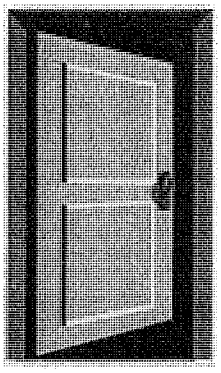
HIGHER EDUCATION ACHIEVEMENT IN MAINE



PREPARED BY THE MAINE DEVELOPMENT FOUNDATION'S
TASK FORCE ON HIGHER EDUCATION ACHIEVEMENT

MARCH, 1998

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HIGHER EDUCATION ACHIEVEMENT IN MAINE

INTRODUCTION

Maine's economic future depends as never before on the higher education participation and attainment levels of its population and the ability of its higher education institutions to create and transmit the latest knowledge about the world.

In 1983, public elementary and secondary education received a wake-up call in *A Nation at Risk.* Maine has led the nation in responding to the needs addressed in that report. Now Maine faces equally serious threats regarding our higher education attainment. However, there will be no *Nation at Risk* for higher education. Our post-secondary institutions are the envy of the world. The risk lies in the apparent separation that exists between our citizens and our institutions of higher education, as evidenced by Maine's low post-secondary participation rates. Surveys show that Maine people believe in the importance of higher education, but too many do not believe they are capable or able to make higher education a reality for themselves.

To continue the path we are on positions Maine to fall further and further behind the rest of the nation in terms of the education level and economic well being of our citizens. To illustrate how we are losing ground, consider that from 1985 to 1995 Maine's participation rate in higher education grew by eight percent. Over the same time period, the national increase was 21 percent. In 1990, Maine ranked 41 with regard to persons 25 years and older who held bachelor's degrees. The magnitude of this discrepancy is alarming. This course will exacerbate our out-migration trends as Maine becomes less and less attractive to new and expanding companies looking for a workforce of well-educated people able to learn and re-learn as jobs change.

The connection between higher education and the economy is widely understood in general terms. Maine needs to move beyond a general understanding to specific actions to increase higher education attainment and to enhance the capacity of its colleges and universities. Individuals must feel the imperative to take action and policy makers and institutions must face the reality of bold action. The trends described above are trends we can influence.

TASK FORCE

In fall 1997, the Maine Development Foundation convened a task force comprised of leaders from business, higher education, and state government to gain a better understanding of how we can position Maine for higher education achievement in the 21st century. This report is intended to provide a broad framework for subsequent dialogue, research, and action.

The task force examined the connection between economic growth and higher education, compared Maine to other states, and tried to understand why our citizens lagged behind the rest of the country in higher education participation and achievement. The task force found that Maine lags severely behind the nation in the number of people taking advantage of higher education. The group noted the complexity of the issues, the difficulty of interpreting the many and sometimes conflicting statistics associated with higher education, and the need for on-going research and analysis. But the task force also believes that the imperative is clear enough that actions can be identified and implemented immediately.

The task force is an extension of the Foundation's K-12 aspirations and education reform work. Maine made significant progress at the primary and secondary level the last decade. Although a great deal remains to be done, the K-12 achievements have been extraordinary. The same energy, creativity, and focus must be applied to higher education to ensure a high quality of life for Maine citizens in the next century.

The task force was chaired by Hugh Farrington, chairman and CEO of Hannaford Bros. Co.; a list of members is appended. The report was prepared for the task force by Foundation staff Henry Bourgeois, Leanne Greeley Bond, and Craig Freshley. Charles Colgan, professor of public policy and management at the University of Southern Maine, helped with the entire report and authored part three of the report. The report is in three parts: vision and goals; actions; and the connection between higher education and economic growth. A profile of higher education in Maine is appended.

HIGHER EDUCATION ACHIEVEMENT TASK FORCE

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VISION AND GOALS FOR HIGHER EDUCATION ACHIEVEMENT

During their deliberations, it became clear to task force members that Maine needs a coherent, long-term strategy for higher education achievement built upon a bold vision, ambitious but achievable goals, and measurable performance targets. This report should be viewed as part of that broader strategy.

The task force has agreed on the following vision, goals, and measures to guide its work and also urges their consideration in a broader strategy.

VISION

Maine residents should be among the best educated in America

GOAL A: Increase the higher education participation and attainment of Maine residents, so that by 2010, Maine's population with higher education degrees moves Maine from the bottom half among states to the top third.

PERFORMANCE MEASURES FOR GOAL A:

Primary Measure: Maine's national rank in the percent of 20-54 year olds who hold higher education degrees.

Suggested targets: increase the number of residents who have attained at least a high school degree from the 1990 rank of 19th to a rank of 10th by 2010; associate degrees, from 28th to 12th; bachelor's degrees from 32nd to 15th; graduate degrees from 35th to 17th.

Secondary Measures:

A. The percentage of Maine's residents age 25 and older enrolled in college leading to a degree.

Suggested target: increase Maine's 1990 rate of 4.89% (38,880 residents) to the national rate of 6.09% (an increase of 9,580 residents) by 2005.

B. The percentage of high school graduates who matriculate directly into two and four year colleges.

Suggested target: increase rate from 62.5% in 1996 to 72% (current U.S. rate) in 2005, and 80% in 2010.[1]

C. The proportion of entering first year students who attain degrees.

Suggested target: achieve or exceed the national rate, with specific targets developed by each institution.

GOAL B: Strengthen higher education institutions to assure that students and graduates succeed in work and society.

PERFORMANCE MEASURES FOR GOAL B:

Primary Measure: Student, graduate, and employer satisfaction with higher education.

Suggested target: to be developed by each institution.

Secondary Measure: The number of programs that have earned national accreditation.

Suggested target: to be developed by each institution.

SUMMARY OF RECOMMENDED ACTIONS

1. Support learning results
2. Expand career planning and counseling
3. Improve college student retention programs
4. Launch a public information and education campaign
5. Facilitate targeted community programs
6. Provide low cost access to college
7. Continuously improve the core curriculum
8. Increase higher education program accountability and assessment
9. Establish a Maine Partnership for Higher Education in the Twenty-first Century

Recommended Actions

The task force recognizes that these goals are ambitious and call for a significant commitment to the preparation and implementation of the long-term strategy mentioned above. That strategy should guide the actions of state government, higher education institutions, elementary and secondary school systems, employers, students, and parents.

The task force believes that its responsibility is to identify high priority actions that are critical to achieving these goals. Members seek to build on existing initiatives; five of the nine actions call for supporting and expanding current programs. We recognize that there are many efforts already underway to accomplish our goals.

Members also tried to focus on high leverage opportunities, i.e. programs and approaches that facilitate other efforts. The intention is not to provide a menu of every possible action, but rather to suggest high priorities to help focus attention and investment. The recommendations are not in priority order.

The nine actions are summarized on the following pages. Each needs more analysis and refinement by educators, government officials, and employers for implementation. The result should be explicit strategies, allocation of human and financial resources, and assignment of responsibility for each action.

RECOMMENDED ACTIONS TO INCREASE HIGHER EDUCATION ATTAINMENT (GOAL A)

1. Support Learning Results

Learning Results in the primary and secondary schools has the potential to significantly impact higher education as well. While the task force recommends that those implications be explored in the forum suggested below, it is important that Learning Results be adopted as soon as possible by school systems. Toward this end, the efforts by the Maine Department of Education and of school districts need to be supported in two ways:

Implement the Career Preparation Component of Learning Results. Career preparation is one of three Learning Results components that do not yet have an implementation date set. The adoption of an implementation date for the career preparation component will underscore the importance of this component and is strongly supported by the task force.

Connect Learning Results to College Admission Standards. We recommend that the Foundation, in partnership with educators and community leaders, conduct a statewide forum to explore how Learning Results in the primary and secondary schools can strengthen education opportunities at all levels, including higher education. The adoption of Learning Results offers new opportunities to enhance admissions standards and curriculum requirements in colleges and universities, and lessen the need for learning assistance programs. At the same time, adoption of the Learning Results could be assisted by linking achievement of the Learning Results directly to admissions and curriculum decisions in colleges and universities. Officials of both the K-12 and post-secondary institutions should explore these opportunities.

2. Expand Career Planning and Counseling

Assisting students in making choices about higher education begins in elementary school and continues through middle school and into high school. At the lower grade levels, information about higher education is best combined with information about careers in general. As students approach graduation from high school, there may be an advantage, as some schools have done, in separating counseling about jobs and higher education from the social service and crisis management responsibilities

of high school guidance counselors. This approach would allow for adequate attention to be focused on the special requirements of the post-secondary education admissions process.

Another important element in improving career planning and counseling services' contribution to increasing higher education participation is the increasing trend to integrating work experience and education through such programs as Maine Career Advantage, Tech Prep, Jobs For Maine's Graduates, co-operative education, internships, and field experience. These programs are an increasingly important part of undergraduate education at many colleges and universities, and are also being used in secondary schools. Such programs open new vistas about the economy for both students and educators, and their expansion is encouraged in secondary schools as well as in colleges and universities.

3. Improve College Student Retention Programs

Once in college, surprisingly high proportions of college students drop out, sometimes for short periods, sometimes for long periods. Nationally, about 60% of all students who start at a four-year college earn a degree within five years. Of the 40% who fail to complete the degree within this time, 57% leave before the start of their second year.

The table below shows the proportion of entering freshmen, from a sampling of institutions, who attain a bachelor's degree within five years.

PROPORTION OF ENTERING FRESHMEN WHO ATTAIN A BACHELOR'S DEGREE WITHIN FIVE YEARS
(most recent measurements)

University of Southern Maine	24.1%
University of Maine	47.8%
Unity College	47.0%
St. Joseph's College	53.2%
Bates College	88.0%

An uncertain proportion of those who do not complete the bachelor's degree within five years are "stop-outs" rather than "drop outs;" that is,

students who interrupt their studies for a period of time but eventually complete their degree, often at another institution than the one at which they began.

Retention of students already in college is an increasing priority for all colleges and universities. Admissions, costs, better counseling and services are all important elements in helping students stay in college once they get there. This is a concern in all institutions of higher education, and each is taking steps to reverse the trend. These efforts should be acknowledged, shared widely, and supported.

In *Leaving College: Rethinking the Causes of Student Attrition*, author Vincent Tinto observes that reconstructing the first year of college should become a priority in some institutions. These efforts focus on why students leave during the first year. The reasons vary: academic difficulty; adjustment difficulties; uncertain or narrow goals; weak commitment; and financial inadequacies. Some students leave because they feel they do not fit or belong socially or academically and others because they feel lonely or isolated.

4. Launch a Public Information and Education Campaign

Recent survey data indicates that an overwhelming majority of Maine citizens understand that higher education is important to their economic future. However, many believe that higher education is not something they can pursue due to access, finance, or capability.

This point was made dramatically at the May, 1997 conference on higher education for 7^{th} –10^{th} graders, sponsored by the Finance Authority of Maine. The conference attracted over 4,000 parents and students who were seeking information on cost, admission requirements, and choices.

While barriers do exist, they are often lower than people believe, and efforts to ensure Maine people have accurate information about access to higher education should be made. A well-designed, multi-year campaign could reinforce the value of higher education and provide practical advice on programs, admissions, financial aid, and financial planning.

5. Facilitate Targeted Community Programs NEW

There are significant disparities among Maine high schools in the rate at which their graduates go on to higher education. Statewide efforts to

increase higher education participation are unlikely to succeed because they will not deal with the particular circumstances in high schools or regions.

A more targeted approach will help to raise the higher education participation rates in those communities that lag the farthest behind. We believe such an approach needs to be developed on a community-by-community basis with the active involvement and leadership of local resources such as businesses, higher education institutions, schools and their local alumni. Working together, these local groups should develop specific programs and services aimed at increasing awareness of higher education opportunities and the rates of higher education participation.

We believe that the Foundation should draw upon its community organizing initiatives and work in partnership with the State Department of Education's recent community effort to support a series of "Community Partnerships for Educational Achievement" in selected communities. These partnerships might also bring together leaders from communities that lag the state in higher education participation with leaders from communities that are similar demographically and are leaders in higher education participation.

Other actions should include bringing college faculty and students to middle and secondary schools on a regular basis to talk with teachers, students, and parents about the value of higher education and answer practical questions about cost, admissions, etc. These outreach efforts can provide valuable information to prospective students, especially if the visitor is a recent graduate of the high school and is now a sophomore or junior in college. The peer relationship with prospective students could be quite powerful.

6. **Provide Low Cost Access to College** NEW!

Since 1990, tuition rates at Maine's universities has increased by 50 percent. As compared to other states and as a proportion of discretionary income, the price is high. Not only is the high tuition rate a barrier for entry-level college-age students enrolling full-time, but it is also a barrier for adults who attend only part time and are usually ineligible for financial aid. Recent survey data from the Finance Authority of Maine indicates that the cost of higher education is one of the greatest deterrents to participation. Experiences of other states suggest that Maine is at a competitive disadvantage because it lacks a low cost entry opportunity, often provided by community colleges.

The issue of higher education affordability is a complex one, involving the pricing tuition and other expenses, federal and state education policy, and the personal financial choices of individuals. Each of these components should be addressed further in light of the goals recommended in this report.

Tuition and financial aid policies need to be reviewed by colleges and universities and state support of public higher education institutions reviewed in order to lower the financial barriers, with particular attention to the needs of both entry level and part- time students. Maine's congressional representatives should place high priority on federal efforts to assure that low income states like Maine do not fall further behind the national averages in higher education attainment.

The task force believes Maine can better provide access to college in three ways:

a. Significantly lowering the tuition costs for entry-level students should be investigated carefully. The task force learned that tuition costs range from $80 to $110 per credit hour at Maine public institutions and are higher for private institutions. Some states have increased higher education participation by enabling entry at far lower costs; often this is done through community colleges. We should examine this approach carefully. Lowering entry-level tuition costs should be analyzed on its own merit, within the existing systems, separate from consideration of a community college approach (see action #9).

b. State support for students with demonstrated financial need is limited in terms of both the number of eligible students served and the amount of scholarship awards. Neither the amount of state funding nor the size of grants has been increased in the last seven years despite substantial increases in the tuition cost of higher education and the number of applicants with financial need. The state should consider additional financial assistance along with other spending priorities.

c. Implementing a college savings program will help to encourage parents to begin saving for higher education earlier, reducing the financial burden when their children are ready to attend college. Efforts to enact legislation to create and implement such a program in Maine should be supported.

RECOMMENDED ACTIONS FOR STRENGTHENING HIGHER EDUCATION INSTITUTIONS (GOAL B)

7. Continuous Improvement of the Core Curriculum

The core curriculum is the set of courses and expectations that are shared by all students in a higher education degree program. It is the point at which the expectations of an educated person are defined. Colleges and universities are continually modifying their core curricula to respond to new circumstances and knowledge.

At the same time, employers demand a workforce that has skills in communication, team building, working with diversity and critical thinking. Many large employers provide intensive on-site training to give their workers these important skills. Identifying ways to meet workforce needs through core curriculum changes could be achieved through the forums suggested below.

We recommend that the Foundation, in partnership with educators and employers, conduct a series of regional forums throughout the state to examine the numerous links between the economy and higher education. We believe that these links should be explored at the level where the greatest difference could be made: between employers and the teaching faculty in the state's colleges and universities. These forums would bring together business, government, and nonprofit organizations with faculty from throughout the public and private institutions of higher education to explore how a changing economy and workplace are impacting the skills and knowledge required of the graduates of higher education programs.

The results of the forums would help define employer needs and inform the design of the core curriculum of institutions.

8. Increase Higher Education Program Accountability and Assessment

Regular examination of every academic program by outside reviewers is the rule in all of Maine's public and private colleges and universities. These reviews provide valuable insights and they should be expanded and improved in two ways:

First, every effort should be made to secure national accreditation for college and university programs, where such accreditation is available. This is the most important and rigorous process by which higher education programs (not institutions) assure that standards of quality are

met. Members of each discipline set accreditation standards and procedures, and individual programs at the graduate and undergraduate levels choose to subject themselves to review by their peers once they believe they have met the standards.

Second, we should document and expand on the variety of ways institutions currently measure and assess the satisfaction of students, graduates, and employers with their higher education experiences. We believe the Foundation, in cooperation with the state's colleges and universities, should facilitate a process that looks at the approaches currently being taken by institutions within and outside Maine. The result could be a "best practices" guide to doing this kind of assessment which can be shared broadly to assure the effective collection and use of this important information.

RECOMMENDED ACTION TO INCREASE HIGHER EDUCATION ATTAINMENT AND STRENGTHEN INSTITUTIONS (GOALS A & B)

9. Maine Partnership for Higher Education in the Twenty-first Century NEW!

The connection between higher education and the Maine economy needs to be strengthened by forging new links between the state's institutions of higher education and the K-12 system and between those institutions and the state's employers in the private, public, and nonprofit sectors.

We believe the Foundation should create a statewide partnership of educators, business people, legislators, community leaders, parents, students, and others who have a stake in higher education achievement. The mission of the partnership would be to:

a. Promote the higher education achievement goals and actions put forward in this report;
b. Examine critical issues affecting higher education achievement in Maine, and the connection between economic growth and higher education;
c. Serve as a common ground where the views of every stakeholder group are represented and respected; and
d. Strengthen the relationship between employers and educational institutions.

Although modest in scope, this task force provided a valuable opportunity for education, business, and government leaders to discuss higher education in a positive, constructive environment, and to examine long-term issues away from the crisis of the moment or the pressures of a busy legislative or board agenda. This dialogue should continue.

The issue of how Maine can best take advantage of the opportunities for economic growth connected with higher education has a number of complex dimensions that we were unable to explore given the time available. Among the critical issues and unanswered questions the partnership could examine include:

a. **The Role of Community Colleges in Maine**

One of the most noticeable differences between the public higher education system in Maine and in most other states is the absence of a distinct community college system in Maine. In other states, community colleges provide easy access to post secondary education at a price far less than other institutions.

The programs provided by community colleges in other states are offered in Maine through the Maine Technical College System and the University of Maine System. The University of Maine System has recently decided to change the way it delivers these services, reassigning them from the University of Maine at Augusta to the seven campuses.

However, as the role of the University of Maine System campuses changes and as the need for higher education participation grows, there will be a need for continued evolution of the role of both the University and Technical Colleges in providing these programs.

b. **Regional Disparities in Higher Education Participation**

We have already suggested that the regional differences in higher education participation rates by high school graduates should be addressed through a series of community partnerships organized by the Foundation. However, as imperative as such efforts are, they will necessarily be limited by time and resources to a small number of communities, at least initially. Greater efforts should be placed on understanding the interaction of economic, ethnic, access, aspiration, and institutional barriers that together determine why some communities are very successful at sending students on to higher education and others are relatively unsuccessful.

c. **Barriers to Adult Participation**

If Maine is to meet the goal we have suggested for increased higher education attainment by 2010, much of the change will have to come in the adult population, rather than the traditional college population. The average age of college students in Maine (as nationally) is actually older than the traditional ages of 18-21, yet Maine lags behind the nation in the

proportion of its population who have attended at least some college courses. We have drawn attention to some of the financial aid needs of part time students in our recommended actions, but more needs to be understood about barriers to adult participation in higher education.

d. **Graduate Education and Research**

Much attention has been focused recently on the critical role that research and development plays in the Maine economy. This is certainly a critical element, but less attention has been directed at a key element of the research and development process that takes places in colleges and universities: its links to graduate education. Graduate education is the stage at which students are most intensely exposed to the process of research that generates new knowledge in all fields, and graduate students are an integral part of the research process itself. Maine's lagging position among the states in research is mirrored by a similar lag in the number of students in graduate programs. As Maine seeks to improve its standing in research and development, the links to graduate education need to be explored in detail and strategies developed to increase graduate education participation and attainment in Maine.

THE CONNECTION BETWEEN HIGHER EDUCATION ACHIEVEMENT AND ECONOMIC GROWTH

Maine has a diverse system of higher education institutions, with fifteen public institutions within three systems (the University of Maine System, the Maine Technical College System, and Maine Maritime Academy) and 15 private colleges. Together, these institutions enroll more than 55,000 students, about 4.5% of the state's population. But this large enterprise still does not serve Maine well enough when compared with the United States as a whole, or a group of similar states. Further, when looking at higher education statistics, the gap between Maine and the other states creates serious long-term problems for the economy. This section considers the relationship between higher education and the Maine economy and how Maine compares with other states.

WHAT IS THE CONTRIBUTION OF HIGHER EDUCATION TO THE MAINE ECONOMY?

Two things make the gap between Maine and other states worrisome. The first is that Maine has lagged throughout most of the past fifty years behind the rest of the United States in economic growth. The second is that the evidence for the importance of higher education in the economy has accumulated over a number of years of research, and is relatively unambiguous: If the higher education gap persists, then the economic growth gap cannot be closed and may widen even more.

Educational attainment, as the principal source of "human capital" is a significant contributor to economic growth. Estimates over 1929-1982 showed that expansion of the educated populace accounted for 16% of the growth in total U.S. gross national product. Education's contribution to growth steadily increased throughout this period at about 0.6% per year.[2] More recent estimates have not been made, but the contribution is almost certainly larger in the contemporary information economy. Using these lower figures, however, education will contribute an average of more than $100 million dollars a year to the Maine economy over the next five years[2]

The income differential between those with and without higher education is large and growing. The following table shows the difference in mean annual U.S. earnings in current dollars by education level for the years 1980 and 1994.

Mean Earnings in Current Dollars of Workers 18 Years Old and Over, by Educational Attainment, 1980 and 1994						
Year	All Workers	Not High School Grad	High School Grad	Some College Assoc. Degree	Bachelor's Degree	Advanced Degree
1980	$12,665	$8,845	$11,314	$12,409	$18,075	$23,308
1994	$25,825	$13,697	$20,248	$22,226	$37,224	$56,105
% Inc.	103.9%	54.6%	79.0%	79.1%	105.9%	140.7%
Source: U.S. Bureau of the Census, *Current Population Survey*, March 1975 to 1995						

Between 1980 and 1994 the mean annual earnings of people with bachelor's and advanced degrees significantly outpaced that of people without degrees. The table further shows that the higher the degree the greater the percent increase in mean annual earnings for the fourteen year period.

The 1990 census data for Maine shows similar striking economic advantage from higher education, with mean annual earnings of about 150% for bachelor's degree holders versus holders of only high school diplomas. This translated into average annual salaries of $22,081 for persons with high school degrees, $33,033 for persons with bachelor's degrees, and $36,790 for persons with graduate degrees.

How Does Higher Education Influence The Pace and Character of Economic Growth?

The evidence that higher education is important is so clear that few stop to ask, *why?* or, more accurately, *how does higher education influence the pace and character of economic growth?* The answer depends on understanding what it is that higher education actually produces and how these products relate to economic growth.

At the broadest level, all institutions of higher education are engaged in providing students with the opportunity to develop in four areas:

- Skills
- Knowledge
- The capacity to learn
- The capacity to innovate

Skills *may be thought of as the ability to do.* Skills might include how to construct a building or use a computer program or write a short story or a concerto or conduct an analysis of variance using statistical software or guide a ship through a crowded channel. Three key skills that should be emphasized throughout education are research (the ability to acquire information), analysis (the ability to discern the meaning in information), and communication (the ability to pass information and meaning to others). Skills are developed at all levels of higher education by broadening and deepening skills students have already acquired and by introducing new skills.

Knowledge is *information about something.* Higher education offers the opportunity to learn more about an extraordinary array of subjects from the rate of growth of spruce trees in certain kinds of soils to the details of the genetic code to the relationship between the Venetian traders and the art of the Renaissance. A key feature of most programs of higher education is the opportunity to specialize in a particular area of knowledge.

The capacity to learn *synthesizes skills and knowledge to create the ability to learn* about new areas without benefit of instruction. At each level of higher education, the possibility exists that students will end their formal education, and so each student should be left with a capability to continue learning in a chosen field on his or her own.

The capacity to innovate *is the ability to push back the frontiers of knowledge* and to *take existing skills and knowledge and apply them in new ways.* It is in this area that the tradition in higher education of combining research and teaching is most critical.

These products are part of higher education at all levels to one degree or another, and so it is somewhat artificial to say that any particular level of higher education is designed to focus on one or another of these products. But there is a definite relationship between the focus among these products at each level. Using the standard degrees granted by institutions of higher education as a template, the relative emphasis of higher education levels changes as follows:

Associate degrees (2 year degrees). The two year degree focuses either on specific areas, generally of a technical nature, or providing a bridge between secondary school and the four year degree program. The emphasis is on building skills and knowledge in the technical field of study or of introducing the research, analytic, and communication skills needed for more advanced study at higher levels of the education system.

Bachelor's degrees (4 year degrees). The bachelor's degree is the largest product of higher education, the most varied in its requirements and emphasis, and has the longest curriculum. Its primary focus is on advanced skills and knowledge, which includes concentrated attention in one area (a major) as well as requirements to demonstrate some level of competency in fields beyond the major. Depending on the field of study and the type of degree program, the bachelor's degree can be rather specialized or can be very broad. This capacity to learn is the foundation upon which future on-the-job training and additional education (including graduate education) depends and which transforms "jobs" into "careers." Recent research has shown that earnings attributable to experience and on-the-job training are much higher for bachelor's degree holders. Again, these returns are also much more important for women than for men[3]

Master's degrees. There are two broad types of master's degrees: the disciplinary and the professional. The disciplinary master's degree broadens and deepens the mastery of a field beyond what can be done in an undergraduate major. The professional master's degree provides advanced skills and knowledge with an emphasis on application of those skills and knowledge in a specific profession. Much greater attention is paid to learning capacity and capacity to innovate.

Doctoral degrees. The doctoral student must demonstrate mastery of a body of knowledge and must have developed the necessary skills to make an original contribution to knowledge in their chosen field. As the "terminal" degree, the doctorate places greatest emphasis on developing the capacities to learn and innovate through its requirements for self-directed research.

This picture is over-simplified of course. At the doctoral level the essential combination of research and teaching is most visible. Students must show their own capacity to learn and to conduct innovative research and, in many institutions, to teach. However, research has become more and more important at all levels of higher education. Research skills are emphasized in most master's degree programs and are increasingly being emphasized at both the bachelor's and associate levels. It is not unusual to see bachelor's degree students conducting and publishing research. At the same time, there are professional doctorates, such as the Jurist Doctor (law degree) that do not emphasize research. It must also be noted that some of the educational effort in the first one or two years of undergraduate education (whether at two or four year institutions) goes to remedial work to help students acquire essential skills

that secondary schools did not provide. But the broad outline of moving from an emphasis on skills and knowledge development to increasing capacity to learn and innovate as one proceeds through the different levels of higher education is accurate.

How Is The Economy Changing And What Is the Role of Higher Education?

Three broad trends have transformed the economy over the past thirty years, and each fundamentally depends on higher education.

Technological advancement. The industries in advanced industrial economies like the United States are both the fastest growing and the greatest creators of wealth are all based on rapidly developing technologies, most of which have been developed in the past three decades. Most prominent among these are information technologies such as computers and telecommunications and biotechnology, though developments in such fields as materials and energy are also critical.

Increased competition. The global economy is primarily an abbreviation for greatly increased competition affecting almost all industries. Increasing competition puts much greater pressure on businesses to improve products, to be more efficient, and to create new products. The essential ability to respond to competition is the ability to innovate, which involves not only technology development, but the development of new markets, new organization forms, and new ways to understand the changing economy.

Shift to services. The relative decline in manufacturing and primary industries (like farming and fishing) and the associated relative rise of the service industries has been widely criticized because of allegations that service jobs do not pay as well. This vastly oversimplifies and distorts the nature and role of the service industries. Services is a very broad category. It includes professions such as medicine, law, and architecture, as well as key services to other businesses such as advertising, design, and finance. Much of the competitiveness in manufacturing is created and sustained by services, such as software engineering.

The connections between each of these trends in the economy and the products of higher education are easy to see:

- A technology-based economy needs skilled people to operate the technologies and, above all, to conduct the basic and applied research upon which technologies depend for continuous improvement, innovation, and expansion.

- Technological innovation is also one of the most important ways in which businesses respond to the imperatives of a competitive economy. Just as important, the capacity to find innovative approaches in a wide variety of social, cultural, organizational, and artistic settings that is emphasized at the graduate level and increasingly at the undergraduate level are key resources for the economy.

- The combination of knowledge, skills, and learning capacity that is the product of professional education (or that is brought to the professions from liberal arts or technical education) are the essential prerequisites to success in the high-paying professions that constitute much of the growth in the service industries. For many of the service professions, a bachelors degree is a minimum requirement, while graduate training is the minimum requirement for the high-paying professions such as medicine, science, engineering, and law.

There are other connections between higher education and the economy. The rising incomes in an economy requiring ever-increasing levels of skills become an important source of the multiplier effect that spurs economic growth. Another aspect of the multiplier is that institutions of higher education have important economic impacts in their communities and regions[4] Moreover, higher education in Maine is, particularly because of its private institutions, an export industry, meaning that it attracts spending to the Maine economy. Many higher education institutions are also increasingly involved in direct economic development assistance to public and private institutions[5] But it is the nexus between knowledge generation (research) and transmission (teaching) that is at the core of higher education's role in transforming people and society and in providing the essential raw materials of the information economy.

How Does Maine Compare With Other States In Higher Education Participation and Attainment?

- In 1990, Maine's national rank in the number of 20-54 year olds who held high school, associate, bachelor and graduate degrees was 19th, 28th, 32nd, and 35th respectively.

- The number of high school graduates planning to attend post secondary school in the 1995-96 school year was 62.5% in Maine, compared to 72% nationally.

- 4.89% of the adult resident population of Maine (38,880 residents) in 1990 were "enrolled in college leading to a degree..." according to the U.S. Census. This compares to 6.09% for the nation. 9,580 more Maine residents would need to be enrolled to meet the national figure. (Note: this figure includes attendance inside and outside Maine and excludes non-Maine residents attending in-state colleges.)

- From 1985 to 1995, enrollment in Maine's institutions of higher education grew by 8%. Over the same period, enrollment in the U.S. grew by 21%.

- Maine has the 14th highest average tuition for its public institutions of higher education.

- Maine ranks 50th in the level of federal support of university-based scientific and technical research.

Please refer to the Appendix of this report for more data. Other sources of data are: the Maine Economic Growth Council's *Measures of Growth, 1998* report; the State Department of Education and its annual *Post Secondary Enrollment Survey; Increasing Postsecondary Enrollments in Maine*, an article by David Silvernail in last fall's issue of Maine Policy Review; the New England Board of Higher Education; the National Center for Educational Statistics; and the Chronicle of Higher Education.

What Is Needed For Maine to Close the Gap In Higher Education Participation and Attainment?

The recommended goal that Maine should move from the bottom half to the top third among states in higher education attainment does not lend itself to easy projection of the number of additional students in higher education, since it requires estimating changes both in Maine and in other states. But it is possible to demonstrate some of the implications of the above figures for the amount of change needed.

	Number of additional graduates/students if the Maine 1990 rates are the same in 2010	Number of additional graduates/students if Maine achieved the U.S. 1990 rates in 2010	Number of additional graduates/students if Maine grows at same rate from 1990-2010 as from 1985-95	Number of additional graduates/students if Maine grows from 1990-2010 at the U.S. 1985-1995 rate
Some College	1,444	17,584	16,390	70,015
Associate, Bachelor and Grad. Degrees	2,305	9,301	19,139	81,313
TOTAL	**3,748**	**26,895**	**35,530**	**151,327**

These changes are clearly dramatic, calling for extremely large increases in the attendance at all institutions of higher education. These growth rates may be extremely ambitious for Maine, yet they effectively demonstrate the magnitude of the task before us. If the U.S. can sustain recent growth in enrollment (which is not certain) Maine will have to work very hard just to keep the gap from growing wider.

Endnotes

[1] Maine Children's Alliance. 1998. *Maine Kids Count 1998 Data Book. P. 19*

[2] Measured as Gross State Product. Estimates of GSP growth taken from the Maine economic forecast for the New England Economic Project

[3] Grubb, W. Norton "The Economic Returns to Baccalaureate Degrees: New Evidence from the Class of 1972". *The Review of Higher Education.* 15,2: 213-31.

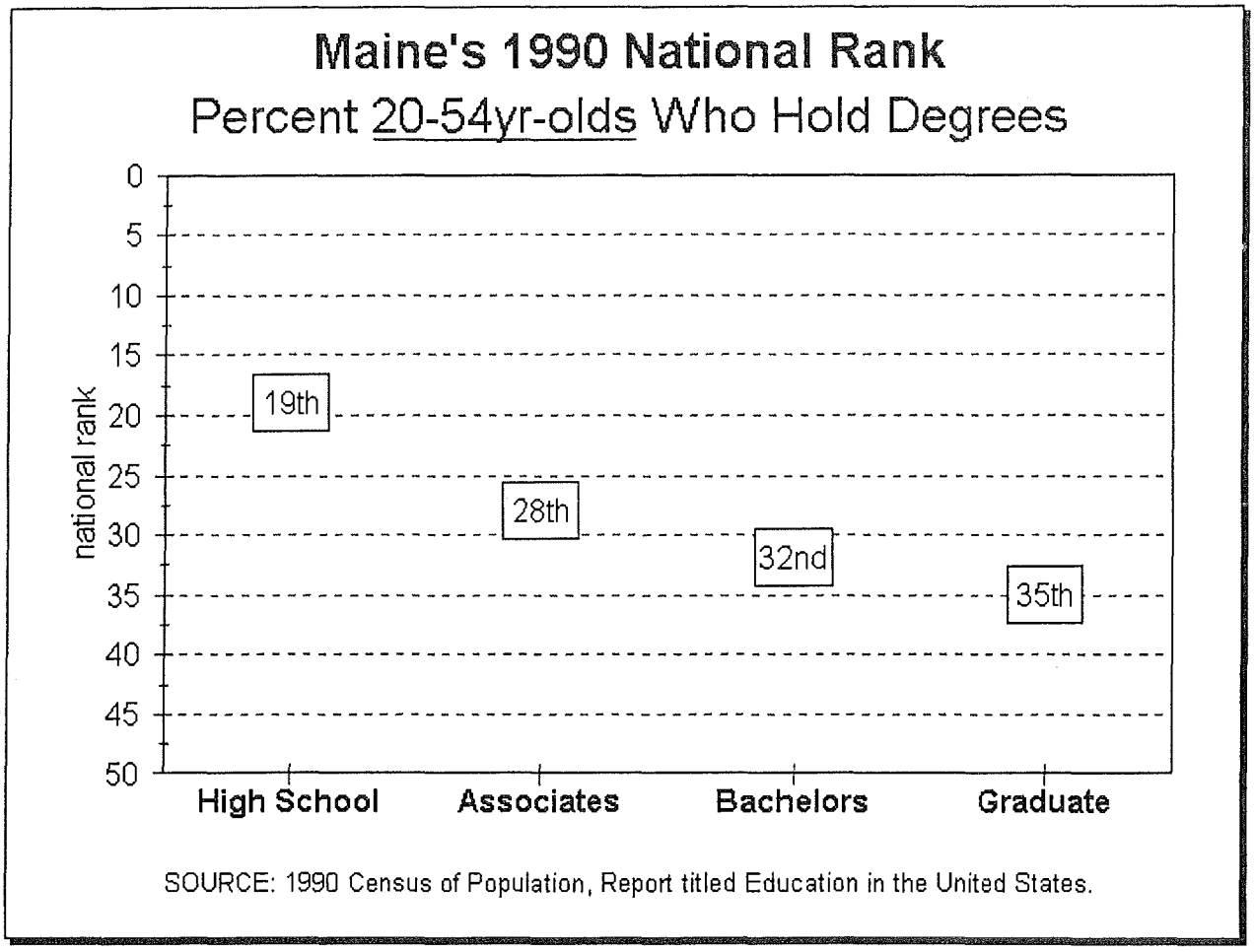
[4] Creech, Carpenter, and Davis. 1994. "The Direct Economic Impact of Texas's Appropriations to Higher Education. *Review of Higher Education.* 17,2: 125-41.

[5] Cote, Lawrence S. and Mary K. Cote. 1993. "Economic Development Activity Among Land-Grant Institutions". Journal of Higher Education. 64,1: 55-73

APPENDIX

	MAINE	U.S.
Educational Attainment of the Population (1990)		
High School	37.1%	30.1%
Some College	16.1	18.7
Associate's Degree	6.9	6.2
Bachelor's Degree	12.7	13.1
Graduate Degree	6.1	7.2
Change in College Enrollment 1985-1995	8%	21%
Average Tuition and Fees		
Public 4 Year	$ 3,474	$ 2,848
Public 2 Year	2,380	1,245
Private 4 Year	16,204	12,239
Financial Aid		
State Aid to Students Per Student	$ 146	$ 204
Research and Development		
Research Expenditures as Percent of total public and private expenditures	4.97%	11.81%
Federal Research Support as Percent of total public and private expenditures	2.14%	6.60%

Source: *Chronicle of Higher Education*, August 29, 1997



SOURCE: 1990 Census of Population, Report titled Education in the United States.

NOTE: For each type of degree noted, the states are ranked with regard to the percentage of their residents who have attained that particular degree or a higher degree.

percent of 20-54 year olds who, in 1990, held at least a

High School Diploma

rank	state	percent
1	Iowa	92.90%
2	Minnesota	92.13%
3	Nebraska	91.34%
4	North Dakota	91.08%
5	New Jersey	90.81%
6	Alaska	90.12%
7	Hawaii	89.89%
8	South Dakota	89.59%
9	Colorado	89.37%
10	Wyoming	89.32%
11	Utah	89.29%
12	Montana	89.16%
13	Kansas	89.01%
14	Washington	88.90%
15	Wisconsin	88.77%
16	**New Hampshire**	**88.57%**
17	**Vermont**	**88.38%**
18	**Massachusetts**	**87.64%**
19	**Maine**	**87.47%**
20	**Connecticut**	**87.41%**
21	Oregon	87.16%
22	Louisiana	86.83%
23	Pennsylvania	86.36%
24	Idaho	86.11%
25	Maryland	86.04%
26	Michigan	85.98%
27	Delaware	85.55%
28	Ohio	84.82%
29	Missouri	84.73%
30	Illinois	84.57%
31	Indiana	84.25%
32	Oklahoma	84.05%
33	New York	83.74%
34	Virginia	83.42%
35	**Rhode Island**	**83.27%**
36	Arizona	83.00%
37	Nevada	82.91%
38	New Mexico	81.68%
39	Florida	81.30%
40	North Carolina	80.34%
41	Washington, DC	80.26%
42	Georgia	79.48%
43	California	78.94%
44	Texas	78.60%
45	Arkansas	78.56%
46	West Virginia	78.21%
47	Tennessee	78.20%
48	Alabama	78.14%
49	South Carolina	77.98%
50	Kentucky	76.48%
51	Mississippi	75.00%

percent of 20-54 year olds who, in 1990, held at least an

Associates Degree

rank	state	percent
1	New Jersey	40.20%
2	**Massachusetts**	**39.78%**
3	Washington, DC	39.61%
4	**Connecticut**	**38.21%**
5	Colorado	35.73%
6	Minnesota	35.29%
7	New York	35.24%
8	**New Hampshire**	**35.13%**
9	North Dakota	34.42%
10	Maryland	34.00%
11	**Vermont**	**33.79%**
12	Hawaii	33.65%
13	Washington	33.24%
14	Iowa	32.87%
15	**Rhode Island**	**32.70%**
16	Virginia	32.27%
17	California	31.90%
18	Illinois	31.49%
19	Nebraska	31.45%
20	Utah	30.53%
21	Kansas	30.47%
22	Oregon	30.04%
23	Delaware	29.99%
24	South Dakota	29.83%
25	Alaska	29.39%
26	Wisconsin	28.91%
27	Florida	28.84%
28	**Maine**	**28.47%**
29	Montana	28.37%
30	Pennsylvania	28.37%
31	Arizona	28.16%
32	Wyoming	28.04%
33	Michigan	27.29%
34	Idaho	27.17%
35	Texas	26.92%
36	North Carolina	26.80%
37	Missouri	26.43%
38	Georgia	26.37%
39	New Mexico	26.14%
40	Ohio	25.62%
41	Oklahoma	25.52%
42	South Carolina	24.74%
43	Indiana	24.13%
44	Alabama	23.81%
45	Louisiana	23.23%
46	Tennessee	22.84%
47	Mississippi	22.78%
48	Nevada	22.16%
49	Kentucky	20.20%
50	Arkansas	19.52%
51	West Virginia	18.95%

SOURCE: 1990 Census of the Population. From the report titled Education in the United States, 1990

NOTE: For each type of degree noted, the states are ranked with regard to the percentage of their residents that have attained that particular degree or a higher degree.

percent of 20-54 year olds who, in 1990, held at least a

Bachelors Degree

rank	state	percent
1	Washington, DC	36.19%
2	New Jersey	33.61%
3	**Massachusetts**	**31.16%**
4	**Connecticut**	**30.27%**
5	Maryland	27.91%
6	Colorado	27.80%
7	New York	26.78%
8	Virginia	25.95%
9	**New Hampshire**	**25.77%**
10	**Vermont**	**25.36%**
11	**Rhode Island**	**24.53%**
12	Minnesota	24.44%
13	Illinois	24.00%
14	Hawaii	23.75%
15	Washington	23.71%
16	Kansas	23.39%
17	California	23.21%
18	Delaware	22.55%
19	Iowa	22.10%
20	Alaska	21.90%
21	Nebraska	21.85%
22	Oregon	21.78%
23	Montana	21.70%
24	Utah	21.38%
25	Pennsylvania	21.33%
26	North Dakota	21.23%
27	Texas	20.89%
28	Missouri	20.54%
29	Georgia	20.48%
30	New Mexico	20.27%
31	Arizona	20.23%
32	**Maine**	**20.09%**
33	South Dakota	19.99%
34	Florida	19.76%
35	Wisconsin	19.72%
36	Wyoming	19.65%
37	Oklahoma	19.14%
38	Michigan	18.95%
39	Ohio	18.85%
40	Louisiana	18.78%
41	North Carolina	18.59%
42	Idaho	18.16%
43	Tennessee	17.57%
44	Indiana	17.30%
45	Alabama	17.23%
46	South Carolina	17.19%
47	Mississippi	15.89%
48	Nevada	15.31%
49	Kentucky	14.95%
50	Arkansas	14.78%
51	West Virginia	13.90%

percent of 20-54 year olds who, in 1990, held at least a

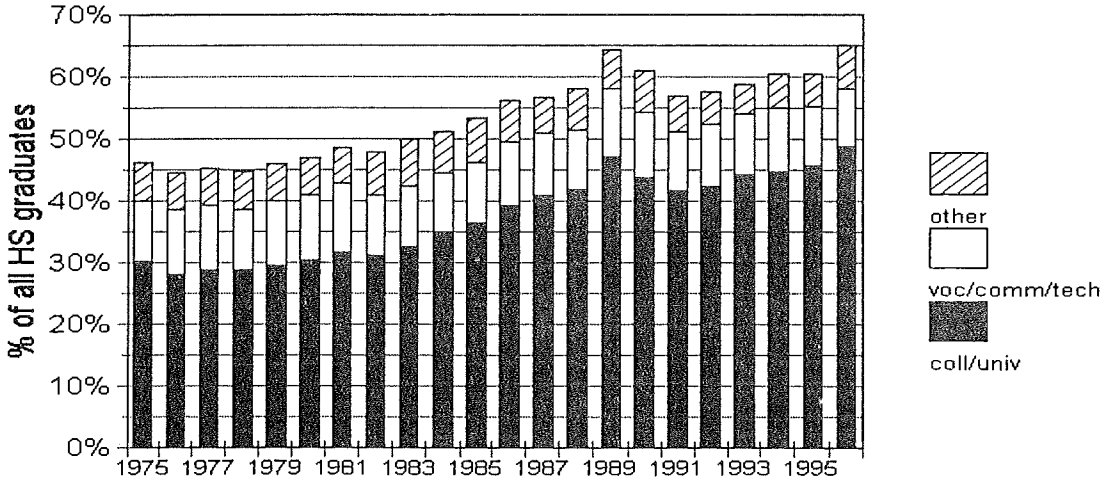
Graduate Degree

rank	state	percent
1	Washington, DC	16.73%
2	New Jersey	14.43%
3	**Connecticut**	**11.20%**
4	**New York**	**10.86%**
5	**Massachusetts**	**10.86%**
6	Maryland	10.43%
7	Virginia	8.72%
8	Colorado	8.49%
9	**Vermont**	**8.45%**
10	**Rhode Island**	**8.03%**
11	Iowa	7.82%
12	New Mexico	7.72%
13	Illinois	7.64%
14	New Hampshire	7.55%
15	California	7.38%
16	Delaware	7.22%
17	Alaska	7.14%
18	Pennsylvania	7.05%
19	Kansas	6.95%
20	Oregon	6.80%
21	Hawaii	6.69%
22	Washington	6.69%
23	Missouri	6.32%
24	Michigan	6.27%
25	Indiana	6.26%
26	Arizona	6.24%
27	Minnesota	6.23%
28	Georgia	6.23%
29	Florida	6.14%
30	Nebraska	6.10%
31	Texas	6.00%
32	Utah	5.96%
33	Ohio	5.95%
34	Louisiana	5.88%
35	**Maine**	**5.86%**
36	Oklahoma	5.73%
37	Montana	5.63%
38	Kentucky	5.59%
39	Wisconsin	5.53%
40	Alabama	5.53%
41	Wyoming	5.46%
42	Tennessee	5.38%
43	North Carolina	5.17%
44	South Carolina	5.17%
45	Idaho	5.06%
46	West Virginia	4.98%
47	Mississippi	4.95%
48	South Dakota	4.88%
49	Nevada	4.79%
50	North Dakota	4.58%
51	Arkansas	4.41%

SOURCE: 1990 Census of the Population. From the report titled Education in the United States, 1990

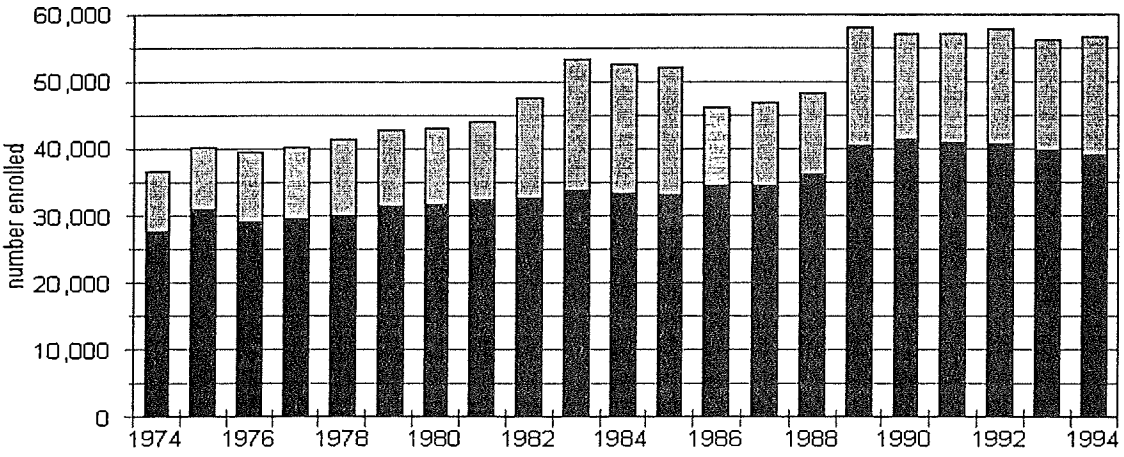
NOTE: For each type of degree noted, the states are ranked with regard to the percentage of their residents that have attained that particular degree or a higher degree.

Percent of HS Graduates Going On To Higher Ed., by Type of Institution



SOURCE: Maine Department of Education based on annual fall survey of all Maine high schools. Based on where graduating students say they intend to go.

Enrollment in All Maine Institutions of Higher Education, 1974-1994 by public and private Institutions



SOURCE: US Department of Education, National Center for Education Statistics, from the Fall Enrollment Survey of Higher Education Institutions. From the report titled: State Comparisons of Education Statistics: 1969-70 to 1993-94.

1996 Fall Enrollment in Maine Institutions of Higher Education

Institution	Full-Time	Part-Time	Total
University of Southern Maine	4,435	5,531	9,966
University of Maine	6,929	2,482	9,411
University of Maine at Augusta	1,217	4,279	5,496
University of Maine at Farmington	1,982	405	2,387
University of Maine at Presque Isle	966	381	1,347
University of Maine at Machias	543	372	915
University of Maine at Fort Kent	445	322	767
University of Maine System	**16,517**	**13,772**	**30,289**
Southern Maine Technical College	1,120	1,292	2,412
Kennebec Valley Technical College	310	954	1,264
Eastern Maine Technical College	449	673	1,122
Central Maine Technical College	420	562	982
Northern Maine Technical College	573	374	947
York County Technical College	105	267	372
Washington County Technical College	200	166	366
Maine Technical College System	**3,177**	**4,288**	**7,465**
Maine Maritime Academy	623	28	651
Publicly Funded Colleges and Universities	**20,317**	**18,088**	**38,405**
Saint Joseph's College	740	3,819	4,559
University of New England	1,704	360	2,064
Husson College	869	1,111	1,980
Colby College	1,764	0	1,764
Bates College	1,672	0	1,672
Bowdoin College	1,574	7	1,581
Thomas College	430	412	842
Andover College	619	11	630
Unity College	499	15	514
Beal College	263	151	414
Maine College of Art	286	62	348
Westbrook College	207	68	275
Mid-State College (Auburn)	214	57	271
College of the Atlantic	248	9	257
Mid-State College (Augusta)	149	69	218
Casco Bay College	130	60	190
Bangor Theological Seminary (Bangor)	57	38	95
Bangor Theological Seminary (Portland)	6	23	29
Private Colleges and Universities	**11,431**	**6,272**	**17,703**
TOTAL ENROLLMENT	**31,748**	**24,360**	**56,108**

Data Source: Maine Department of Education from the Post Secondary Enrollment Survey completed by all Maine Institutions of Higher Education. Includes all enrolled in credit courses.

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