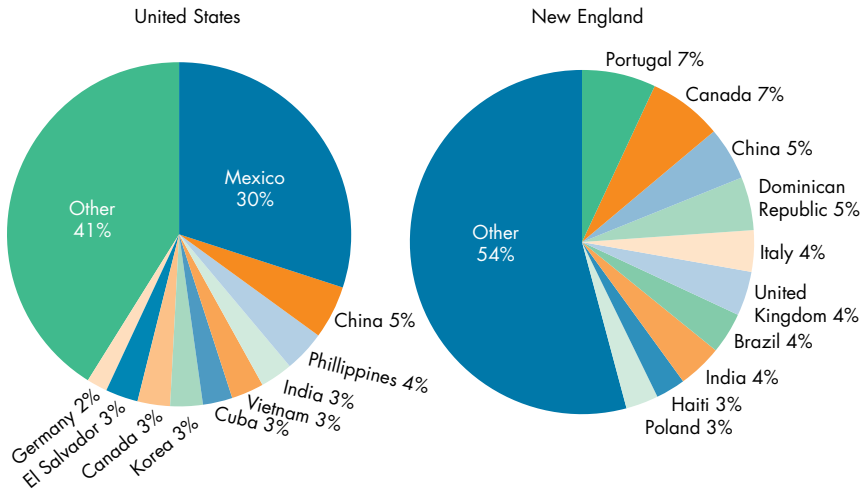
Fig. 3: Regional Population Change by Age and Gender, 2000 to 2010



Source: U.S. Census Bureau, Population Division, Interim State Population Projections, 2005

Fig. 4: Immigration in New England

Countries of Origin of New Immigrants to United States and New England



Source: Federal Reserve Bank of Boston; www.bos.frb.org.

State of Intended Residence of New Immigrants to New England, 2004

Connecticut	12,138
Maine	1,264
Massachusetts	27,676
New Hampshire	2,198
Rhode Island	3,689
Vermont	790
New England	47,755
United States	939,049

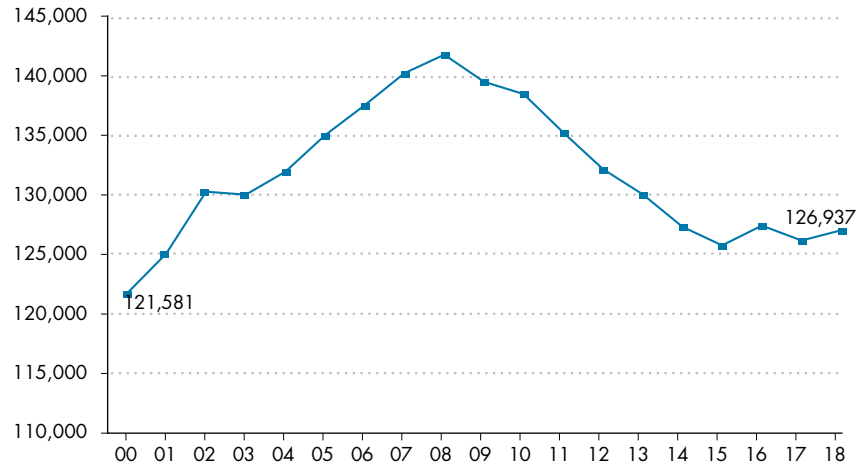
Note: An immigrant is any person granted lawful permanent residence

Source: New England Board of Higher Education analysis of U.S. Citizenship and Immigration Services data.

K–12 ENROLLMENT & PREPARATION

New England's high school graduating classes will shrink over the next 10 years. Moreover, research suggests that fewer than 50 percent of those who do graduate complete the necessary courses and master the skills to be considered "college-ready."

Fig. 5: Public High School Graduates in New England, 2000 to 2018



Source: New England Board of Higher Education analysis of Western Interstate Commission for Higher Education (WICHE) data.

Fig. 6: High School Graduation Rates, 2001-02

	Fall 1998 9th-Graders	2001-02 High School Graduates	Percent Graduating within Four Years
Connecticut	43,140	32,610	76%
Maine	16,635	12,620	76
Massachusetts	74,668	55,590	74
New Hampshire	16,566	12,480	75
Rhode Island	12,504	8,900	71
Vermont	9,016	7,040	78
New England	172,529	129,240	75%
United States	3,856,100	2,630,130	68%

Source: National Center for Higher Education Management Systems (NCHEMS); www.higheredinfo.org.

Fig. 7: "Loss Rate" per 100 Ninth-Graders at Various Transition Points, 2002

	Students Who Did Not Graduate from High School	High School Graduates Who Did Not Go to College	College Students Who Did Not Graduate Within 150% of Time*	College Graduates
Connecticut	25	27	22	26
Maine	24	35	19	22
Massachusetts	24	25	23	29
New Hampshire	25	30	19	27
Rhode Island	28	32	17	23
Vermont	23	42	14	21

Note: 150% of time equals three years at a two-year institution and six years at a four-year institution. Horizontal rows may add up to more than 100 due to rounding.

Source: National Center for Public Policy and Higher Education; www.highereducation.org.

For more trends and indicators, visit www.nebhe.org/research.

Fig. 8: Percent of High School Graduates Enrolling in College Immediately, 2002

	High School Graduates 2002	First-Time Freshmen Enrolled Directly from High School Anywhere in the U.S. Fall 2002	Percent of High School Graduates Going Directly to College
Connecticut	37,736	23,528	62%
Maine	14,665	7,524	51
Massachusetts	65,276	42,482	65
New Hampshire	14,669	8,279	56
Rhode Island	10,516	5,612	53
Vermont	8,382	3,809	45
New England	151,244	91,234	60
United States	2,904,584	1,643,496	57%

Source: National Center for Higher Education Management Systems (NCHEMS); www.higheredinfor.org.

Fig. 9: College Readiness of High School Graduates, 2000 vs. 2002

	College Readiness Rate (2000)	College Readiness Rate (2002)	Improvement
Connecticut	37%	40%	+3
Maine	37	38	+1
Massachusetts	36	38	+2
New Hampshire	36	40	+4
Rhode Island	35	37	+2
Vermont	36%	39%	+4

Note: Students are considered "college-ready" when they graduate from high school with the skills and credentials required to attend a four-year college.

Source: The Manhattan Institute; www.manhattan-institute.org

Fig. 10: College Readiness Rates by Race, 2002

	Total	Hispanic	African-American	White
Connecticut	40%	15%	30%	47%
Maine	38	NA	NA	40
Massachusetts	38	14	29	43
New Hampshire	40	NA	NA	43
Rhode Island	37	NA	35	39
Vermont	39	NA	NA	NA

Note: Students are considered "college-ready" when they graduate from high school with the skills and credentials required to attend a four-year college.

Source: The Manhattan Institute; www.manhattan-institute.org

Fig. 11: Intended Fields of Study of College-Bound Seniors by Gender, 2005

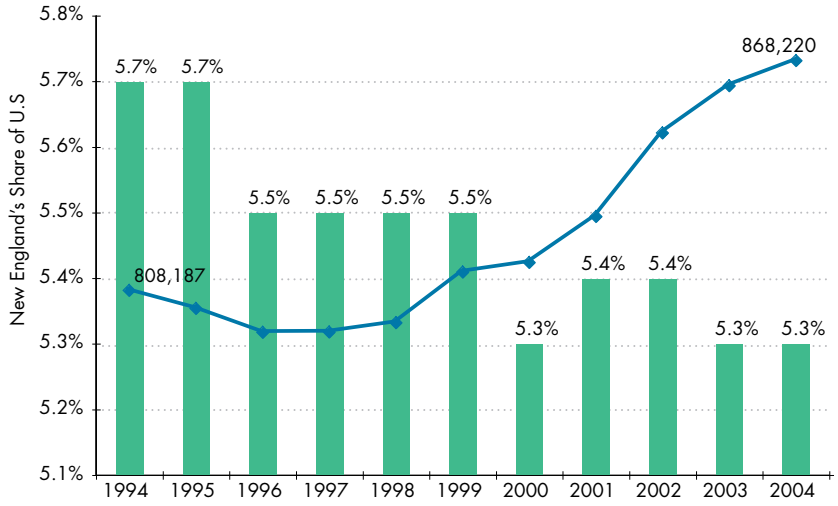
	New England			United States		
	% Male	% Female	Total	% Male	% Female	Total
Biological Sciences	35%	65%	4,462	36%	54%	58,475
Business and Commerce	57	43	11,968	53	47	137,977
Computer Information Systems	90	10	2,971	87	13	42,890
Education	20	80	7,172	22	78	80,847
Engineering and Engineering Technologies	88	12	5,481	85	15	84,416
Language and Literature	29	71	1,909	29	71	18,042
Mathematics	62	38	756	60	40	9,935
Physical Sciences	61	39	1,191	58	42	15,860
Social Sciences and History	35%	65%	8,009	34%	66%	92,843

Source: The College Board; www.collegeboard.com.

HIGHER EDUCATION ENROLLMENT

New England college and university enrollment grew to a record 868,220, but the region's share of total U.S. college enrollment remained flat.

Fig. 12: Total Enrollment at New England Colleges and Universities and New England's Share of U.S. Enrollment, 1994 to 2004



Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 13: Higher Education Enrollment in New England by Type of Institution and Full-Time Status, 2004

	All Institutions			Public Institutions			Private Institutions		
	Total	Full-time	Part-time	Total	Full-time	Part-time	Total	Full-time	Part-time
Connecticut	174,021	109,800	64,221	111,348	61,897	49,451	62,673	47,903	14,770
Maine	65,415	40,071	25,344	47,284	27,264	20,020	18,131	12,807	5,324
Massachusetts	439,539	299,724	139,815	187,519	104,051	83,468	252,020	195,673	56,347
New Hampshire	70,229	46,905	23,324	40,642	24,920	15,722	29,587	21,985	7,602
Rhode Island	80,377	57,431	22,946	39,920	22,381	17,539	40,457	35,050	5,407
Vermont	38,639	27,803	10,836	22,980	14,705	8,275	15,659	13,098	2,561
New England	868,220	581,734	286,486	449,693	255,218	194,475	418,527	326,516	92,011
United States	16,468,000	9,860,000	6,608,000	12,627,000	NA	NA	3,841,000	NA	NA
New England as a % of United States	5.3	5.9	4.3	3.6	NA	NA	10.9	NA	NA

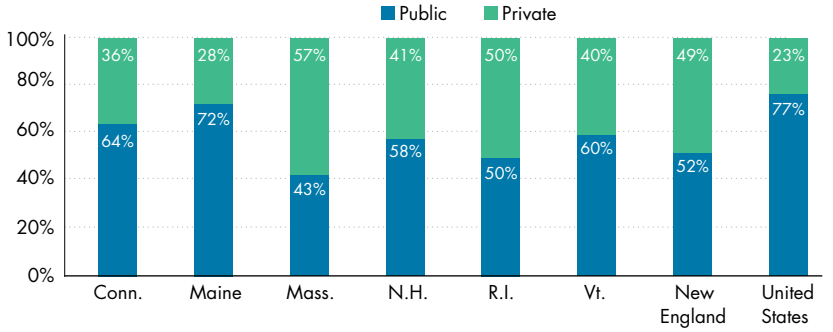
Note: U.S. totals are projected by the U.S. Department of Education. Full-time and part-time breakdowns for public and private institutions were not available.

Source: New England Board of Higher Education analysis of U.S. Department of Education data.

For more trends and indicators, visit www.nebhe.org/research.

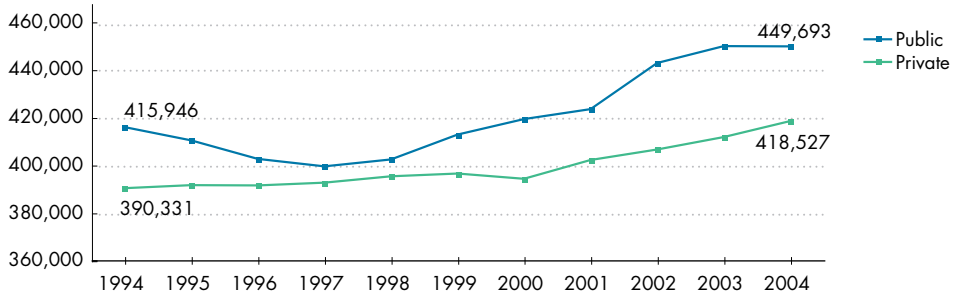
Nearly half of New England college students attend private institutions compared with about one-quarter of college students nationally.

Fig. 14: Distribution of Higher Education Enrollment, Public vs. Private, 2004



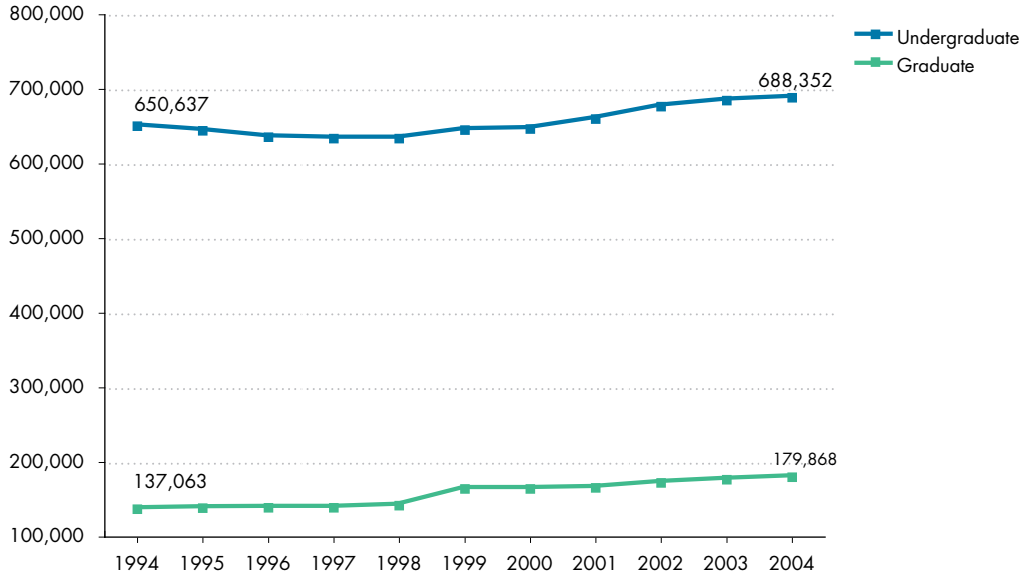
Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 15: Public vs. Private College Enrollment in New England, 1994 to 2004



Source: New England Board of Higher Education analysis of U.S. Department of Education data.

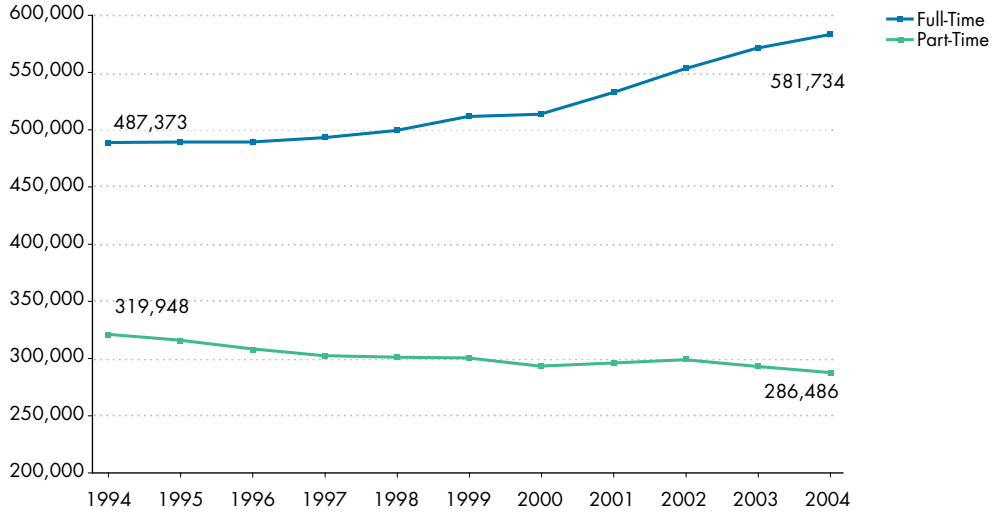
Fig. 16: Undergraduate vs. Graduate Enrollment in New England, 1994 to 2004



Source: New England Board of Higher Education analysis of U.S. Department of Education data.

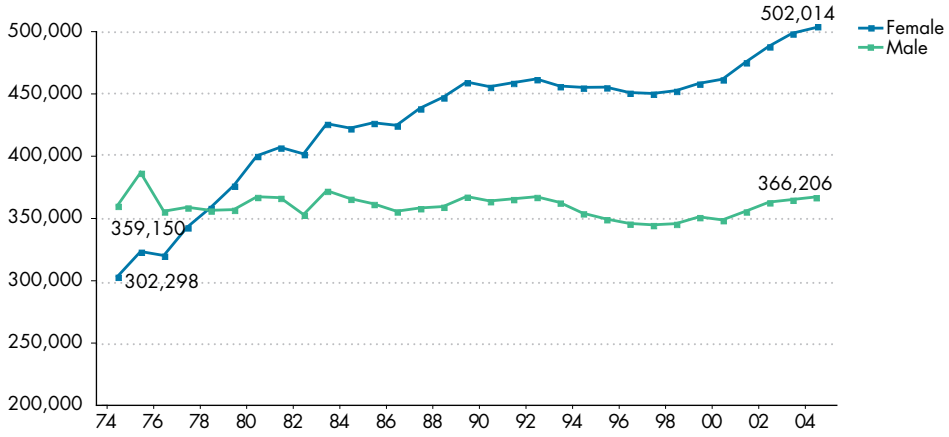
Full-time college enrollment is larger and growing faster in New England than part-time enrollment, which declined last year.

Fig. 17: Full-time vs. Part-time College Enrollment in New England, 1994 to 2004



Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 18: Total Higher Education Enrollment by Gender in New England, 1974 to 2004



Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 19: New England Institutions with the Largest Undergraduate Enrollments, Fall 2004

Institution Name	Full-time	Part-time	Total
University of Massachusetts Amherst	17,563	1,403	18,966
Northeastern University	14,618	3,953	18,571
Boston University	16,386	1,354	17,740
Community College of Rhode Island	5,731	10,562	16,293
University of Connecticut	14,843	908	15,751
University of Rhode Island	9,673	1,724	11,397
University of New Hampshire	10,769	613	11,382
Boston College	9,353	433	9,786
Central Connecticut State University	7,245	2,359	9,604
Harvard University	6,954	2,565	9,519
Johnson & Wales University	8,301	945	9,246
University of Vermont	7,956	1,279	9,235
University of Maine	7,467	1,618	9,085
University of Massachusetts Boston	5,502	3,330	8,832
University of Southern Maine	4,762	3,974	8,736
University of Massachusetts Lowell	5,804	2,858	8,662
Southern Connecticut State University	6,617	1,697	8,314
Middlesex Community College (Mass.)	3,398	4,724	8,122
Bunker Hill Community College	2,581	5,240	7,821
Bridgewater State College	6,343	1,410	7,753
University of Massachusetts Dartmouth	6,151	1,139	7,290
Rhode Island College	5,042	2,242	7,284
Massasoit Community College	3,221	3,687	6,908
Bristol Community College	3,037	3,827	6,864
Salem State College	4,998	1,773	6,771
Total 25 Largest Institutions	194,315	65,617	259,932

Source: New England Board of Higher Education analysis of U.S. Department of Education data.

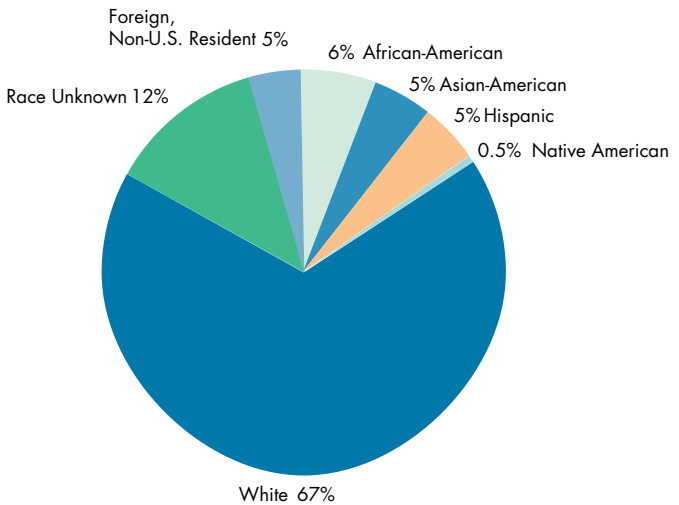
Fig. 20: New England Cities with the Largest College Enrollments, 2004

City	Number of Colleges & Universities	Total Enrollment
Boston, Mass.	33	131,702
Cambridge, Mass.	8	48,697
Providence, R.I.	6	39,843
Amherst, Mass.	3	27,651
Storrs, Conn.	1	27,579
Worcester, Mass.	8	25,913
Lowell, Mass.	2	19,211
Warwick, R.I.	2	19,304
Springfield, Mass.	5	16,853
Kingston, R.I.	1	14,749
Durham, N.H.	1	14,405
Burlington,Vt.	4	14,038
Portland, Maine	4	12,346
New Britain, Conn	1	12,320

Note: Total enrollment includes full- and part-time undergraduate, graduate and non-degree students.

Source: New England Board of Higher Education Annual Survey of New England Colleges and Universities, 2005.

Fig. 21: Enrollment at New England Colleges and Universities by Race/Ethnicity, 2004



Source: New England Board of Higher Education analysis of U.S. Department of Education data.

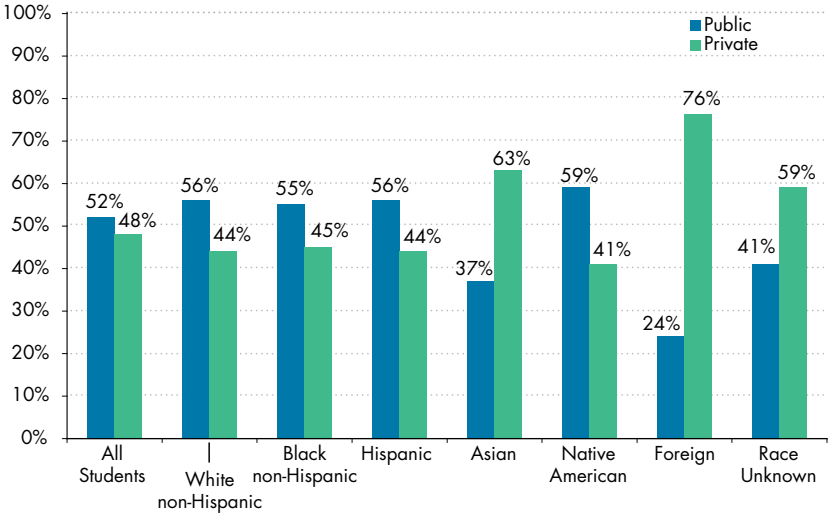
Fig. 22: Minority Enrollment by State and Race/Ethnicity, 1994 and 2004

		Enrolled Students				As % of 18- to 24-Year-Old Population 2000	% Change in Enrollment 1994-2004
		1994	% of Total	2004	% of Total		
Connecticut	African-American	11,693	7.2%	16,574	9.5%	12%	42%
	Asian-American	5,110	3.2%	6,777	3.9%	3	33
	Hispanic	7,497	4.6%	12,689	7.3%	15	69
	Native American	475	0.3%	685	0.4%	1	44
	White	126,192	78.2%	116,583	67.0%	63	-8
	Race Unknown	5,111	3.2%	14,165	8.1%	NA	177
Maine	African-American	359	0.6%	831	1.3%	1	132
	Asian-American	628	1.1%	899	1.4%	1	43
	Hispanic	255	0.5%	655	1.0%	1	157
	Native American	538	1.0%	822	1.3%	1	53
	White	47,531	85.2%	55,585	85.0%	95	17
	Race Unknown	5,919	10.6%	5,290	8.1%	NA	-11
Massachusetts	African-American	20,130	4.8%	28,468	6.5%	7	41
	Asian-American	20,673	4.9%	26,742	6.1%	6	29
	Hispanic	15,004	3.6%	22,390	5.1%	10	49
	Native American	1,394	0.3%	1,640	0.4%	0.3	18
	White	286,548	68.4%	270,016	61.4%	71	-6
	Race Unknown	50,977	12.2%	63,723	14.5%	NA	25
New Hampshire	African-American	644	1.1%	1,154	1.6%	1	79
	Asian-American	844	1.4%	1,504	2.1%	2	78
	Hispanic	657	1.1%	1,379	2.0%	1	110
	Native American	234	0.4%	320	0.5%	1	37
	White	46,695	79.1%	52,772	75.1%	93	13
	Race Unknown	8,876	15.0%	11,452	16.3%	NA	29
Rhode Island	African-American	2,866	3.8%	4,024	5.0%	6	40
	Asian-American	2,397	3.2%	2,951	3.7%	4	23
	Hispanic	2,277	3.0%	4,209	5.2%	12	85
	Native American	222	0.3%	290	0.4%	1	31
	White	58,772	78.1%	55,955	69.6%	71	-5
	Race Unknown	6,243	8.3%	10,337	12.9%	NA	66
Vermont	African-American	340	1.0%	638	1.7%	1	88
	Asian-American	469	1.3%	772	2.0%	1	65
	Hispanic	339	1.0%	713	1.8%	2	110
	Native American	162	0.5%	222	0.6%	1	37
	White	30,002	85.7%	32,721	84.7%	95	9
	Race Unknown	2,959	8.4%	2,788	7.2%	NA	-6
New England	African-American	36,032	4.4%	51,689	6.0%	7	44
	Asian-American	30,121	3.7%	39,645	4.6%	4	32
	Hispanic	26,029	3.2%	42,035	4.8%	10	62
	Native American	3,025	0.4%	3,979	0.5%	0.4	32
	White	595,740	72.8%	583,632	67.2%	74	-2
	Race Unknown	80,085	9.8%	107,755	12.4%		35
United States	African-American	1,448,630	11.1%	1,952,722	11.6%	12	35
	Asian-American	774,295	5.9%	987,033	5.8%	4	28
	Hispanic	1,045,564	8.0%	1,602,484	9.5%	15	53
	Native American	127,372	1.0%	162,997	1.0%	1	28
	White	10,426,994	79.9%	10,538,922	62.4%	68%	1%

Note: Table does not include enrollment at military academies. African-American, Asian-American, Native American and White totals reflect non-Hispanic population. Does not include the category non-resident alien. United States data are provided by the U.S. Department of Education; 2003 is the most current data set available.

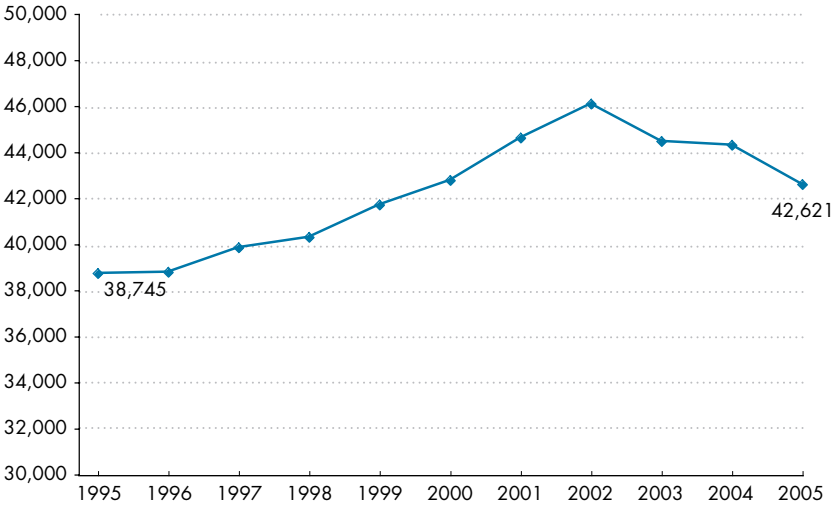
Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 23: Public and Private College Enrollment by Race/Ethnicity and Type of Institution, 2004



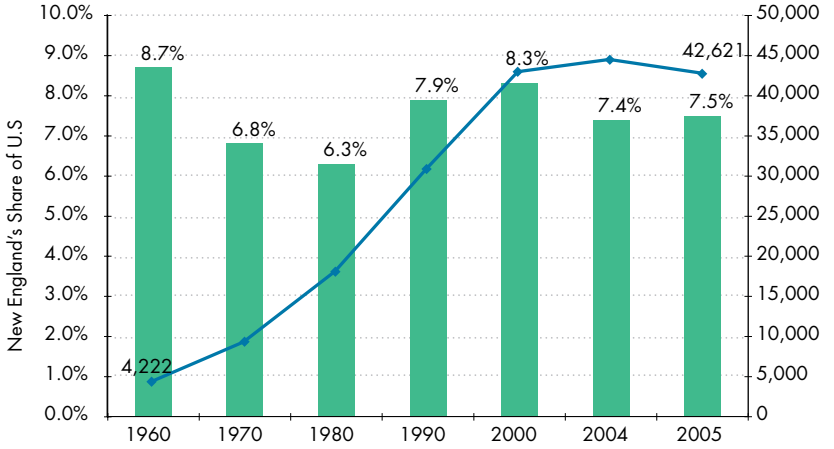
Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 24: Foreign Enrollment at New England Colleges and Universities, 1995 to 2005



Source: New England Board of Higher Education analysis of Institute of International Education data; www.iie.org.

Fig. 25: Foreign Enrollment at New England Colleges and Universities and Share of U.S. Enrollment, 1960 to 2005



Source: New England Board of Higher Education analysis of Institute of International Education data; www.iie.org.

Fig. 26: New England Institutions Enrolling More than 1,000 Foreign Students and Leading U.S. Metro Areas for Foreign Students, Academic Year 2004–05

New England Institutions with More than 1,000 Foreign Students

Institution	Foreign Enrollment	Total Enrollment	Foreign Students as a % of Total Enrollment
Boston University	4,541	29,596	15%
Harvard University	3,546	24,648	14
Massachusetts Institute of Technology	2,723	10,320	26
Northeastern University	2,104	22,932	9
University of Connecticut	1,800	22,694	8
Yale University	1,759	11,441	15
University of Massachusetts Amherst	1,724	24,646	7
University of Bridgeport	1,164	3,274	36
Brown University	1,083	8,004	14
Total of above institutions	20,444	157,555	13%
Total of all New England institutions	42,621	868,220	5%
Above institutions as a share of all New England institutions	48%	18%	

Source: New England Board of Higher Education analysis of Institute of International Education data; www.iie.org.

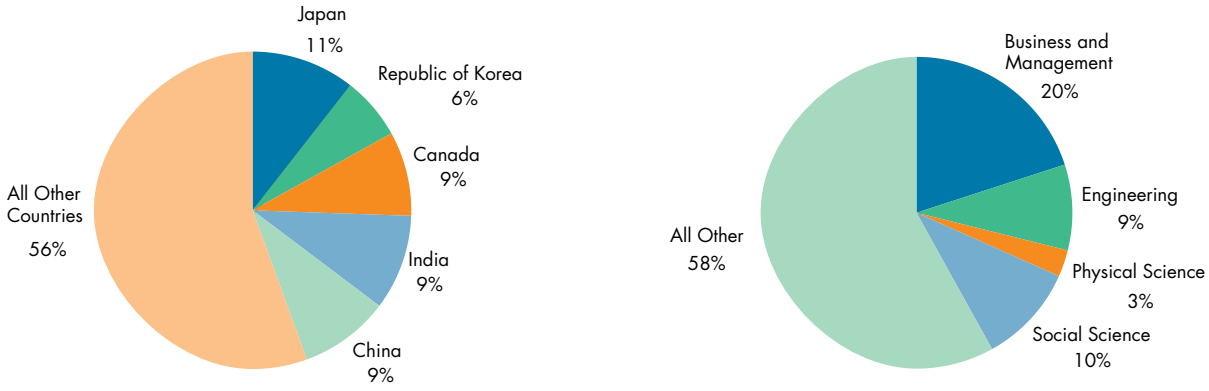
Nearly half of New England's 42,000 foreign students are enrolled at just nine of the region's 270 colleges and universities.

Leading U.S. Metropolitan areas for Foreign Enrollment, 2004-05

Metropolitan Area	International Students
New York-Edison, NY-NJ-PA	49,470
Los Angeles-Long Beach-Santa-Ana, CA	33,736
Boston-Cambridge-Quincy, MA-NH	23,336
Washington-Arlington-Alexandria, DC-VA-MD-WV	18,811
Chicago-Naperville-Joliet, IL-IN-WI	14,757
San Francisco-Oakland-Fremont, CA	13,783
Dallas-Fort Worth-Arlington, TX	13,611
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	12,707
Houston-Baytown-Sugar Land, TX	11,707
Miami-Fort Lauderdale-Miami Beach, ML	11,177
Total	203,095

Source: Institute of International Education; www.iie.org.

Fig. 27: Foreign Students in New England by Countries of Origin and Field of Study, 2005



Source: New England Board of Higher Education analysis of Institute of International Education data; www.iie.org.

For more trends and indicators, visit www.nebhe.org/research.

GRADUATION RATES & DEGREES

Average graduation rates in New England range from 21% at community colleges to about 65% at public land grant universities and private four-year colleges, and substantial gaps exist between completion rates for white students and minority groups.

Fig. 28: Graduation Rates by State, Race/Ethnicity and Type of Institution, 2004

	Foreign	Black, non-Hispanic	American Indian or Alaskan Native	Asian or Pacific Islander	Hispanic	White, non-Hispanic	Race/Ethnicity Unknown	Total
Public Two-Year								
Connecticut	15%	12%	NA	21%	14%	13%	9%	12%
Maine	32	6	50	27	25	39	29	36
Massachusetts	24	14	10	16	13	21	13	18
New Hampshire	NA	17	NA	50	12	45	30	40
Rhode Island	40	3	0	10	4	11	12	8
Vermont	NA	NA	NA	NA	NA	19	NA	19
New England	23	13	23	18	12	20	15	21
Public Four-Year								
Connecticut	30	32	59	37	24	41	30	38
Maine	33	21	37	36	NA	44	NA	43
Massachusetts	42	39	11	54	36	50	34	48
New Hampshire	21	33	33	36	29	47	48	47
Rhode Island	38	14	NA	39	22	45	41	43
Vermont	NA	NA	NA	NA	NA	39	NA	39
New England	39	28	29	41	25	44	38	48
Public Land Grant								
Connecticut	59	63	50	76	62	72	70	71
Maine	38	36	26	58	50	57	40	56
Massachusetts	44	48	15	56	53	64	60	62
New Hampshire	31	65	75	68	62	71	72	71
Rhode Island	67	38	50	51	47	58	50	56
Vermont	71	75	67	61	57	68	55	67
New England	54	55	53	60	53	66	63	66
Private Four-Year								
Connecticut	46	67	72	85	69	70	33	60
Maine	86	62	57	79	59	72	80	73
Massachusetts	71	65	66	75	69	74	43	69
New Hampshire	75	52	60	83	61	66	51	64
Rhode Island	68	75	62	78	62	67	60	66
Vermont	79	70	51	72	68	70	52	66
New England	71%	63%	60%	77%	68%	68%	63%	65%

Note: The graduation rate is the percentage of students who complete an associate degree (at two-year institutions) within three years or a bachelor's degree (at four-year institutions) within six years.

Source: New England Board of Higher Education analysis of U.S. Department of Education data.

For more trends and indicators, visit www.nebhe.org/research.

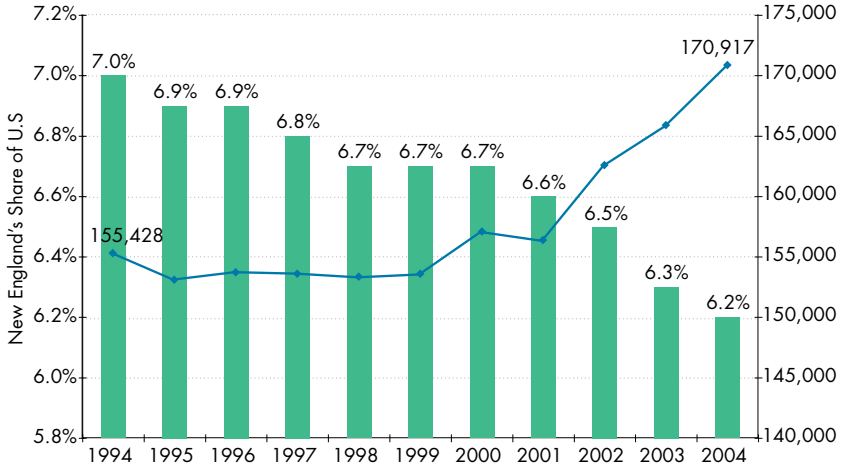
Fig. 29: Graduation and Transfer Rates by State and Type of Institution, 2004

	Public Two-Year		Public Four-Year		Public Land Grant		Private Four-Year	
	% Graduating	% Transferring to other Institutions	% Graduating	% Transferring to other Institutions	% Graduating	% Transferring to other Institutions	% Graduating	% Transferring to other Institutions
Connecticut	12%	14%	38%	8%	71%	21%	60%	12%
Maine	36	8	43	12	56	NA	73	15
Massachusetts	18	15	48	10	62	NA	69	14
New Hampshire	40	1	47	NA	71	NA	64	2
Rhode Island	8	24	43	NA	56	NA	66	8
Vermont	19	NA	39	NA	67	NA	66	4
New England	21%	17%	48%	9%	66%	NA	65%	7%

Note: The graduation rate is the percentage of students who complete an associate degree (at two-year institutions only) within three years or a bachelor's degree (at four-year institutions) within six years. Figures are based on cohorts entering in 1998 (four-year institutions) or 2001 (two-year institutions). New England figures are based on the aggregate numbers of all institutions of a given type, rather than an average of the states' graduation rates.

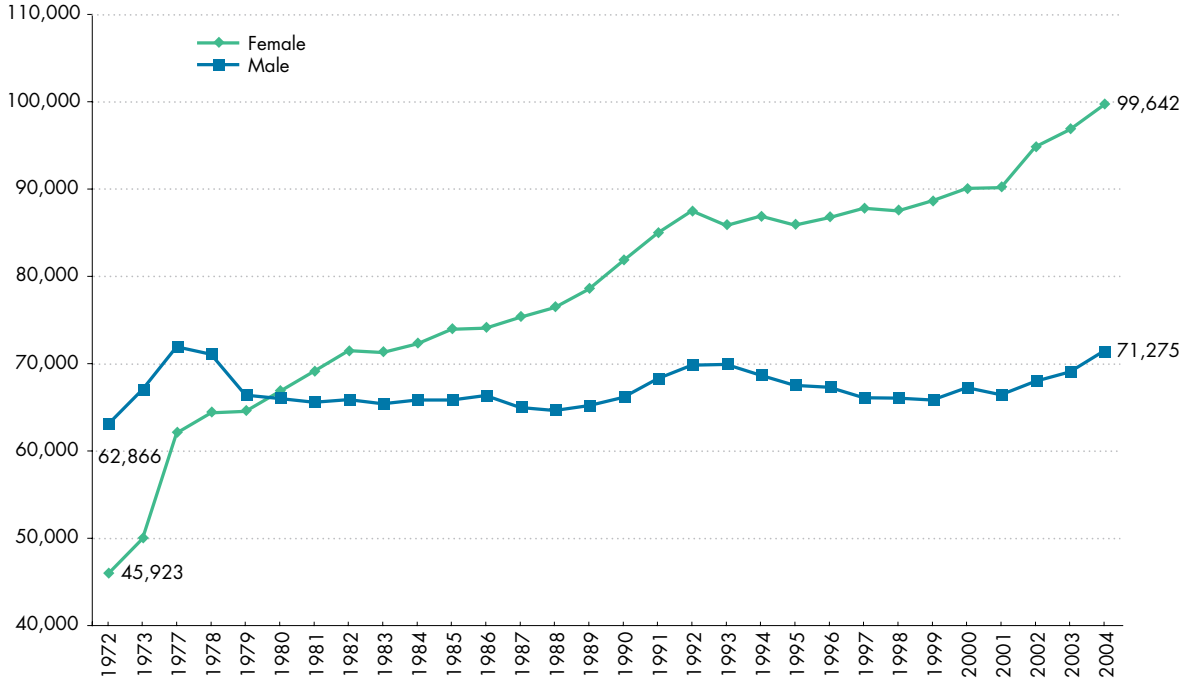
Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 30: Total Degrees Awarded at New England's Colleges and Universities and New England's Share of U.S. Degrees, 1994 to 2004



Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 31: Degrees Awarded in New England by Gender, 1972 to 2004



Source: New England Board of Higher Education analysis of U.S. Department of Education data.

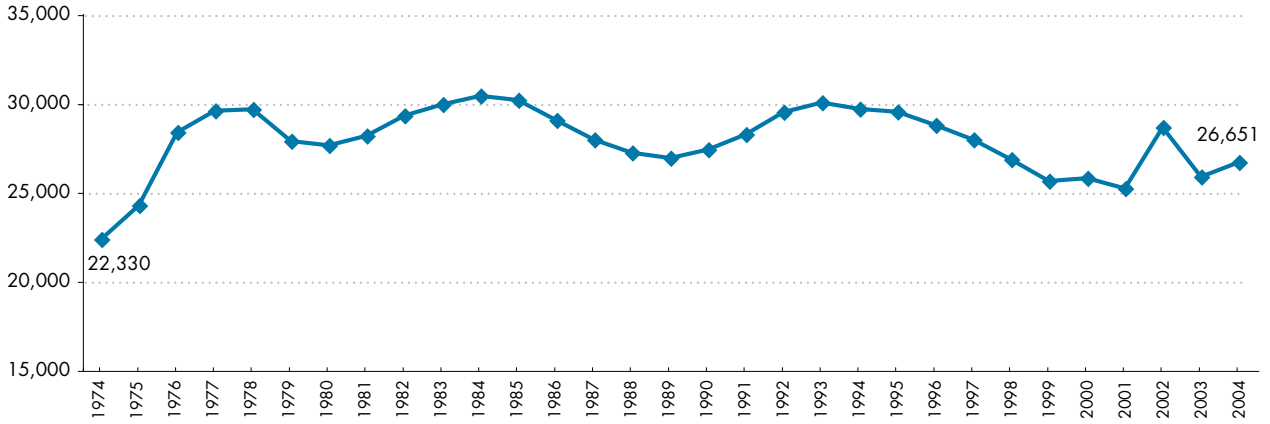
New England's already-low number of associate degrees awarded declined slightly in 2004. Stark gaps remain between men and women and between different racial and ethnic groups.

Fig. 32: Associate Degrees Conferred on Men, Women, Minorities and Foreign Students, 2004

	Total	Men	Women	Foreign	African-American	Native American	Asian	Hispanic	White	Race Unknown
Connecticut	4,807	1,619	3,188	193	652	21	130	469	3,111	231
Maine	2,252	843	1,409	14	17	38	16	13	2,008	146
Massachusetts	11,373	4,268	7,105	395	994	55	449	675	7,795	1,010
New Hampshire	3,289	1,278	2,011	9	80	16	37	93	2,681	373
Rhode Island	3,540	1,695	1,845	110	261	6	83	224	2,629	227
Vermont	1,390	652	738	9	18	27	22	16	1,215	83
New England	26,651	10,355	16,296	730	2,022	163	737	1,490	19,439	2,070
% of New England Associate Degrees		39%	61%	3%	8%	1%	3%	6%	73%	8%

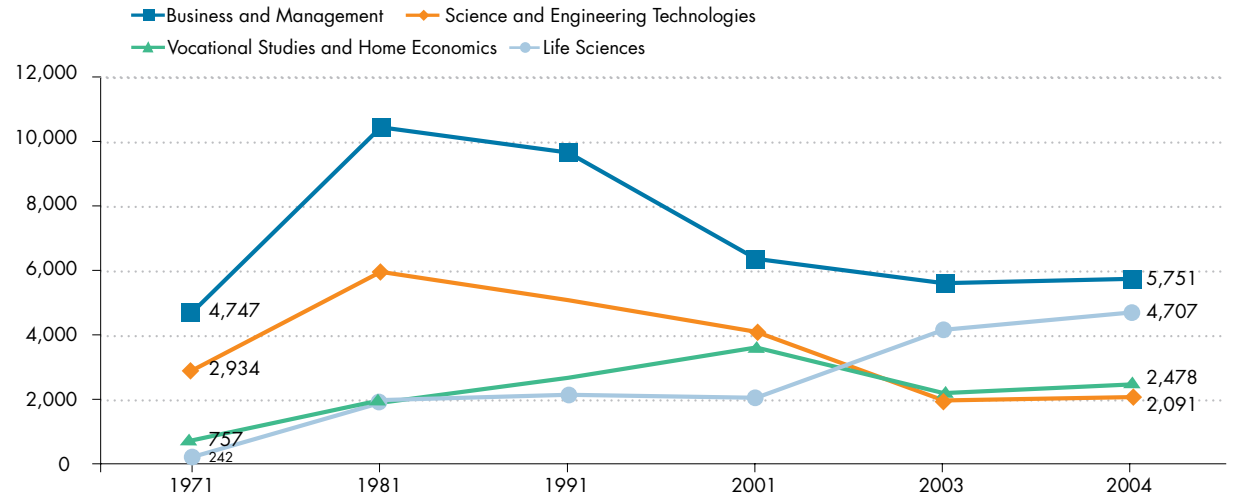
Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 33: Associate Degrees Awarded in New England, 1974 to 2004



Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 34: Associate Degrees Awarded at New England Colleges and Universities by Selected Fields of Study, 1971 to 2004



Note: Disciplines not listed include: Arts and Music, Education, Social Service Professions, Communication and Librarianship, Engineering, Psychology, Social Sciences, Geosciences, Law, Interdisciplinary or other Sciences, Physical Sciences, Architecture and Environmental Design, Humanites, Religion and Theology, Math and Computer Sciences and unknown disciplines. These unlisted disciplines awarded 11,624 degrees in 2004.

Source: New England Board of Higher Education analysis of U.S. Department of Education data.

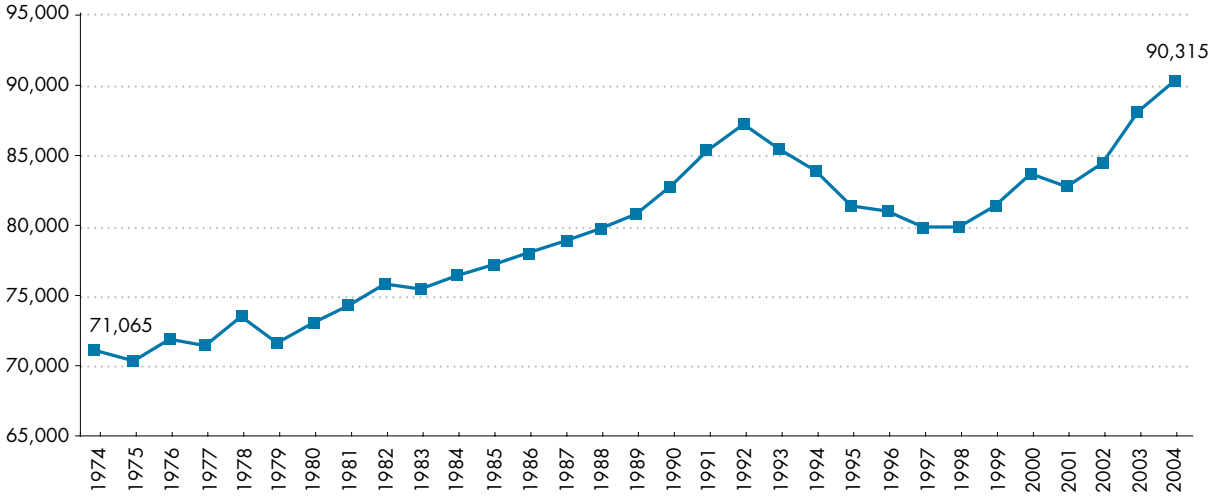
The number of bachelor's degrees awarded in New England increased slightly over last year.

Fig. 35: Bachelor's Degrees Conferred on Men, Women, Minorities and Foreign Students, 2004

	Total	Men	Women	Foreign	African-American	Native American	Asian	Hispanic	White	Race Unknown
Connecticut	16,856	7,081	9,775	473	1,089	62	714	802	12,668	1,048
Maine	6,059	2,405	3,654	375	55	47	105	47	5,226	204
Massachusetts	45,583	19,510	26,073	2,484	2,322	169	3,117	1,933	30,237	5,321
New Hampshire	7,918	3,314	4,604	224	123	34	151	158	6,420	808
Rhode Island	9,251	3,988	5,263	354	388	28	409	365	6,794	913
Vermont	4,648	2,055	2,593	100	37	46	87	89	4,002	287
New England	90,315	38,353	51,962	4,010	4,014	386	4,583	3,394	65,347	8,581
% of New England Bachelor's Degrees		43%	58%	4%	4%	0.4%	5%	4%	72%	10%

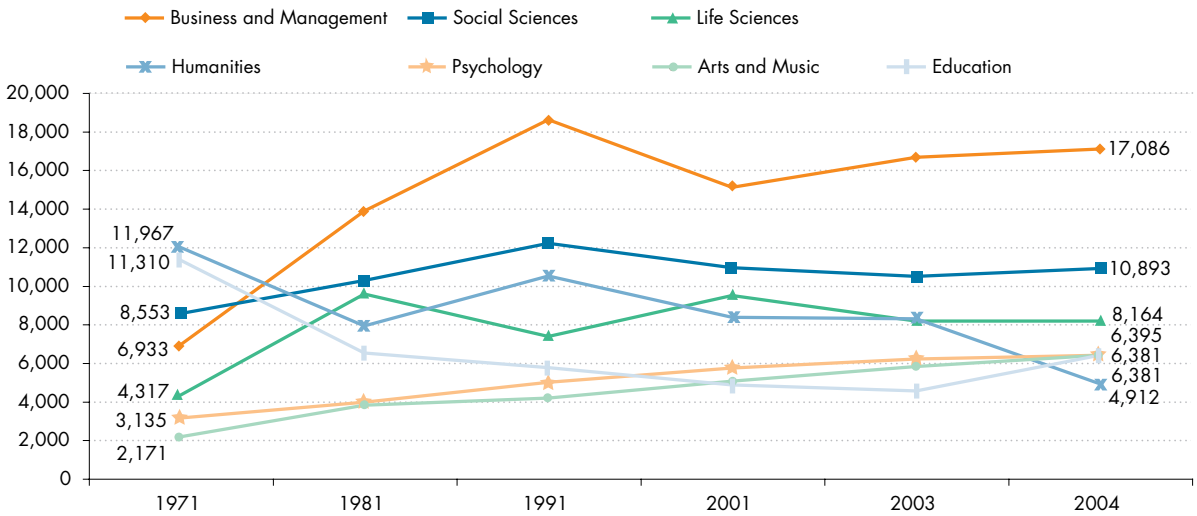
Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 36: Bachelor's Degrees Awarded in New England, 1974 to 2004



Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 37: Bachelor's Degrees Awarded at New England Colleges and Universities by Selected Fields of Study, 1971 to 2004



Note: Disciplines not listed include: Communication and Librarianship, Math and Computer Sciences, Engineering, Vocational Studies and Home Economics, Science and Engineering Technologies, Social Service Professions, Physical Sciences, Architecture and Environmental Design, Geosciences, Religion and Theology, Interdisciplinary or other Science, Law and unknown Disciplines. These unlisted disciplines awarded 30,103 degrees in 2004.

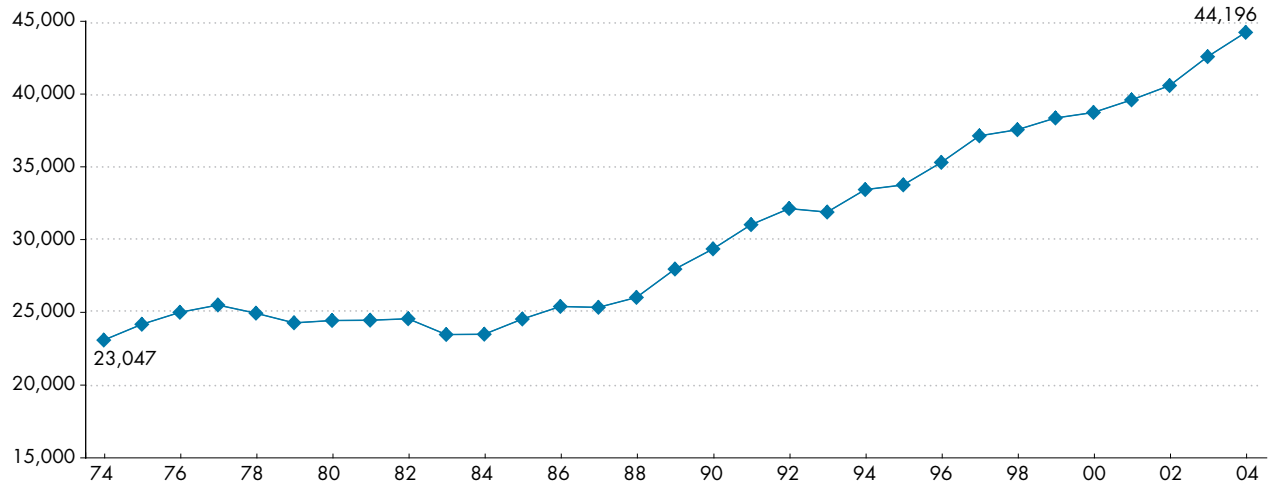
Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 38: Master's Degrees Conferred on Men, Women, Minorities and Foreign Students, 2004

	Total	Men	Women	Foreign	African-American	Native American	Asian	Hispanic	White	Race Unknown
Connecticut	8,402	3,486	4,916	1,189	386	19	341	253	5,269	945
Maine	1,542	462	1,080	60	20	8	15	12	1,320	107
Massachusetts	27,768	11,103	16,665	4,494	1,349	73	1,325	830	14,003	5,694
New Hampshire	2,839	1,183	1,656	442	36	11	80	82	1,609	579
Rhode Island	2,171	909	1,262	404	52	3	51	44	1,328	289
Vermont	1,474	540	934	121	18	5	12	22	1,068	228
New England	44,196	17,683	26,513	6,710	1,861	119	1,824	1,243	24,597	7,842
% of New England Master's Degrees		40%	60%	15%	4%	0.3%	4%	3%	56%	18%

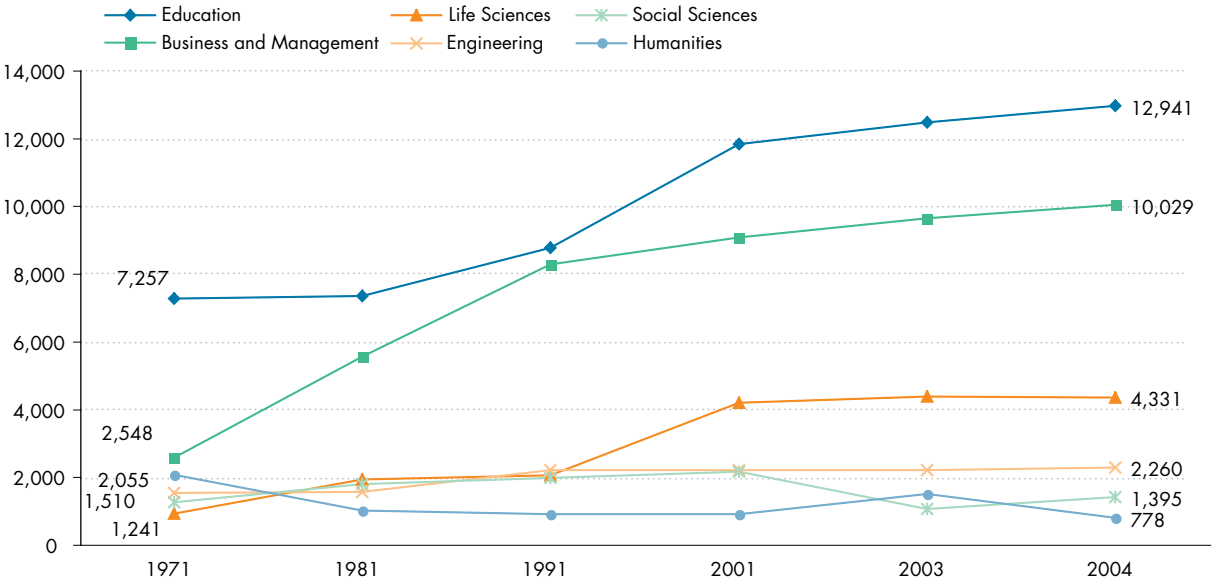
Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 39: Master's Degrees Awarded in New England, 1974 to 2004



Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 40: Master's Degrees Awarded at New England Colleges and Universities by Selected Fields of Study, 1971 to 2004



Note: Disciplines not listed include: Physcial Science,Geosciences, Math and Computer Science, Psychology, Science and Engineering Technologies, Interdisciplinary or other Sciences, Religion and Theology, Arts and Music, Architecture and Environmental Design, Communication and Librarianship, Law, Social Service Professions, Vocational Studies and Home Economics, unknown Disciplines. These unlisted disciplines awarded 12,462 degrees in 2004.

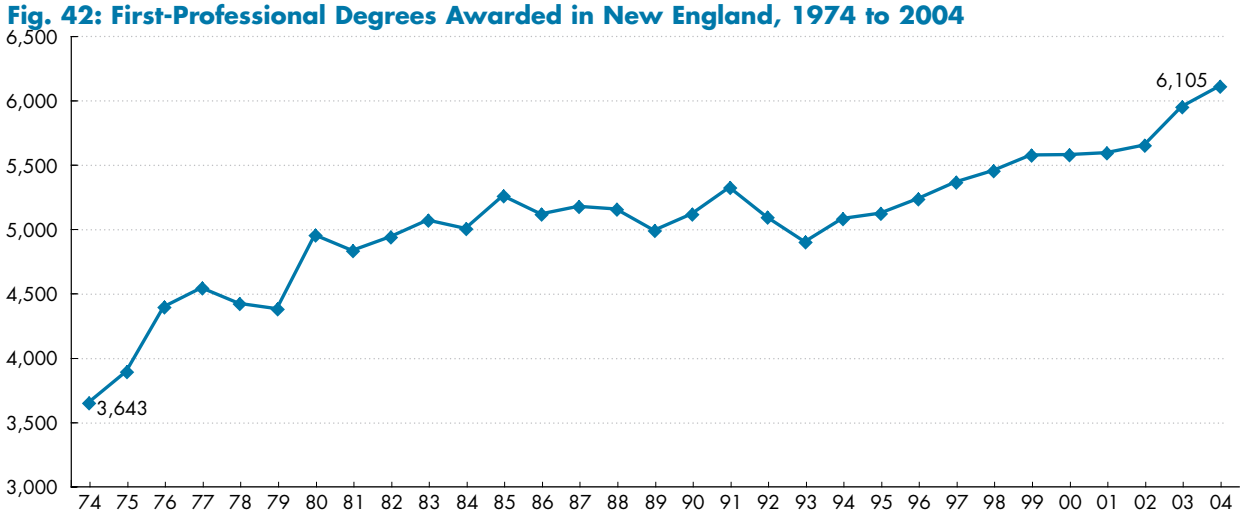
Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 41: First-Professional Degrees Conferred on Men, Women, Minorities and Foreign Students, 2004

	Total	Men	Women	Foreign	African-American	Native American	Asian	Hispanic	White	Race Unknown
Connecticut	949	480	469	23	67	3	75	49	697	35
Maine	202	85	117	1	2	1	8	2	185	3
Massachusetts	4,228	2,028	2,200	188	210	19	686	158	2,636	331
New Hampshire	158	90	68	16	1	0	10	5	115	11
Rhode Island	321	142	179	4	14	8	40	17	214	24
Vermont	247	123	124	2	5	2	16	4	218	0
New England	6,105	2,948	3,157	234	299	33	835	235	4,065	404
% of New England First-Professional Degrees		48%	52%	4%	5%	0.5%	14%	4%	67%	7%

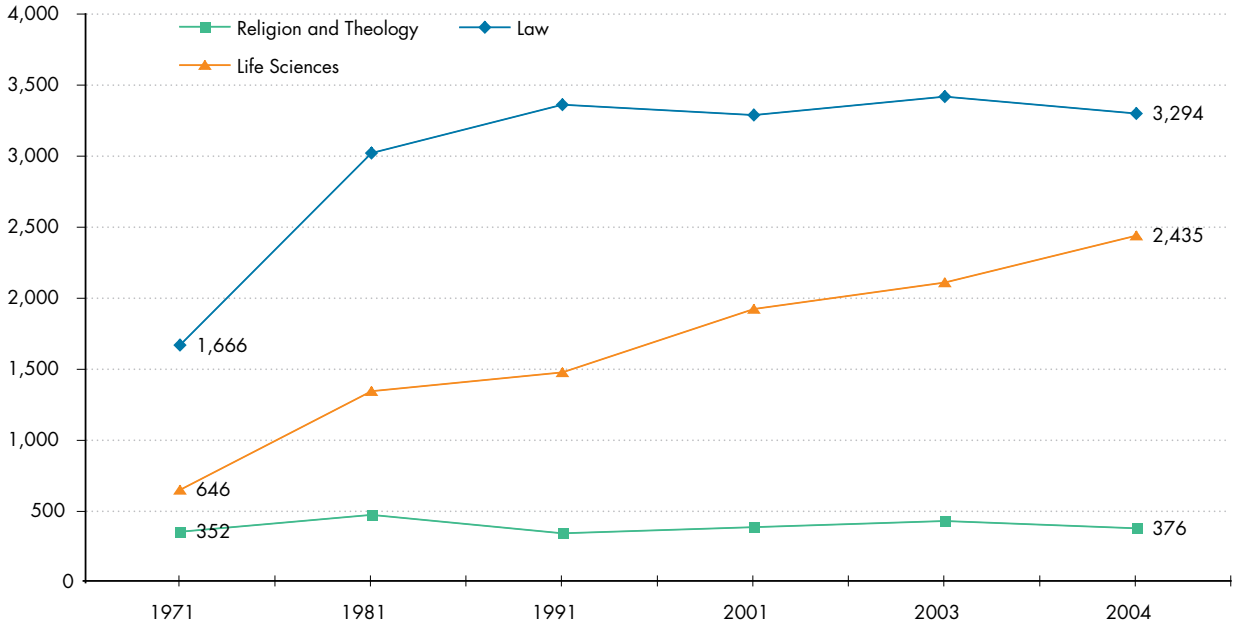
Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 42: First-Professional Degrees Awarded in New England, 1974 to 2004



Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 43: First-Professional Degrees Awarded at New England Colleges and Universities by Field of Study, 1971 to 2004



Source: New England Board of Higher Education analysis of U.S. Department of Education data.

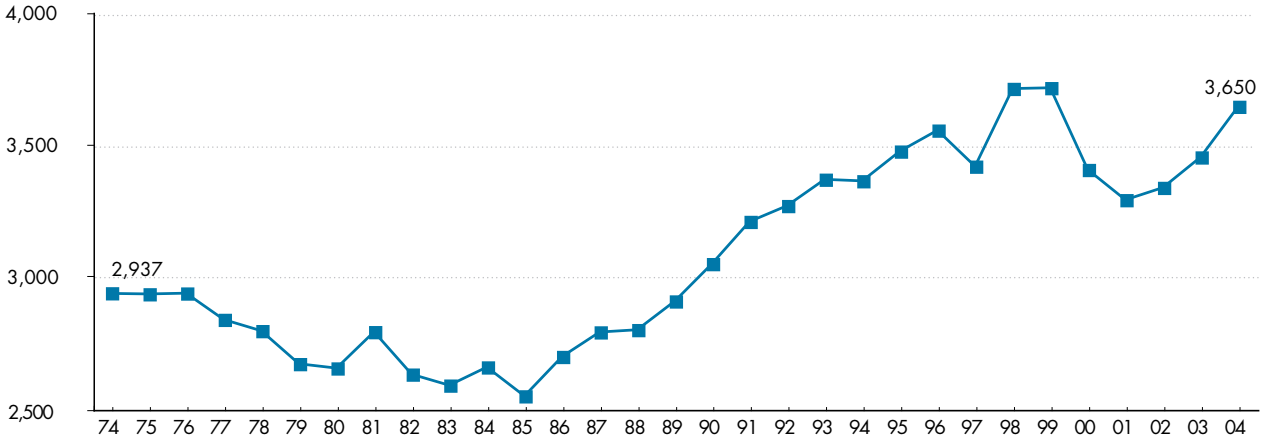
Twenty-nine percent of doctorates are awarded to foreign students, while only about 10 percent go to minority students.

Fig. 44: Doctorates Conferred on Men, Women, Minorities and Foreign Students, 2004

	Total	Men	Women	Foreign	African-American	Native American	Asian	Hispanic	White	Race Unknown
Connecticut	692	369	323	214	20	0	19	20	332	87
Maine	43	26	17	6	0	0	0	0	37	0
Massachusetts	2,484	1,324	1,160	714	68	8	166	57	1,163	308
New Hampshire	127	66	61	31	2	1	2	2	84	5
Rhode Island	249	126	123	77	10	2	6	5	143	6
Vermont	55	25	30	4	3	0	2	3	41	2
New England	3,650	1,936	1,714	1,046	103	11	195	87	1,800	408
% of New England Doctorates		53%	47%	29%	3%	0.3%	5%	2%	49%	11%

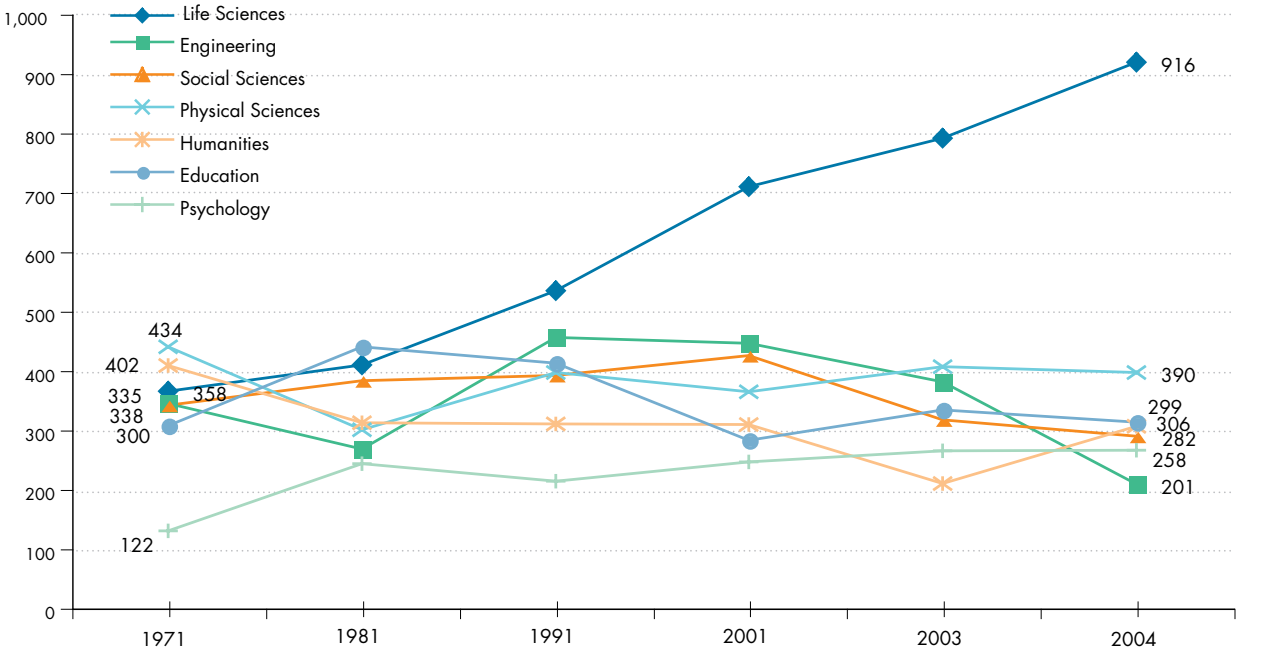
Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 45: Doctorates Awarded in New England, 1974 to 2004



Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 46: Doctorates Awarded at New England Colleges and Universities by Field of Study, 1971 to 2004



Note: Disciplines not listed include: Geosciences, Math and Computer Science, Science and Engineering Technologies, Interdisciplinary or other Sciences, Religion and Theology, Arts and Music, Architecture and Environmental Design, Business and Management, Communication and Librarianship, Law, Social Service Professions, Vocational Studies and Home Economics, unknown Disciplines. These unknown disciplines awarded 998 Degrees in 2004.

Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 47: Total Net Migration of Residents, Ages 22 to 29, by Level of Education, 1995 to 2000

	Total Net Migration of Residents 22 to 29	Entering New England With...						
		Less than HS	High School	Some College	Associate	Bachelor's	Masters	Doctorate/ Professional
Connecticut	14,052	10,668	13,688	15,094	3,625	27,709	7,853	2,770
Maine	-6,279	1,524	4,737	5,794	1,510	5,712	898	307
Massachusetts	57,799	14,082	20,853	32,134	7,585	78,823	21,384	7,532
New Hampshire	2,111	2,111	7,384	8,237	2,677	10,836	2,175	434
Rhode Island	3,594	3,978	4,352	6,203	1,949	8,981	1,398	603
Vermont	-2,637	675	2,730	3,934	1,220	5,800	817	335
		Leaving New England With...						
		Less than HS	High School	Some College	Associate	Bachelor's	Masters	Doctorate/ Professional
Connecticut		3,039	9,018	14,650	2,961	30,392	5,077	2,218
Maine		925	5,240	6,957	1,756	10,484	1,047	352
Massachusetts		5,923	15,173	20,660	5,462	56,850	13,689	6,837
New Hampshire		1,399	4,808	6,791	2,304	13,760	2,250	431
Rhode Island		1,166	2,801	4,062	1,349	11,785	2,081	626
Vermont		951	2,360	3,103	1,203	9,322	870	339

Source: National Center for Higher Education Management Systems (NCHEMS); www.higheredinfo.org.

FINANCING HIGHER EDUCATION

Total yearly charges for resident students, including room and board, average nearly $39,000 at New England's private four-year institutions and $17,000 at the region's public institutions—far above national rates.

Fig. 48: Average Expenses, New England vs. the United States, Academic Year 2005-06

	Tuition & Fees for State Residents	Additional Charges for Out-of-State Residents	Books & Supplies	Resident			Commuter		
				Room & Board	Transportation	Other	Room & Board	Transportation	Other
New England									
Two-year public	$3,136	$5,331	$752	NA	NA	NA	$5,942	$1,121	**$1,573**
Four-year public	7,277	7,816	820	7,081	530	1,281	6,587	882	1,481
Four-year private	27,111		885	9,271	543	1,114	7,832	965	1,228
United States									
Two-year public	$2,191	$4,160	$801	NA	NA	NA	$5,909	$1,175	$1,616
Four-year public	5,491	7,673	894	6,636	852	1,693	6,476	1,168	1,962
Four-year private	21,235		904	7,791	691	1,295	7,249	1,060	1,622

Note: Room & board costs for commuter students represent average estimated living expenses for students living off-campus but not with parents.

Source: Table 5, Average Student Expenses, by College Board Region, 2005-2006 (Enrollment-Weighted). *Trends in College Pricing* 2005.

Fig 49: Tuition and Mandatory Fees, Academic Years 2004-05 to 2005-06 and Percent Change

	2004-05	2005-06	Percent Change		2004-05	2005-06	Percent Change
Connecticut				**New Hampshire**			
Two-year public	$2,410	$2,540	5%	**Two-year public**	$4,600	$5,100	11%
Four-year public	5,970	6,330	6	**Four-year public**	6,990	7,460	7
Four-year private	22,780	24,080	6	**Four-year private**	19,590	20,660	5
Maine				**Rhode Island**			
Two-year public	3,430	3,600	5	**Two-year public**	*	*	*
Four-year public	6,170	6,500	5	**Four-year public**	5,550	6,040	9
Four-year private	*	*	*	**Four-year private**	21,440	22,640	6
Massachusetts				**Vermont**			
Two-year public	2,550	2,770	9	**Two-year public**	4,720	4,990	6
Four-year public	5,230	5,660	8	**Four-year public**	7,200	7,610	6
Four-year private	22,550	23,760	5%	**Four-year private**	19,920	21,220	6%

*Note: Figures for public institutions show rates for state residents. All data are enrollment-weighted averages, intended to reflect the average costs that students face in various types of institutions. * indicates sample too small to report.*

Source: Table 6, Tuition and Fees by Region and Institution Type, in Current Dollars, 1994-1995 to 2005-2006 (Enrollment-Weighted). *Trends in College Pricing 2005,* Copyright © 2005 The College Board. Reprinted with permission. All rights reserved. www.collegeboard.com

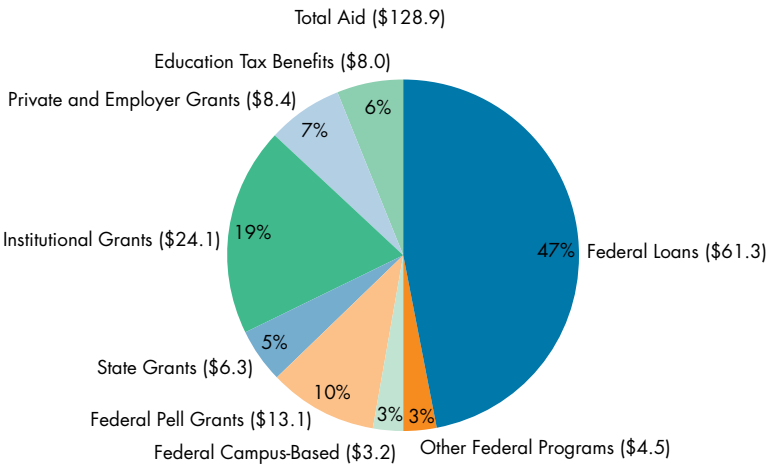
Americans pay an average of $225 each in annual state taxes to support public higher education and student aid in their states. New Englanders, however, pay just $159 dollars.

Fig. 50: Appropriations of State Tax Funds for Higher Education Operating Expenses, Fiscal 2006

	Appropriations	1-Year % Change	2-Year % Change	10-Year % Change	Per-Capita Appropriations	U.S. Rank 2005	Appropriations Per $1,000 of Personal Income	U.S. Rank 2005
Connecticut	$826,529,000	4.8%	10.5%	56.5%	$235.46	21st	$4.96	43rd
Maine	247,943,000	2	6	39	187.62	36th	6.02	33rd
Massachusetts	918,127,000	0	11	19	143.49	47th	3.28	49th
New Hampshire	117,172,000	2	4	41	89.45	50th	2.34	50th
Rhode Island	182,368,000	5	7	50	169.46	42nd	4.71	45th
Vermont	82,043,000	4	6	49	131.68	48th	3.99	47th
United States	$66,642,898,000	6%	10%	50%	$225.25		$6.56	

Source: New England Board of Higher Education analysis of data from Illinois State University Center for Higher Education and Education Finance; www.coe.ilstu.edu/grapevine.

Fig. 51: Estimated Student Aid by Source, United States, Academic Year 2004–05



Note: Figures are in current dollars (billions)

Source: Trends in Student Aid. Copyright ©2005 The College Board. All rights reserved; www.collegeboard.com.

Fig. 52: Federal Student Financial Aid Programs-Total Expenditures or Allocations and Number of Recipients

	Pell Grants		College Work-Study		Perkins Loans		Supplemental Educational Opportunity Grants	
	2003-04 Expenditures	2004 Total Recipients	2005-06 Allocations	2004 Total Recipients	2005-06 Allocations	2004 Total Recipients	2005-06 Allocations	2004 Total Recipients
Connecticut	$80,754,290	36,196	$11,436,943	10,054	$27,588,781	8,583	$8,877,911	13,530
Maine	50,472,128	21,055	7,803,292	6,927	21,008,661	8,440	6,849,336	11,050
Massachusetts	173,065,819	73,686	44,681,560	38,368	113,410,534	40,629	30,109,044	39,461
New Hampshire	29,697,479	13,536	6,837,486	6,960	15,786,527	8,065	5,345,269	7,595
Rhode Island	30,152,265	13,255	8,188,497	7,584	25,646,308	10,899	7,476,936	13,608
Vermont	20,616,831	9,202	5,754,393	5,244	14,600,244	6,096	5,301,275	5,096
New England	384,758,812	166,930	84,702,171	75,137	218,041,055	82,712	63,959,771	90,340
United States	$12,707,897,337	5,139,638	$983,954,415	764,636	$2,038,750,302	756,348	$778,458,731	1,389,608
New England as a % of United States	3.0%	3.2%	8.6%	9.8%	11%	10.9%	8.2%	6.5%

Note: Spending on federal campus-based programs is reported as 2005-06 allocations. Spending on Pell Grants is reported as 2003-04 expenditures.

Source: New England Board of Higher Education analysis of U.S. Department of Education data.

Fig. 53: Total State Grant Aid Awarded by State, 1993-94, 1998-99, 2002-03, 2003-04

	1993-94	1998-99	2002-03	2003-04	5-Year % Change	10-Year % Change
Connecticut	$20,841,000	$33,117,000	$37,995,000	36,773,000	11%	76%
Maine	5,170,000	8,081,000	13,143,000	12,561,000	55	143
Massachusetts	45,309,000	92,173,000	87,685,000	79,735,000	-13	76
New Hampshire	851,000	1,753,000	3,768,000	3,653,000	108	392
Rhode Island	6,500,000	5,717,000	6,780,000	12,296,000	115	89
Vermont	11,314,000	12,939,000	16,712,000	18,177,000	41	61
New England	$89,985,000	$153,780,000	$166,083,000	$163,195,000	6	81
United States	2,501,275,000	3,686,243,000	5,780,360,000	6,166,416,000	67%	147%

Note: Figures may not include aid funds provided through entities other than the principal state student aid agency.

Source: National Association of State Student Grant and Aid Programs; www.nassgap.org

Fig. 54: State Need-Based Aid as a Percent of Federal Pell Grant Aid, 2003

	State Need-Based Grant Total	Federal Pell Grant Total	State Need-Based Aid as a Percent of Federal Pell Grant Aid
Connecticut	$31,107,220	$70,796,471	44%
Maine	12,093,885	41,624,698	29
Massachusetts	105,021,263	170,364,595	62
New Hampshire	3,405,022	28,152,654	12
Rhode Island	9,933,030	46,985,579	21
Vermont	16,683,804	19,432,096	86
New England	$178,244,224	$377,356,093	47%
United States	$4,411,086,752	$10,990,676,079	40%

Source: National Center for Higher Education Management Systems (NCHEMS); www.higheredinfo.org.

Fig. 55: Percent of Family Income Needed to Pay for College at a Public Two-Year Institution, 2004

	Percentage of Family Income Needed to Pay	% Lowest Income Quintile	% 2nd Income Quintile	% 3rd Income Quintile	% 4th Income Quintile	% Highest Income Quintile
Connecticut	23%	56%	25%	15%	10%	6%
Maine	29	71	32	20	14	8
Massachusetts	24	60	26	15	10	6
New Hampshire	27	65	30	19	13	8
Rhode Island	28	71	30	18	12	7
Vermont	30	71	34	22	15	9
United States	22%	54%	25%	16%	10%	6%

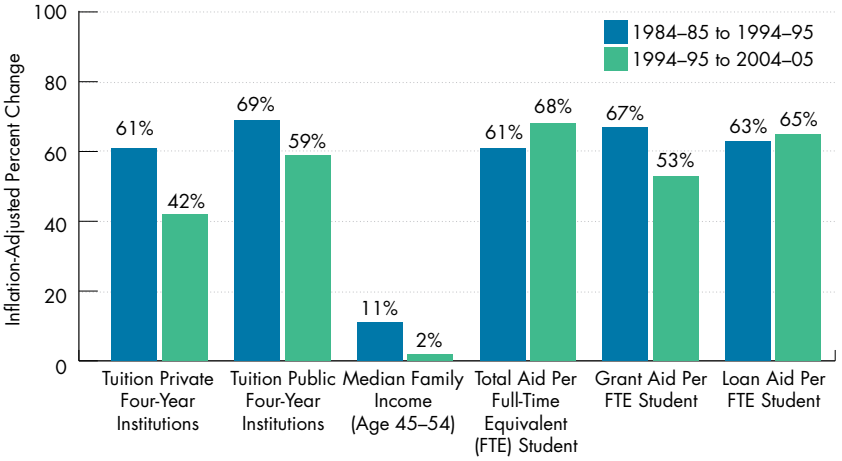
Source: National Center for Higher Education Management Systems (NCHEMS); www.higheredinfo.org

Fig. 56: Percent of Family Income Needed to Pay for College at a Public Four-Year Institution, 2004

	Percentage of Family Income Needed to Pay	% Lowest Income Quintile	% 2nd Income Quintile	% 3rd Income Quintile	% 4th Income Quintile	% Highest Income Quintile
Connecticut	29%	73%	32%	19%	13%	8%
Maine	34	81	37	24	17	10
Massachusetts	31	79	33	20	14	8
New Hampshire	32	78	35	23	16	10
Rhode Island	35	90	37	23	15	9
Vermont	41	96	45	30	20	13
United States	29%	67%	31%	10%	14%	8%

Source: National Center for Higher Education Management Systems (NCHEMS); www.higheredinfo.org

Fig. 57: Inflation-Adjusted Changes in Tuition, Family Income and Student Aid, 1984–85 to 1994–95 and 1994–95 to 2004–05



Source: *Trends in Student Aid, 2005*. Copyright ©2005 The College Board. All rights reserved; www.collegeboard.com.

Fig. 58: New England's 10 Largest College Endowments, Fiscal 2005

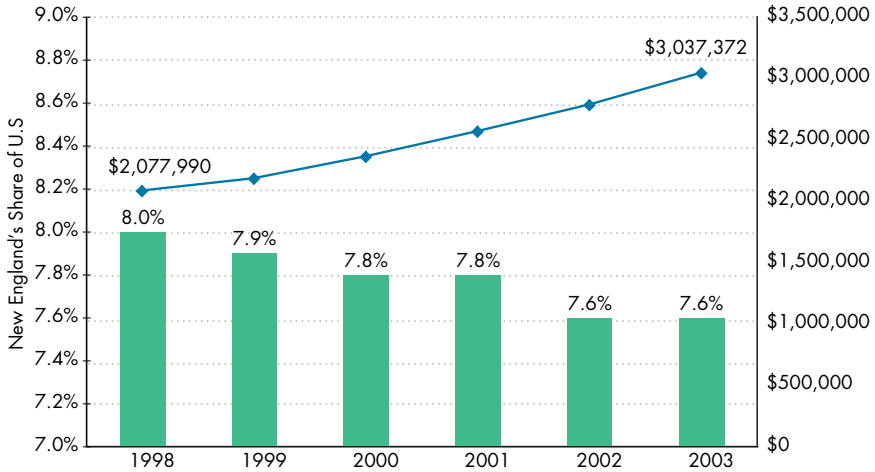
U.S. Rank	New England Rank	Institution	Market Value at End of Fiscal 2005	% Change from Fiscal 2004
1	1	Harvard University	$25,473,721,000	15%
2	2	Yale University	15,224,900,000	19
6	3	Massachusetts Institute of Technology	6,712,436,000	14
22	4	Dartmouth College	2,714,300,000	11
26	5	Brown University	1,843,904,000	12
37	6	Williams College	1,348,374,000	10
40	7	Wellesley College	1,275,529,000	8
41	8	Boston College	1,270,303,000	10
46	9	Amherst College	1,154,570,000	16
53	10	Smith College	1,035,542,000	12%

Source: New England Board of Higher Education analysis of 2005 National Association of College and University Business Officers data; www.nacubo.org

UNIVERSITY RESEARCH

New England universities once performed more than 10 percent of America's academic research and development (R&D). Now, the region's $3 billion in university R&D represents just 7.6 percent of the U.S. total.

Fig. 59: Research and Development Expenditures at New England's Universities and Colleges and New England's Share of U.S. R&D Expenditures, 1998 to 2003



Source: New England Board of Higher Education analysis of National Science Foundation data.

Fig. 60: Regional Comparison of Research and Development Expenditures at Universities and Colleges, 1998 and 2003

				Per-Capita Expenditures		Per-Capita U.S. Rank	
	1998	2003	5-Year % Change	1998	2003	1998	2003
East North Central	$3,685,020.000	$5,877,725.000	60%	$83.96	$128.80	7th	7th
East South Central	1,182,757.000	1,859,515.000	57	72.4	107.95	9th	9th
Middle Atlantic	3,758,471.000	5,850,922.000	56	98.4	146.13	5th	3rd
Mountain	1,654,743.000	2,465,449.000	49	100.4	129.54	4th	6th
New England	2,077,990.000	3,037,372.000	46	155.4	214.89	1st	1st
Connecticut	$406,618.000	$594,541.000	46%	$123.70	$174.58	NA	NA
Maine	35,265.000	75,092.000	113	28.7	58.90	NA	NA
Massachusetts	1,348,220.000	1,821,817.000	35	224.1	286.94	NA	NA
New Hampshire	117,323.000	252,210.000	115	105.8	204.09	NA	NA
Rhode Island	111,979.000	187,131.000	67	111.6	178.51	NA	NA
Vermont	58,585.000	106,581.000	82	104.2	175.06	NA	NA
Outlying areas	$95,239.000	$101,161.000	6%	NA	NA	NA	NA
Pacific	4,470,873.000	6,994,579.000	56	104.2	150.51	3rd	2nd
South Atlantic	4,860,646.000	7,505,393.000	54	100.8	140.12	2nd	4th
West North Central	1,692,729.000	2,617,106.000	55	91.1	134.46	6th	5th
West South Central	2,376,256.000	3,768,177.000	59	80.2	116.27	8th	8th
United States	$25,854,724.00	$40,077,399.00	55%	$96.6	$139.2		

Source: New England Board of Higher Education analysis of National Science Foundation data; www.nsf.gov.

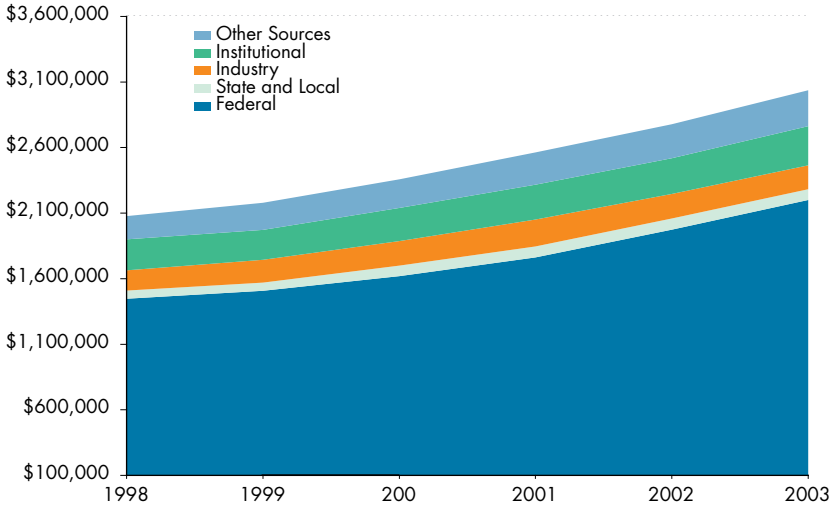
Fig. 61: Research and Development Expenditures at New England Universities and Colleges by Field, 2003

	Engineering	Physical sciences	Environmental sciences	Math and computer sciences
Connecticut	$33,512,000.00	$31,170,000.00	$12,518,000.00	$11,254,000.00
Maine	11,178,000	6,289,000	22,481,000	1,379,000
Massachusetts	313,836,000	228,866,000	152,070,000	101,522,000
New Hampshire	39,360,000	8,860,000	44,289,000	6,392,000
Rhode Island	26,321,000	11,420,000	34,956,000	13,572,000
Vermont	2,236,000	2,416,000	640,000	1,414,000
New England	$426,443,000.00	$289,021,000.00	$266,954,000.00	$135,533,000.00
United States	5,998,821,000	3,272,629,000	2,187,841,000	1,733,373,000
New England as a % of U.S.	7%	9%	12%	8%

	Life sciences	Psychology	Social sciences	Other Sciences	Total
Connecticut	$468,767,000.00	$18,455,000.00	$15,829,000.00	$3,036,000.00	$594,541,000.00
Maine	25,836,000	880,000	5,102,000	1,947,000	75,092,000
Massachusetts	868,452,000	31,899,000	75,785,000	49,387,000	1,821,817,000
New Hampshire	127,567,000	6,104,000	6,727,000	12,911,000	252,210,000
Rhode Island	82,246,000	7,791,000	6,452,000	4,373,000	187,131,000
Vermont	95,534,000	1,024,000	143000	3,174,000	106,581,000
New England	$1,668,402,000.00	$66,153,000.00	$110,038,000.00	$74,828,000.00	$3,037,372,000.00
United States	23,763,981,000	768,730,000	1,661,090,000	690,934,000	40,077,399,000
New England as a % of U.S.	7%	9%	7%	11%	8%

Source: New England Board of Higher Education analysis of National Science Foundation data; www.nsf.gov.

Fig. 62: Research and Development Expenditures at New England's Universities and Colleges by Source of Funds, 1998 to 2003



Source: New England Board of Higher Education analysis of National Science Foundation data.

Fig. 63: Research and Development Expenditures at New England Colleges and Universities by U.S. Rank and Source of Funds, 2003

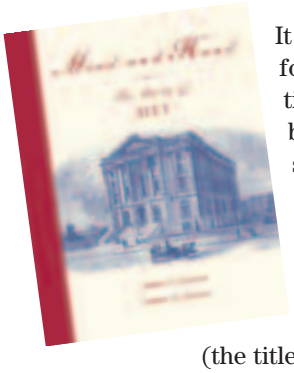
U.S. Rank	Institution	All R&D expenditures	Federal government	State and local government	Industry	Institutional funds	All other sources
17	Massachusetts Institute of Technology	$485,764.00	$356,206.00	$398.00	$80,664.00	$12,580.00	$35,916.00
28	Harvard University	408,707.000	348,620.000	1,561.000	5,929.000	0.000	52,597.000
30	Yale University	387,644.000	296,713.000	870.000	15,417.000	25,228.000	49,416.000
61	Boston University	224,841.000	203,947.000	394.000	8,084.000	NA	12,416.000
74	University of Connecticut (all campuses)	190,341.000	111,654.000	6,615.000	12,143.000	43,564.000	16,365.000
87	Dartmouth College	155,795.000	106,034.000	3,256.000	5,062.000	28,821.000	12,622.000
94	University of Massachusetts, Worcester	148,823.000	109,082.000	26,976.000	4,397.000	NA	8,368.000
101	Brown University	125,090.000	81,445.000	189.000	2,363.000	35,809.000	5,284.000
106	University of Massachusetts, Amherst	113,512.000	60,839.000	3,842.000	3,838.000	36,490.000	8,503.000
108	Tufts University	112,609.000	78,942.000	1,232.000	8,756.000	12,072.000	11,607.000
110	University of Vermont	104,994.000	70,832.000	3,436.000	7,477.000	16,818.000	6,431.000
115	Woods Hole Oceanographic Institution	104,223.000	84,410.000	775.000	167.000	3,051.000	15,820.000
119	University of New Hampshire	96,415.000	59,463.000	4,453.000	6,195.000	20,318.000	5,986.000
135	University of Maine	68,923.000	28,901.000	11,017.000	3,323.000	23,545.000	2,137.000
139	University of Rhode Island	61,818.000	51,942.000	6,540.000	619.000	1,428.000	1,289.000
160	Northeastern University	42,931.000	26,895.000	1,276.000	8,179.000	6,581.000	0.000
180	Boston College	32,158.000	22,907.000	50.000	1,251.000	4,175.000	3,775.000
Total, Above New England Institutions		$2,864,588.00	$2,098,832.00	$72,880.00	$173,864.00	$270,480.00	$248,532.00
Total, All U.S. Institutions		40,077,399.00	24,734,033.00	2,652,966.00	2,162,215.00	7,683,484.00	2,844,701.00
Above New England Institutions as % of U.S. Total		7.1%	8.5%	2.7%	8.0%	3.5%	8.7%

Source: New England Board of Higher Education analysis of National Science Foundation data; www.nsf.gov.

Tech School

Alan R. Earls

Mind at Hand: The Birth of MIT, Julius A. Stratton and Loretta H. Mannix, The MIT Press, 2005, $55



It is not unusual for an institutional history to be written by someone with strong connections to that institution. In that, *Mind and Hand*, (the title is a translation of the Latin motto, *Mens et Manus*, which graces MIT's seal), is very typical. Julius A. Stratton, who died in 1994, was an MIT student, faculty member, provost, chancellor and president from 1959 to 1966. Stratton's long-time administrative assistant, Loretta H. Mannix, continued the project after his death. And though his name does not appear on the title page, Phillip Alexander of the MIT Program in Writing and Humanistic Studies, is credited with bringing the book to completion.

What *is* unusual is that an institutional history should be at once so narrow and so broad. *Mind and Hand* focuses narrowly on the relatively brief historical period that led to the establishment of the institution in 1861 and then on the first years of its existence. But this period is also considered broadly from the vantage point of the social, economic, intellectual and political currents that aligned to bring the school into existence.

Thus, the authors illuminate the history of engineering education and link that history with the pragmatic characteristics of the American Industrial Revolution and the fresh considerations given to the need for science education in the mid-19th century that led other institutions, such as Yale and Harvard, to establish their own schools of science in this period. *Mind and Hand* further traces the ideas about science and education that have shaped MIT and defined its mission—from the new approach to science of the Enlightenment era and the ideals of representative democracy spurred by the Industrial Revolution to new theories on the nature and role of higher education in 19th-century America. Thus, MIT emerged in mid-century as an experiment in both scientific and technical education, with its origins in the tension between these old and new ideas. In fact, for a time, the institute was envisioned as a combination museum, scientific school and practical technical institute.

Civic and personal ambition, particularly among members of the Rogers family, played an important role in MIT's gestation. With a multigenerational interest in education and particularly in science, the family is conspicuous in the institute's early years and in some ways representative of the age. Patrick Kerr Rogers, an immigrant from Ireland, graduated from the University of Pennsylvania, practiced medicine and later served as a professor of natural history and chemistry at the College of William and Mary in Virginia. Among his sons, who often collaborated with one another professionally, James Blythe Rogers, was a physician, but became a professor of chemistry. Henry Darwin Rogers was a geologist, Robert Empie Rogers, was a professor of chemistry and physician, and MIT founder, William Barton Rogers was a professor of natural philosophy and chemistry at William and Mary and later at the University of Virginia. He also directed the first geological survey of Virginia.

In 1849, William Barton Rogers, already a Bostonian in outlook (he had lectured and spent much time in Massachusetts), became one by marriage and moved permanently to the city a few years later. Here, he championed scientific and technical education and gained a following among Bostonians, many of whom had been thinking along similar lines, enabling him to launch MIT in 1861. He subsequently served as an influential first president from 1862 until 1870 and then again from 1878 until 1881.

The broad cast of characters also includes a gaggle of Bostonians: the philanthropists of the Lowell family, Jacob Bigelow and many others. Helpmates appeared from within government, as well. An initial grant of land by the governor of Massachusetts in the newly filled Back Bay area of Boston (MIT's home until early in the 20th century) helped ensure a physical location while funds made available through the brand new Morrill Act (apportioned to benefit MIT after much negotiation), and a large donation by Dr. William Walker added to a modest start and helped counterbalance the many difficulties occasioned by the outbreak of the Civil War.

Still, if there is an overriding impression of these early years, it is one of tentativeness and uncertainty. The Institute had to make do with rented space in the Boston Mercantile Building from 1862 to 1866, while its Back Bay home was constructed. Concurrently, arguments continued over the very focus of the effort: whether the goal should be a practical school, a museum or arts society, or some kind of hybrid. Money was in short supply, and the founders had to endure repeated proposals to merge their effort with those at Harvard or elsewhere.

Thus, this lengthy narrative succeeds in engaging us in the human drama of creating and nurturing something new and worthy of its founders' high hopes. And despite or perhaps because of the deep level of detail contained in its nearly 800 pages, *Mind and Hand* is even entertaining. For those involved with higher education today, it shows how the concerns and interests of so many different participants were eventually brought together and enabled to coalesce in a working institution. While much has changed in the intervening 140 years, much is familiar in this process, too. Thus, while of special interest to those affiliated with MIT, *Mind and Hand* is really a case study with lessons applicable to all academia today.

***Alan R. Earls** is a freelance writer who lives in Franklin, Mass. Email: alanearls@comcast.net.*

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DATA CONNECTION

- Number of students affected since 2000 by the federal Higher Education Act provision delaying or denying federal student aid to anyone convicted of sale or possession of illicit drugs: **180,000**
- Number of states that deny state-based educational loans and grants to some or all applicants who are ineligible for federal financial aid, including those with drug convictions: **35**
- Ratio of states that follow federal rules as a matter of policy or administrative convenience to those where state laws explicitly require them to deny aid: **5-to-1**
- Federal funding in 2006 of the Safe and Drug-Free Schools and Communities State Grants program: **$346,500,000**
- Bush administration's proposed 2007 funding for the program: **$0**
- Spending by pharmaceutical companies on television advertising in 1996: **$220,000,000**
- In 2000: **$1,574,000,000**
- Chance of a visit to a health care professional by a teenage boy resulting in prescription of a psychotropic drug such as those used to treat ADHD, depression and other mood disorders: **1 in 10**
- Rate by which expulsion of three- and four-year-olds from pre-kindergarten programs exceeds expulsion of children in grades K-12: **3x**
- Share of Maine school principals who leave their jobs within two years: **1 in 3**
- Percentage of 25- to 64-year-olds in Maine's Cumberland County who had bachelor's degrees in 2000: **47%**
- Percentage of 25- to 64-year-olds in Maine's Somerset County who did: **20%**
- Percentage-point increase in Somerset County bachelor's degrees-holders between 1990 and 2000: **2**
- In Cumberland County: **8**
- Of 2004 New Hampshire public high school graduates headed for four-year colleges, percentage of girls who expected to major in education: **11%**
- Percentage of boys who did: **3%**
- Percentage of boys who expected to major in engineering: **14%**
- Percentage of girls who did: **2%**
- Percentage of non-college-bound seniors in New Hampshire's public high school class of 2004 who said they were joining the military instead of going to college: **17%**
- Percentage in class of 2005 who said so: **9%**
- Approximate value of 2005 defense contracts awarded to 20 largest defense contractors in Eastern Massachusetts: **$14,000,000,000**
- Number of companies with 500 or more employees with headquarters in Massachusetts in 2001: **245**
- Number in 2004: **198**
- Rank of soccer among "most competitive" pro team sports measured by frequency of upsets: **1**
- Average number of basis points by which a nation's stock market drops the day after its national soccer team is eliminated from World Cup play: **39**
- Approximate percentage of Division I athletes who graduate within six years of entering college, including transfer students: **76%**
- Approximate percentage of University of Texas football players who do: **40%**

Sources: 1,2,3 Coalition for Higher Education Act Reform; 4,5 U.S. Department of Education; 6,7,8 Brandeis University Heller School for Social Policy and Management; 9 Walter S. Gilliam, Yale Child Study Center; 10 University of Maine; 11,12,13,14 Maine Compact for Higher Education; 15,16,17,18,19,20 New Hampshire Partnership for the Advancement of Postsecondary Education Research; 21 CONNECTION analysis of *Boston Business Journal* data; 22,23 Massachusetts Technology Collaborative; 24 Theoretical physicist Sidney Redner and graduate student Frederico Vazquez of Boston University and Eli Ben-Naim of Los Alamos National Laboratory; 25 Diego Garcia, Dartmouth College; 26,27 National Collegiate Athletic Association

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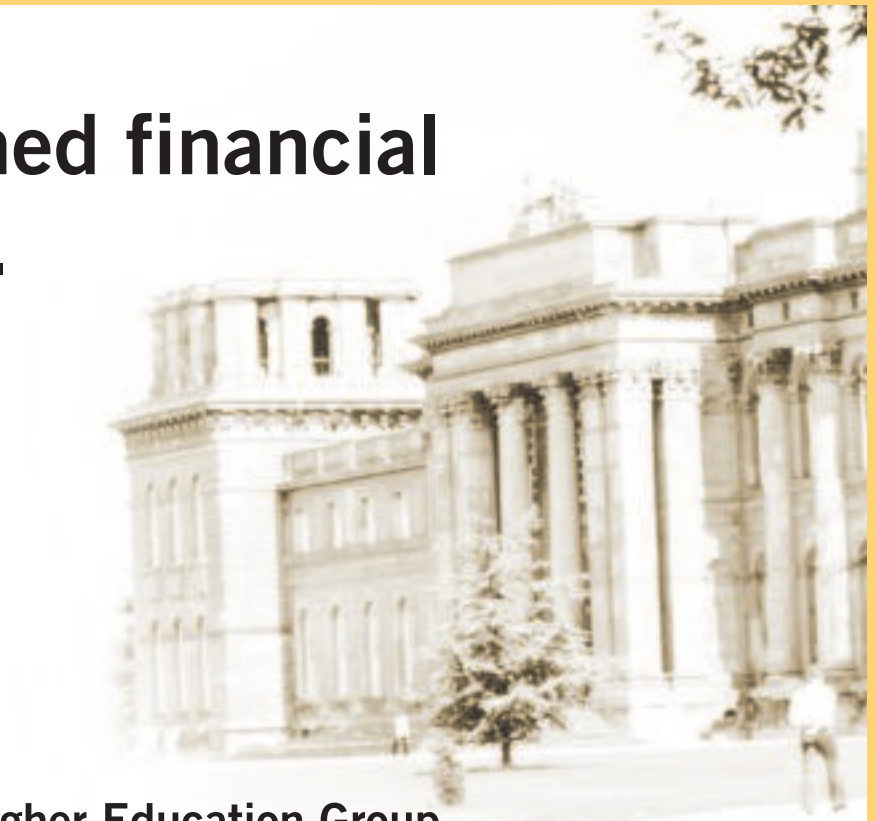

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