

EXPANDING UNDERGRADUATE EDUCATION TO MEET NATIONAL GOALS: THE ROLE OF RESEARCH UNIVERSITIES

An A·P·L·U Discussion Paper

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President Obama's higher education goal is to provide "... every American with a quality higher education—whether it's college or technical training."¹ In establishing this goal the President spoke of the role higher education has played in America's success: "For we know that economic progress and educational achievement have always gone hand-in-hand in America. Land-grant colleges and public high schools transformed the economy of an industrializing nation. The GI Bill generated a middle class that made America's economy unrivaled in the 20th century."²

The objective of this paper is to suggest the role degree-awarding colleges and universities, particularly public research universities, can best serve in accomplishing his higher education goal. Thus, this paper addresses only the proportion of the population who receive a tertiary degree consistent with the goal; it does not include a discussion of goal setting or educational cost for those who attain less than a tertiary degree.

This paper should be seen as a first approximation of the complex nexus of enrollment changes, graduation rates, and cost factors with levels of degree attainment. These relationships have not been satisfactorily modeled and our approximations are therefore subject to change. As usual, we welcome comment and suggestions from our colleagues.

We build on the goals suggested by the 2008 Commission on Access, Admissions and Success in Higher Education,³ by the State Higher Education Executives' Officers

¹ President Barack Obama, Address to the Hispanic Chamber of Commerce, March 10, 2009 as reported in the [New York Times](#) on-line, March 10, 2009

² Ibid.

³ Commission on Access, Admissions and Success in Higher Education, *Coming to Our Senses: Education and The American Future*, The College Board, 2008.

association (SHEEO) in their open letter to presidential candidates in fall 2008⁴ and by the Lumina Foundation in 2009.⁵ The Commission declared the goal “of ensuring that by the year 2025 fully 55% of young Americans are completing their schooling with a community college degree or higher.”⁶ SHEEO declared the goal: “To match today’s leading nations (Canada and Japan), 55 percent of our young adults must have an associate or bachelor’s degree.”⁷

After reviewing the same OECD data on tertiary education attainment, the Lumina Foundation specified the goal as “to increase the percentage of Americans with high-quality degrees and credentials from 39 percent to 60 percent by the year 2025.”⁸ (There has been some discussion that the date for the tertiary attainment goal should be 2020, a date we believe to soon to permit realistic achievement of the goal.) While 55% degree attainment would make the United States a world leader now, the trajectory of tertiary degree attainment across nations has been upward.

According to the Organization for Economic Cooperation and Development (OECD), in 2006 39% of its 25 to 34 age population in the United States had tertiary degrees. That contrasts to Japan with 54% tertiary attainment and Canada with 55%. While the United States is far above the OCED average of 26% in tertiary degree attainment, it is far below the leaders, Japan and Canada.⁹ Thus “world-leading” is the goal that both the Commission and SHEEO set. For the purposes of this paper we use the aggressive 55% degree attainment goal recommended by the Commission and SHEEO with the understanding that the large increase it entails may have to be revised upward if educational attainment in leading countries continues to increase.

Since the tertiary attainment goals were articulated, new data on tertiary attainment has become available from the U.S. Census for the year 2008 that demonstrates substantial increase in tertiary attainment, from the 39% that the OECD reported based on 2006 data to 41.57% in 2009. Degrees granted have also increased since 2006. Both of these changes reduce the gap between the United States and the leading nations and demonstrate that progress is already being made. Our estimates incorporate these changes. The table below summarizes the substantial changes in the underlying data.

⁴ “Second to None in Attainment Discover and Innovation: The National Agenda for Higher Education,” [Change Magazine](#), September – October 2008, pp. 42-49

⁵ “A Stronger Nation through Higher Education,” Lumina Foundation, February 2009.

⁶ Commission op cit, p. 1

⁷ “Second to None,” op. cit. p. 43

⁸ “A Stronger Nation,” op. cit. p. 3.

⁹ Education at a Glance 2007: OCED Indicators, Table A1.3a

Figure I: Change in Attainment and Degrees Awarded

	2006	2008
Tertiary Attainment of 25-34 age population	15,492,000 (39.24% tertiary attainment rate)	16,687,000 (41.57% tertiary attainment rate)
Tertiary Degrees Awarded	2,951,400	3,018,600 ¹⁰

According to the U.S. Census Bureau's estimates, the U.S. 25- to 34-year-old population in 2025 will number 46,115,948. Thus the target number for 55% tertiary attainment in 2025 is 25,363,771 ($0.55 * 46,115,948$). The additional number of tertiary degrees required to meet this attainment goal is 8,676,771 ($25,363,771 - 16,687,000$).

Tertiary degrees are the associate's, bachelor's, master's, professional and doctoral degrees. The table below shows the 2008 distribution of degree holders in the various categories. The census obtains the data by asking individuals to report the highest degree that they hold. Essentially all those who hold master's, professional and doctoral degrees also hold an associate's and/or a bachelor's degree. For someone holding one of these two degrees to obtain a higher degree does not increase tertiary attainment, as doing so merely shifts the entry for the individual from one of the first three degree categories in the table below to one of the last three categories. The total remains unchanged so tertiary attainment remains unchanged. With few exceptions tertiary attainment increases only when an individual is initially awarded an associate's degree or when someone who does not already hold an associate's degree is awarded a bachelor's degree.

Figure II: Tertiary Degree Attainment of the 25 to 34 Age Population in 2008 (thousands)

Age	Associate's degree, occupational	Associate's degree, academic	Bachelor's degree	Master's degree	Professional degree	Doctoral Degree
25-29	834	1,054	5,012	1,227	181	57
30-34	873	956	4,409	1,565	309	210

Based on limited data, we estimate roughly 10% of those holding bachelor's degree have previously received an associate's degree.¹¹ Of the 3,018,600 who received

¹⁰ Estimated number of degrees granted in 2007-08 from table 258, NCES.

¹¹ See for example, David Wright and Tara Goodman, "The Long and Winding Road: Student Progress Toward the Bachelor's Degree in Florida, presented at Southern Association Intuition Research

tertiary degrees in 2008, 699,000 received associate's degrees and 1,544,000 received bachelor's degrees. Using our 10% estimate for bachelor's recipients who already held associate's degrees, in 2008, 2,088,600 of the associate's and bachelor's degrees awarded increased the tertiary attainment of the population.

An Immediate and Targeted Goal

Thus, the effort has to be to increase the number of degrees that actually add to tertiary attainment if the goal is to be achieved. Above we calculated that 8,676,771 tertiary degrees must be acquired by the 25 to 34 age population by 2025 to meet the 55% tertiary attainment goal. Since the 25 to 34 age group has 10 single-year age cohorts within it, increasing the attainment of associate's and bachelor's degrees earned by each of the 10 cohorts by 867,677 will (assuming emigrants balance immigrants and deaths are relatively few) lead to achieving the 55% attainment goal. This addition would increase the number of bachelor's and associate's degrees awarded annually from the current level of roughly 2.1 million to 3 million.

The 2025 cohort of age 25 to 34 individuals is the 2010 cohort of 10- to 19-year-olds. Nearly the full range of interventions that ultimately increase the probability of earning a degree can be employed on the younger members of that cohort with maximum opportunity to increase their degree earning proclivity by the roughly 42% required to meet the goal. Those at the older end of the cohort already will have made the college enrollment decision. The interventions available to increase their degree earning rate will be restricted to just those that increase retention and graduation of already enrolled college students. Thus it is less probable the full increase could be achieved for the 18- and 19-year-old population than it is that the full increase could be achieved for the 10- to 13-year-old population. Nonetheless, finding the set of interventions that succeed in getting the younger members of the group to the target tertiary attainment level would put the country on course to achieve 55% attainment goal in the long run. What we are describing here is a gradual process that increases from the current level the number of degrees generated annually by roughly 867,000. Doing so will ultimately result in a total accumulation of 8,670,000 more 25- to 34-year-olds with tertiary degrees in the latter half of the 2020 decade. The country will be on target to reach the 55% tertiary attainment goal.

While this intermediate goal focuses only on associate's and bachelor's degrees, a larger number of students earning bachelor's degrees will produce more students clamoring to get into masters, professional and doctoral programs. Thus the initial cost of the effort to meet the 55% tertiary attainment rate by 2025 is the cost of producing 870,000 more associate's and bachelor's graduates per year; the long-term cost is likely to be the cost of producing at all degree levels some multiple of the number of additional associate's and bachelor's graduates per year as those receiving initial degrees return for further study.

Estimation of Enrollment Requirements and Costs

In the remainder of this paper we will focus only on the expansion of undergraduate enrollment, i.e. associate and bachelor's degrees. Assuming graduation rates remain unchanged, if enrollment increases by the same proportion as degrees must increase (42%) to meet the attainment goal, the degree production will follow. If that expansion is proportional to current undergraduate FTE enrollments the growth would be distributed across the higher education sectors as displayed in Figure III.

Figure III: Current Undergraduate Full Time Equivalent Enrollment and Additional Enrollment Required to Meet Goals

	2006 UG FTE	Additional UG FTE Required by 2025 for 55% Attainment
Public 4 year	1,934,989	812,695
Public Very High	1,258,049	528,380
Public High	867,798	364,475
Private 4-yr, nonprofit	1,221,200	512,904
Private Very High, nonprofit	229,574	96,421
Private High, nonprofit	160,185	67,278
Public 2 year	2,772,899	1,164,618
Private 2 yr, non profit	48,250	20,265
Private 4 yr, profit	342,604	143,894
Private 2 yr, profit	49,700	20,874
Total 4 year	6,014,399	2,526,047
Total 2 year	2,870,849	1,205,757
Total Tertiary	8,885,248	3,731,804

Source of current enrollment: IPEDS

These projections assume colleges and universities will be no more or less efficient at converting college enrollments into graduates in 2025 than at present. We believe that greater efficiencies are possible and that enrollment expansion of a smaller magnitude might be adequate to meet the 55% degree attainment goal. We expand on this belief later in this paper.

Figure IV provides the additional annual costs under the two scenarios. Scenario I calculates the additional full educational cost of attaining the goals using the actual full educational cost rates for the various providers. Scenario II calculates the additional cost using the full educational costs of the public institutions for both those institutions and for their private counterparts, e.g., the public 4-year, non-research university's cost is substituted for the private 4-year, non-research university's cost.

The additional annual full educational cost¹² of achieving the 55% goal is \$40.2 billion under Scenario II's public cost model and \$48.6 billion under the Scenario I actual cost model. To put these numbers in context, tertiary education institutions had total revenues (not just education related) of \$457 billion in 2005-06¹³ and state government appropriations to higher education totaled about \$77 billion in 2006.¹⁴

Figure IV: Annual Full Educational Cost of 2006 Dollars of Achieving 55% Age 25-34 Attainment Goal Using Per-FTE Student Cost for All Categories of Universities

	2006 Total UG Actual Cost	<u>Scenario I</u> Additional UG Actual cost 55% goal	<u>Scenario II</u> Additional UG Public Cost 55% Goal
Public 4 year	\$19,517,108,245	\$8,197,185,463	\$8,197,185,463
Public Very High	\$22,144,489,112	\$9,300,685,427	\$9,300,685,427
Public High	\$10,330,447,989	\$4,338,788,155	\$4,338,788,155
Private 4-yr, nonprofit	\$20,738,847,652	\$8,710,316,014	\$5,173,364,556
Private Very High, nonprofit	\$13,712,893,775	\$5,759,415,386	\$1,697,226,085
Private High, nonprofit	\$4,004,640,143	\$1,681,948,860	\$800,888,042
Public 2 year	\$21,262,589,532	\$8,930,287,603	\$8,930,287,603
Private 2 yr, non profit	\$730,167,250	\$306,670,245	\$155,392,020
Private 4 yr, profit	\$2,723,830,965	\$1,144,009,005	\$1,451,372,260
Private 2 yr, profit	\$601,917,470	\$252,805,337	\$160,061,832
Total 4 year	\$93,172,257,882	\$39,132,348,310	\$30,959,509,989
Total 2 year	\$22,594,674,252	\$9,489,763,186	\$9,245,741,455
Total Tertiary	\$115,766,932,134	\$48,622,111,496	\$40,205,251,444

These cost estimates are, as they are labeled, the educational costs incurred by colleges and universities for matriculated undergraduate students. The costs of getting a larger portion of the population ready for college that would be borne by elementary and secondary schools is not included; it is a significant cost and one that must be

¹² "Full Educational Cost" is the sum of Instructional, Academic Support, Student Services and Institutional Support expenditures.

¹³ Snyder, T.D., *Mini-Digest of Education Statistics*, 2008, (NCES-2009-021) NCES, Institute of Education Sciences, U.S. Department of Education, pp. 47 to 49.

¹⁴ SHEEO, SHEF <http://www.sheeo.org/finance/shef/2008%20tables/SHEF%20Data%201997-2007%20by%20state%20in%20current%20dollars.xls>

borne. The ability to increase tertiary attainment to 55% will depend both on the success of our colleagues in primary and secondary schools in ensuring readiness for college, as well as college and university efforts once the students matriculate.

Is it possible to achieve such a large increase? In short, the answer is “yes,” though not without great effort. We come to this conclusion because the United States has sustained periods in the past when proportionate increases in higher education enrollment were at or above the rates required to meet these goals. To meet the tertiary degree production goals with no change in graduation rates or related factors, annual higher education enrollment must grow by 3.7 million FTE students or by 35.7% during the next 15 years. Context within which the possibility of reaching these goals can be evaluated is found in the record of the last 60 years.

Figure V:

Year	College Enrollment (head count)	Growth Over Prior 15 Years	Compounded Annual Growth Rate	Proportion of the Population Age 20 to 21 in School
1947	2,311,000			10.2%
1962	4,208,000	82%	4.08%	23.0%
1977	11,546,000	174%	6.96%	31.8%
1992	14,035,000	21.6%	2.71%	42%
2007	17,232,000	22.8%	1.38%	48.4%

Source: U.S. Bureau of the Census, School Enrollment: Historical Tables, Table A-6. Age Distribution of College Students 14 Years Old and Over, by Sex: October 1947 to 2007 and School Enrollment -- Social and Economic Characteristics of Students: October 1991 (P20-469), and Table A-2. Percentage of the Population 3 Years Old and Over Enrolled in School, by Age, Sex, Race, and Hispanic Origin: October 1947 to 2007

During this 60-year period, college enrollment grew 646%. During two of the four 15-year sub-periods, enrollment grew more than 35.7%, the growth rate that would be required to achieve the 55% tertiary achievement goal within the next 15 years. Interestingly, the greatest proportional growth period was not triggered by the GI Bill of Rights period that began in 1947, but in the subsequent 1962-77 period when enrollment grew an astounding 174%. During that sub-period enrollment grew by nearly 7.4 million students, more than the 6.6 million that will be necessary to meet the 55% target during the next 15 years. Enrollment growth has stabilized at around 22% growth in each of the last two 15-year periods.

Over the 60-year period the compounded annual growth rate of college enrollment has been 3.41%; over the last 30 years it has been 1.34%. To achieve the growth in degree production required to reach the 55% tertiary attainment goal in the

next 15 years college enrollment would have to grow at a compounded annual growth rate of 2.37%. Thus the rate of growth necessary to achieve the 55% attainment goal is below the growth rate of college enrollment of the last 60 years, and far less than half of our fastest growth rate period, 1962 to 1977.

We have lost momentum during the last 30 years, a period when our annual compound growth in college enrollment has been only 1.34%. As one approaches an absolute limit, the rate of growth necessarily slows. The absolute limit here is reached when 100% of the college age population is in college. Between 1947 and 2007 the proportion of the prime college age group, 20 to 21 year olds, attending college grew from 10.2% to 48.4%. There have been significant increases for every group over time as illustrated in Figure VI that examines college enrollment by race/ethnicity of high school graduates.

Figure VI

	Total	Black, non-Hispanic	Hispanic	White, non-Hispanic
% of Recent High School Completers Enrolled in College in 1973	46.6%	32.5%	54.1%	47.8%
% of Recent High School Completers Enrolled in College in 2006	66%	55.5%	60%	68.5%

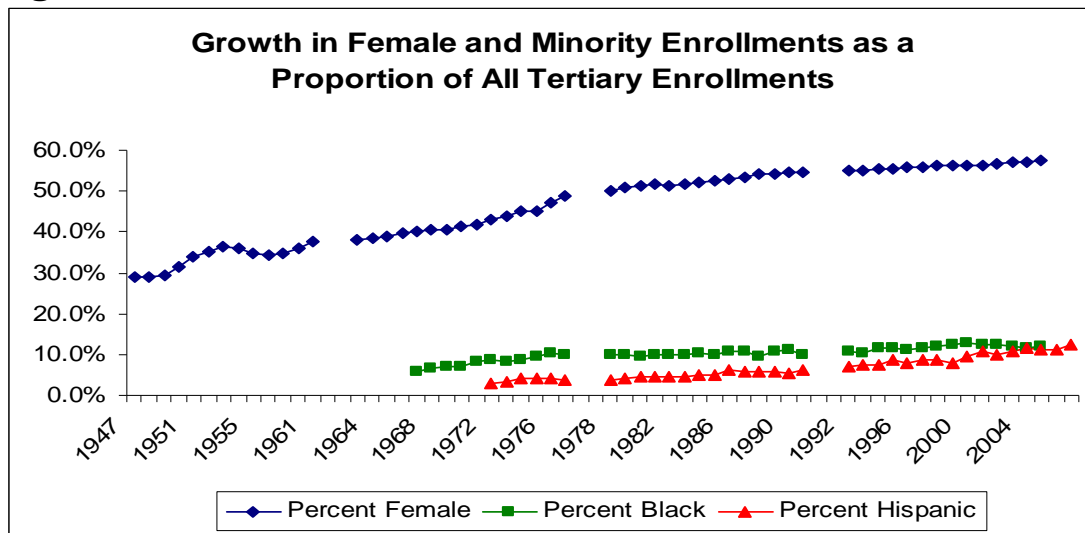
Source: Digest of Educational Statistics, 2008, Table 192

Clearly, we are closer to the 100% limit than we were in 1973 but are still quite some distance from it. The 66% of recent high school graduates who enroll in college the next fall dwindles to only 48.4% of 20- to 21 year-olds who remain enrolled in college, so less than half the population is pursuing a degree roughly one year after high school graduation. A bit more than 55% of the 20- to 21-year-old population would need to be in college in an equilibrium state when the 55% degree attainment goal is reached, assuming that population growth is modest and most of those who remain enrolled at the end of their sophomore year earn a degree.

The overall proportion of high school graduates enrolling in college can and should grow significantly higher as college attendance by minority students is still significantly below that of white students. Increasing minority participation to the level of majority students would increase significantly enrollment levels. From a social equity point of view, we know that the gap between minority and majority students should continue to shrink as it has over the years covered in Figure VII. In that regard, note in Figure V the path that female enrollment has taken over the last 60 years. The greatest rate of growth occurred during the two early, robust enrollment growth periods.

Enrollments of Blacks and Hispanics were low as a proportion of all college students in the most rapid enrollment growth periods (and data on them was not consistently recorded in national statistics during part of this period). Growth for Blacks and Hispanics has been steady since the late 1960s but no rapid growth period equivalent to that enjoyed by women in the 1950-70s has occurred. As a result both Blacks and Hispanics remain less well represented in the college population than in the general population. We believe that the effort to increase enrollment to meet the tertiary attainment goals would create the opportunity needed for both of these groups to expand rapidly their penetration into higher education, just as the earlier rapid growth periods permitted women to expand their participation. Societal roadblocks to access have eroded over the years so participation should increase rapidly as enrollment increases.

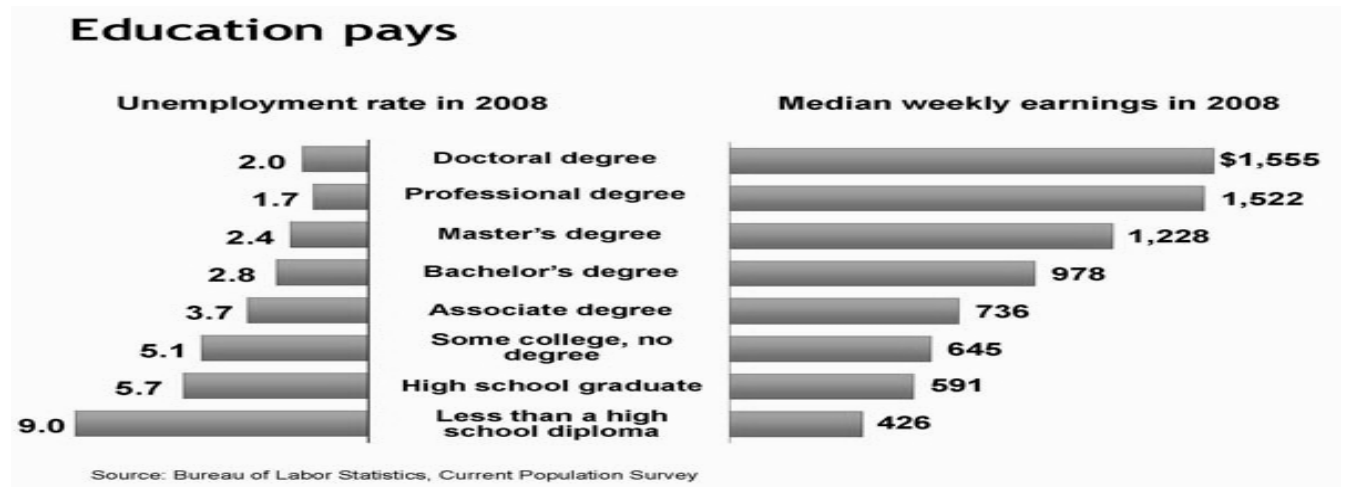
Figure VII



Source: US Census Bureau - School Enrollment, College Enrollments by Race
<http://www.census.gov/population/www/socdemo/school.html>

The fact that other countries have surged ahead of the United States in tertiary attainment clearly means that advanced economies productively can utilize higher proportions of individuals holding higher degrees. Basic signals in our market continue to demonstrate the demand for individuals holding higher degrees. This demand is illustrated by the Bureau of Labor Statistics figure below. Those with higher degrees both earn more and experience less unemployment. These are strong signals that labor market participants are rewarded for earning degrees.

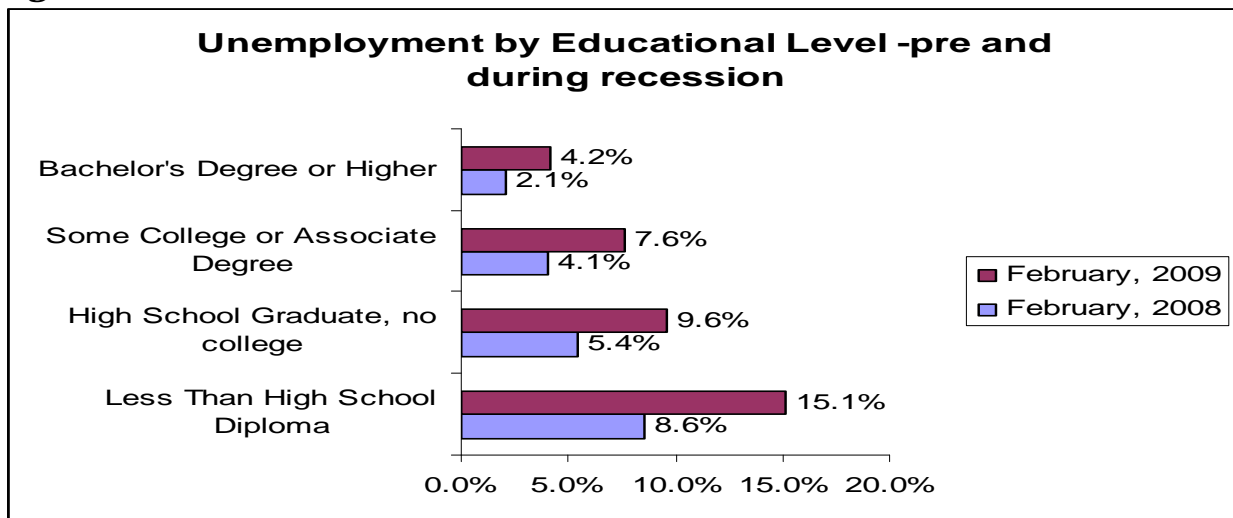
Figure VIII



Source: <http://www.bls.gov/emp/emptab7.htm>

While we have learned from recent experience that nothing is recession-proof, the data in the table below clearly demonstrate that the rapidly worsening economy during the last year treated those with higher degrees far better than those without them.

Figure IX



Source: U.S. Bureau of Labor Statistics, 2009

Paul Osterman examined thoroughly the question of whether our labor market can accommodate a major increase in college degree holders from many perspectives. Osterman's summary of his findings is worth repeating here at some length to demonstrate the factors he considered:

The economic case for expanding higher education is strong . . . there has been a long-term trend for the U.S. economy to require more skill in its labor force. This shows up in the pattern of wages over time, but there is also more

direct evidence. Occupational projections as well as observations of work organization and technology point in the same direction. Fears that education is a signaling device with no productivity implications are allayed by the observation that the productivity of cities and regions is tied to the educational level of their residents as well as by the experience of the open admissions policy at the City University of New York. To top it off, the supply of college-educated employees is stagnating due to enrollment trends, and this creates both a need and an opportunity to intervene.¹⁵

Osterman's overall conclusion is that "it would be good public policy to expand access to higher education."¹⁶ That is also our conclusion. What it would cost to do so?

FACTORS AFFECTING THE ACTUAL COST OF INCREASING TERTIARY DEGREE ATTAINMENT TO 55%

We utilized "full educational cost per FTE" as the appropriate measure of additional cost in developing the estimates in Figure IV. Full educational cost is essentially the average direct cost of educating a student. The cost to build or buy new facilities is not included in this measure, so we are implicitly assuming that expansion of the magnitude needed can be accomplished with existing facilities. A decision to include the cost of new facilities in the enrollment cost estimate would increase the cost considerably.

We do not include the cost of new facilities for two reasons. First, capital for new facilities often comes from non-operating budgets of states or foundations rather than the operating budgets of universities. Indeed, facilities such as residence halls and cafeterias tend to be budgeted as auxiliaries, with users paying the cost of new construction. It is traditional to employ direct educational costs only when considering changes such as this. Budgeting considerations, however, do not mean that real costs are not involved if facilities expansion is required.

Second, we did not include facilities expansion costs because some part of enrollment expansion can be accomplished by more fully utilizing existing facilities. Expanding classroom utilization from the traditional 30 hours per week by scheduling more night classes and weekend classes can effectively double classroom space. Laboratory usage can be expanded in the same manner on many campuses. Distance education techniques can largely eliminate the need for physical facility expansion. Even if the need for new educational facilities is minimized, the huge unfunded backlog of past-due maintenance and building repairs will require large capital expenditures if existing facilities are to remain serviceable.

¹⁵ Paul Osterman, "College for All, the Labor Market for College Educated Workers," Center for American Progress, 2008 p. 24

¹⁶ Ibid.

In a period in which national need motivates universities to increase enrollment, such economies will be realized, just as they were during the 1947 to 1976 period of rapid enrollment growth. This, of course, implies expansion of enrollment at existing universities rather than establishment of entirely new ones. There are many techniques that are successfully employed to make large universities seem small, e.g., scheduling groups of students into several common courses as a learning community. Research universities and the systems to which they belong should consider expansion of enrollment on existing campuses as a cost-effective means of enrollment expansion.

Many additional considerations affect the actual costs of attaining either goal. We evaluate three of them here:

1. How should additional student enrollments be distributed across degree categories?
2. How should one estimate the aggregate cost of increasing college enrollment to achieve the attainment goal?
3. Are there viable efficiencies that might reduce the cost of reaching the tertiary attainment goal below that of our Figure II projections? Because the differences among higher educational institutions are vast, the efficiencies accessible to one university may not be accessible or appropriate to another.

1- How should additional student enrollments be distributed across degree categories?

We favor letting this decision be made by students. While the existing distribution of students across degree categories is affected by subsidies that reduce the cost of education to students in various categories of institutions, we see no valid reason to intervene further by effectively making choices for students that limit their range of study options or type of institution.

Unless students themselves decide not to attend these institutions, we are persuaded that the proportion of degrees granted by research universities should remain at its current level or increase. We suspect that in the “flat world” described by Thomas Friedman,¹⁷ students, either graduates or undergraduates, will be even more inclined to attend research universities. Public policy should emphasize forcefully to well-prepared students the benefits of the research university education to them and the country.

Undergraduate students enrolled in a research university have experiences that differ on many dimensions from those of students attending other types of institutions. The campuses contain laboratories and research facilities; libraries and computing resources are generous; and a very wide variety of majors and minors are available. Such an environment is ideal for educating the able and curious student as their options are so numerous and so diverse.

¹⁷ Thomas Friedman, The World is Flat, Farrar, Straus and Giroux, 2005

Because research by definition is at the cutting edge of knowledge, the environment provided by research universities places students in a milieu that immerses them in technology, intellectual arguments and global issues that those who attend educational institutions with less rich environments may not experience until well after graduation. Student exposure to faculty, whose research keeps them aware of the world-wide breadth of knowledge, while being seated beside classmates from all over the world, is the ideal educational recipe for keeping this country internationally competitive. While the research university environment may not be best for every undergraduate, in today's global economy, it is critical the research university environment educate a significant proportion of this country's graduates.

The economics of graduate education are intertwined with undergraduate education at research universities in such a way that one is dependent on the other. Faculty who are active in research in the full range of disciplines needed for both graduate and undergraduate education can be found primarily in research universities. The faculty cadre of the size required to produce this nation's research could not be supported outside of the research university environment. While the ratio of undergraduate to graduate students is highly variable, even at research universities, the complementarity of the two levels of education in the same institution is undeniable.

Clearly the need for research grows as we seek to be more competitive among the world's nations. The research university, with its necessary complement of graduate and undergraduate students, must grow apace with that need for research. More than \$30 billion in federal science research expenditures are directed to public and private research universities annually. The resolve of Congress to fund increases in research was further demonstrated again during both the economic stimulus exercise and the funding of the 2009 budget.

Public research universities not only award a large proportion of all U.S. degrees but the areas of study they offer corresponds with national needs as formally identified by the U.S. Department of Education. Because many public research universities were born out of the Morrill Act, which specified that each state should contain "at least one college where the leading object shall be, without excluding other scientific and classical studies and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts," they, by design, provide education in fields that correspond to societal demands.

Public research universities produce nearly 90% of all the U.S. doctoral degrees in natural resources and conservation and 60% to 80% of the doctoral degrees in computer and information sciences, engineering, foreign languages and linguistics, mathematics and statistics, physical sciences and security and more than 92% of all the doctoral degrees in agriculture. Indeed, they generate more than 50% of the doctorates produced in the United States in 11 of the 13 national needs categories.¹⁸ The United States would be sorely disadvantaged if the massive proportion and large number of

¹⁸ Data on the proportion of national need degrees granted is Computed by DAS-T Online Version 5.0 on 2/25/2009 from IPEDS (2006)

quality doctorates supplied in national needs areas by public research universities were jeopardized.

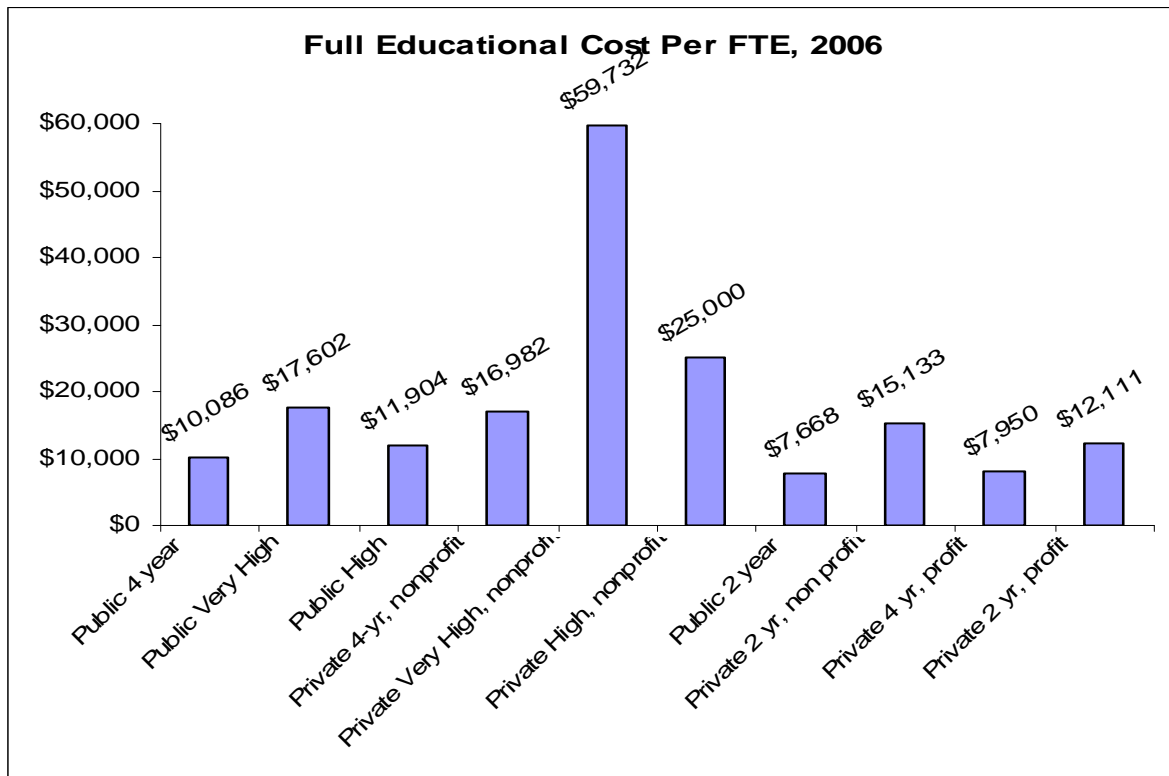
At the baccalaureate level, public research universities account for 78% to 95% of the bachelor's degrees produced by all research universities in each area of national need, including over half of all the U.S. bachelor's degrees in natural resources, conservation and engineering. The 9,612 engineering bachelor's degrees they grant annually represent 61% of the nation's entire annual production. Given the strong science background of these universities, the 2,295 education degree recipients produced by public research universities are arguably in the best position to help correct the deficiencies in our science and math primary and secondary education systems. Public research universities also produce 45.5% of the nation's foreign language graduates and 81% of these graduates from all research universities. Clearly public research universities contribute at a scale that could not be replaced from other sources.

Research universities make opportunity available to all U.S. citizens. More than 800,000 minority students attend public research universities while just over 182,000 attend private ones. Low-income students also are well represented among research university students. Approximately 596,000 Pell Grant recipients attend public research universities while about 63,000 attend private research universities. More than 26% of the students at the average public research university and 15% of the students at the average private research university are Pell Grant recipients.¹⁹ Thus research universities touch every segment of the student population.

But isn't research university education too costly to be a real player in the effort to substantially increase total enrollment? Given the massive scale of the increase required to meet the tertiary degree attainment goals, it is perhaps natural to suggest that the decision about where enrollment increases occur should be made on the relative cost of educating students. Figure X demonstrates the variation in full educational costs per FTE student across the various providers of higher education. (The Appendix provides detail, rationale and implications of using "full educational cost" to compare institutions and to estimate the cost of attaining the tertiary goals.) The range of cost at the most expensive set of institutions is nearly 7.8 times the level of the least expensive set of institutions.

¹⁹ Source: IPEDS 2005; EdTrust College Results (www.collegeresults.org)

Figure X



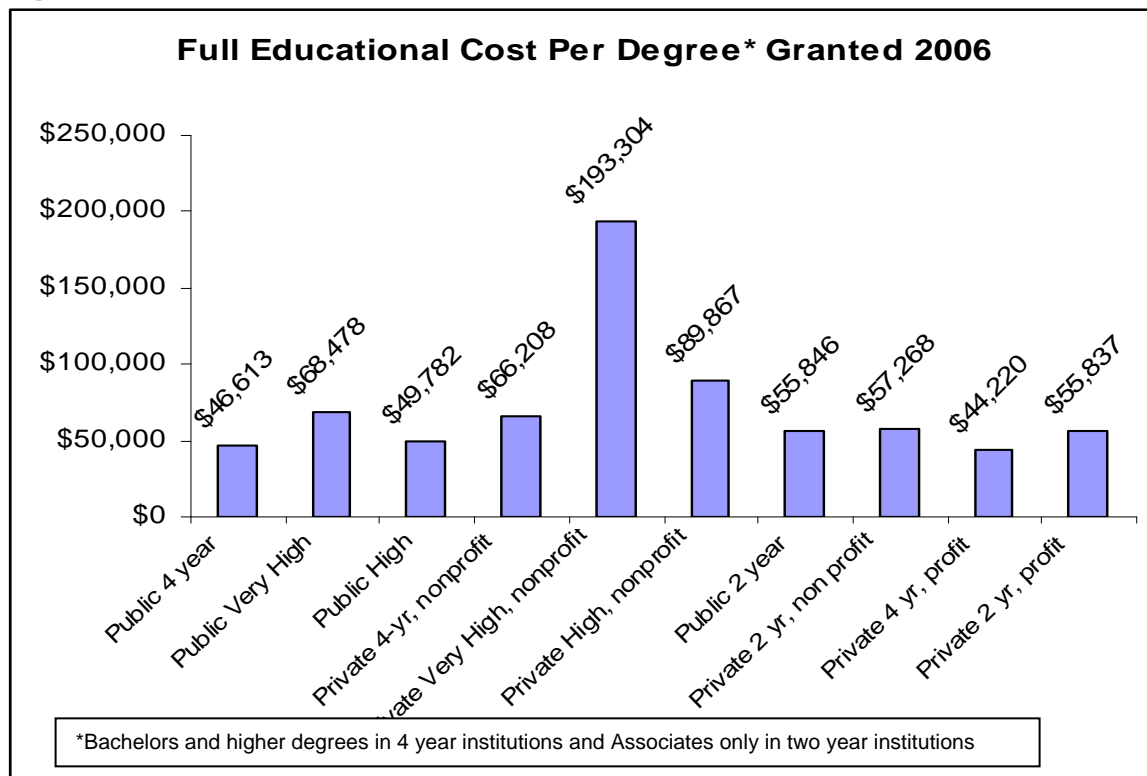
Source: calculated from IPEDS

The quality of instruction cannot be gleaned from this data. There are no generally accepted measures of the quality of educational programs or of the outcomes from those programs. All that can be surmised legitimately from the data in Figure X are the differences in cost of providing educational services across institutions; no data-informed inferences can be drawn about instructional quality.

Cost per degree granted (rather than per student enrolled) is an alternative, and we think better way to examine cost. This is particularly so in this case as the objective set forth by the Commission on Access, Admissions and Success in Higher Education, SHEEO and Lumina is to increase the number of *degrees* held by the target population; not to increase the number of *students enrolled* in college. Cost per degree is simply full educational cost in a given year divided by all degrees conferred by the institution in that same year. That data is displayed in Figure XI.²⁰

²⁰ We note that the Delta Cost Project's, [Trends in College Spending](#) 2009 calculation computes this cost per degree metric for the years 1995, 2002, 2005 and 2006. Across these years the relative rankings of the various educational providers does not vary from that in Table IX.

Figure XI



Source: Calculated from IPEDS

If one judges categories of higher education providers by the cost per degree granted, public universities as a group are clearly the best buys when they are compared directly with their private counterparts, i.e., very high research publics with very high research privates or public four-year and master's with private four-year and master's. Interestingly, the public very high research institutions with many expensive doctoral programs in their degree mixes have about the same cost per degree as do the non-research private 4-year and master's universities which offer very few doctoral programs. The most startling cost per degree comparisons are between the public high and very high research universities whose degree programs are up to 10 years in duration with the community colleges whose degree programs are designed to be only two years in duration. Despite the degree mix of bachelors to Ph.D.s and law to medicine degrees they offer, very high public doctoral programs cost only \$11,600 more per degree and public high research universities are \$7,000 less expensive per degree than are community colleges that predominately offer 2-year associate degrees.

The same caveat as applies to full educational cost per student applies here, i.e., the cost is an average over all the various types of degrees granted by the institution. But there is another qualification that must be listed; the calculation implicitly assumes that all students at an institution intend to earn a degree. Institutions with low degree completion rates, other things being equal, have higher cost per degree. Community colleges often note that this calculation disadvantages them as portions of their students enter without the intent of earning a degree. Recent research, however, suggests that even among those community college students who have expressed their intention to

earn a degree, the probability of doing so for those who begin their initial enrollment at a community college is markedly lower than if the student initially had entered a four year institution.²¹

In fairness, a portion of community college students who transfer to a four-year institution do so prior to completion of the associate's degree. Such students inflate the calculated cost per degree at the community college while reducing it at the four-year institution from which they earn the degree.

Thus, while we do not recommend that it be a controlling consideration in deciding how best to expand academic programming to meet these tertiary attainment goals, we note with some pride that public research institutions, taken as a group, maintain the lowest cost per degree while offering degrees such as the Ph.D. that require much prolonged individualized instruction. Clearly an advanced research-based economy such as this one can provide the type of education needed to promote innovation without incurring excessive cost to do so. Those who argue that we cannot afford research university education²² simply are not informed on actual cost per degree.

2- How should one estimate the aggregate cost of increasing college enrollment to achieve the attainment goal?

The question here arises from the "who should pay" issue. We must raise this issue because of the enormous variation in full educational cost per student that we illustrated in Figure X. In Figure IV above we presented the cost of additional enrollment needed to attain the goals under two scenarios. Scenario I calculated the additional full educational cost of attaining the goals using the actual full educational cost rates for the various providers we listed in Figure X. Scenario II calculates the additional cost using the full educational costs of the public institutions for both those institutions and for their private counterparts, e.g., the public four-year, non-research university's cost is substituted for the private four-year, non-research university's cost.

We made these counterfactual substitutions for much the same reason that the new GI Bill was written to grant tuition to veterans at the highest rate charged by a public university in their home state, rather than at the rate charged by the private university they might attend. Public institutions are an available, low-cost resource for accomplishing the national goal of providing higher education to returning veterans. While the legislation did not require returning veterans to attend public institutions, it specified that veterans are to be reimbursed for their higher education expenses on the

²¹ Bridget Terry Long and Michal Kurlaender, "Do Community Colleges Provide a Viable Pathway to a Baccalaureate Degree?" NBER working paper #14367, September 2008, pp. 16-18

²² For example see Tamar Lewin, "State Colleges Also Face Cuts in Ambitions" New York Times, March 16, 2009 online edition in which the following text appeared: "It may be that the idea of a 100,000-student research university was never very sustainable," said Patrick M. Callan, president of the National Center for Public Policy and Higher Education, which promotes access to higher education."

basis of the inexpensive alternative that is readily available to them,²³ public higher education, rather than at more expensive private university tuition rates.²⁴

Figure IV (above) estimates the additional annual costs under the two scenarios. To recap its totals, the additional cost of achieving the 55% goal is \$40.2 billion under Scenario II's public cost model and \$48.6 billion under the Scenario I actual cost model.

If one were to decide that the cost of the additional education needed to meet the goals were to be distributed as it is currently and also paid for in the same way, Scenario I is appropriate. Students, endowments, states and local governments would then be expected to increase their expenditures for tuition and educational subsidy by the additional 42% required. This, of course, assumes that each of the actors was financially able to do so and would choose to do so. Given that an expansion of the college-going population should include more minorities and individuals from low-income families, it is doubtful if the full expansion of enrollment contemplated here could be accomplished without further subsidy, probably from the federal government.

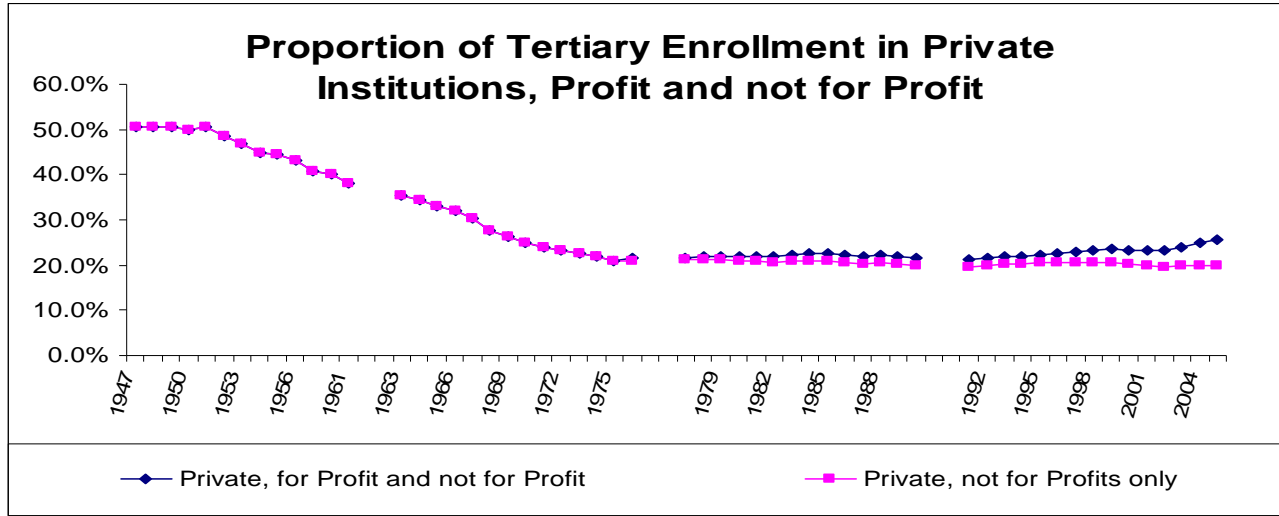
Reliance on the federal government to fund a significant portion of the expansion probably would involve careful scrutiny of the size of subsidy. That would likely mean that consideration would be given to adopting Scenario II's GI Bill of Rights-like public costing methodology.

Rapid expansion of tertiary education in the past has largely been expansion of only public tertiary education. Figure XII shows this history. During the two periods of most rapid tertiary enrollment expansion, the proportion of students educated in private institutions fell from 51% of the total to 21% as publics expanded while privates largely did not. We suspect that the same factors that resulted in the relative decline of private education in past periods of rapid growth will be present between now and 2025. If this is the case, establishing the cost of increased enrollment by the public model is entirely appropriate as almost all the enrollment growth likely will be in the public sector of higher education.

²³ Congress does permit additional payment to private schools veterans attend if the universities join the "yellow ribbon" program: "The Yellow Ribbon GI Education Enhancement Program (Yellow Ribbon Program) is a provision of the Post-9/11 Veterans Educational Assistance Act of 2008. This program allows institutions of higher learning (degree granting institutions) in the United States to voluntarily enter into an agreement with VA to fund tuition expenses that exceed the highest public in-state undergraduate tuition rate. The institution can waive up to 50% of those expenses and VA will match the same amount as the institution." http://www.gibill.va.gov/School_Info/yellow_ribbon/index.htm

²⁴ In all cases except for the private 4-year, for-profit college, the cost of the public alternative is lower than that of the private. In the case of the 4-year, for-profit universities, the cost per degree is about the same as it is in their public counterpart; their lower cost per FTE is offset by their very low graduation rates.

Figure XII



SOURCE: U.S. Department of Education, National Center for Education Statistics, *Biennial Survey of Education in the United States; Opening Fall Enrollment in Higher Education, 1963 through 1965*; Higher Education General Information Survey (HEGIS), "Fall Enrollment in Colleges and Universities" surveys, 1966 through 1985; and 1986 through 2005 Integrated Postsecondary Education Data System, "Fall Enrollment Survey" (IPEDS-EF:86–99), and Spring 2001 through Spring 2006

On the projection of costs into the future: Over the period 1989-90 to 2004-05, full educational expenditure per student essentially has been stable in public research universities and public associate’s institutions and has increased at significant rates in the private sector institutions. Details are in Figure XIII.

Figure XIII: Annual Rate of Increase in Full Educational Cost

	Public Research ²⁵	Public Master’s	Public Associate’s	Private Research	Private Master’s	Private Bachelor’s
Annual Rate of Increase in Real per FTE Full Educational Cost 1998-2004-2005	0.2%	3.4%	0.3%	4.5%	10.9%	6.1%

Source: Delta Cost Project, 2008, Median #/FTE, from 19 year matched set.

²⁵ This is the set of institutions classified by the Carnegie Foundation as “research” according to their year 2000 definitions. When grouped by the more precise 2005 definitions the 1987-2006 rate of increase in real full educational cost of public very high research universities was .84% per year; for private very high research universities, 3.88% per year; for high public research universities, .84% per year and for high private research universities, 2.48% per year.

Given the public-cost scenario above, and the large proportion of students enrolled in public research universities and public community colleges (75% of the total), what happens to educational cost in public institutions is most relevant to the projection of overall educational cost into the future. Based on the cost increase data for the last 20 years, our assumption is that real full educational cost per FTE in public higher education institutions during the next 15 years will be little changed from the 2006 figures. Market or regulatory forces may or may not cause a convergence between the rates of increase in private and public university educational cost increases, but the option implicit in Scenario II makes what happens to private educational costs largely irrelevant to this discussion. Thus the present value of the additional annual cost for a higher education system that enables this country to meet a 55% tertiary attainment goal are the numbers provided in Figure II above.

One reasonably assumes a ramping up of the scale of the system in an orderly fashion during the 15-year period so the full additional annual cost in Figure II would not be experienced until 2025. The cost estimates in Figure IV are based on the efficiencies present in the existing higher education system. Below we explore whether greater efficiency can be achieved.

3. Are there viable efficiencies that might reduce the cost of reaching the tertiary attainment goal below that of our Figure IV's projections?

Clearly, the answer is "yes." The two key assumptions made in producing the cost estimate are not immutable. Assumption I: The cost estimates to achieve the tertiary attainment goals we provided above assumed that the ratio of degrees produced to students attending college remains unchanged. That ratio could be altered by increasing the proportion of college beginners who receive degrees or by increasing the speed by which college matriculants complete degrees. Assumption II: Our cost estimates in Figure IV assumed that the cost of providing instruction remains unchanged. If that assumption is relaxed, the increase in cost required to achieve the attainment goals could be a fraction of the figure's total.

Can Assumption I be relaxed?

The overall six-year graduation rate for the cohort of students beginning college in 2000 for four-year baccalaureate granting institutions was 57.5%. For two-year schools, the graduation rate overall was 32.3%.²⁶ Theoretically, graduation rates could be raised to such a level that the tertiary attainment rate of 55% could be achieved *without increasing the number of Americans who enter college* by improving the success of those who do attend. Such large increases, particularly at the bachelor's degree level, probably are not attainable as it appears that approximately ten percent of students who begin a bachelor's degree in one university complete that degree in another. That means that the *system* of higher education has a graduation rate that may

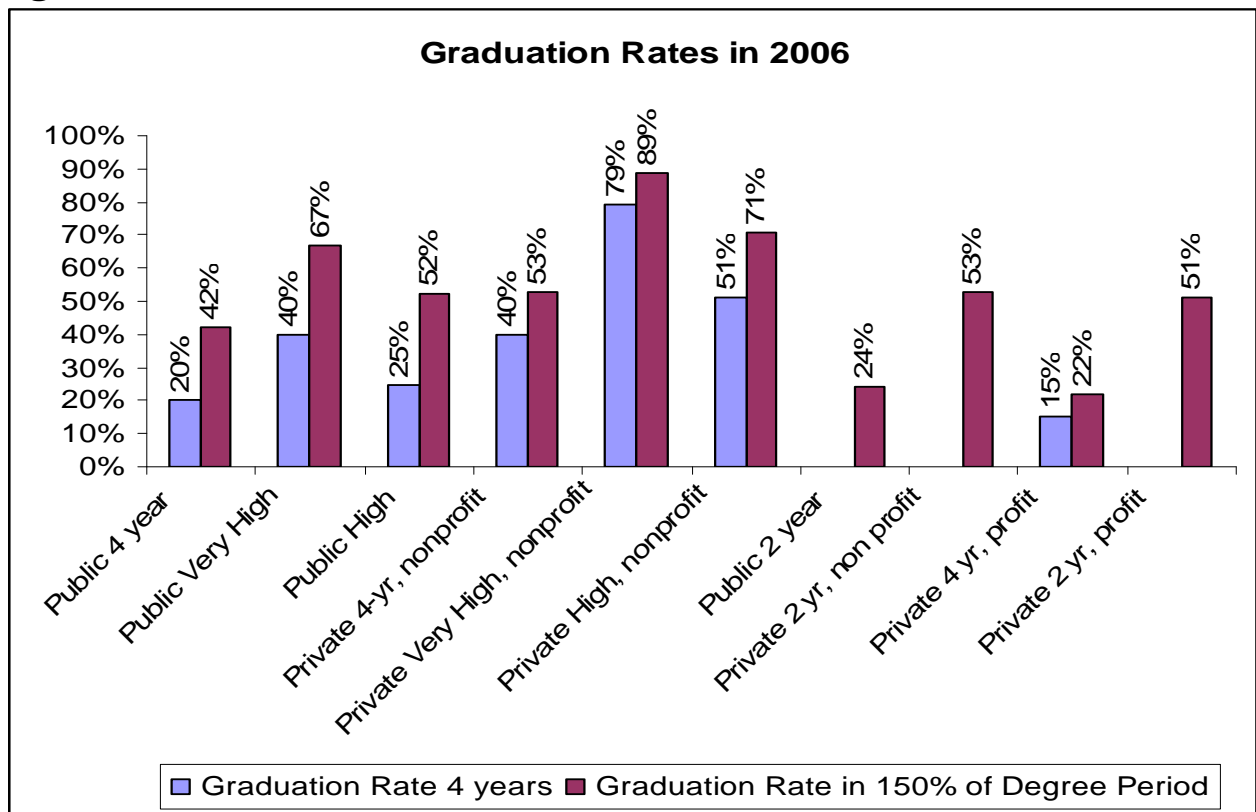
²⁶ Enrollment in Post-Secondary Institution, Fall 2006; Graduation Rates' 2000 and 2004 Cohorts; and Financial Statistics, fiscal year 2006, NCES, U.S. Department of Education, (NCES 2008-173) June 2008, p. 10

be sixty-eight percent or more. To the extent that graduation rates can be increased, the cost of reaching a 55% attainment goals is below Figure II's estimates.

Figure XIV provides the four- and six-year graduation rates for institutions offering the bachelor's degree and three-year graduation rates for those offering the associate's degree. Clearly there is room to improve both four- and six-year graduation rates. Achieving a 94% overall six-year graduation rate is unrealistic as many students enter tertiary education woefully underprepared and unmotivated, but the low six-year graduation rates found in most institutional groups can and should be improved.

The most dramatic efficiency improvement would come from enhancing four year graduation rates. Perhaps it is feasible to double the four-year graduation rates that currently range from 20% to 40% except in the private research universities. Doing so would permit achievement of the tertiary achievement goal without increasing the size of the college-going cohort.

Figure XIV



Source: IPEDS

Graduation rates vary directly with institutional selectivity and family income. They also differ significantly by race.²⁷ The least expensive and surest way for a

²⁷ For a full discussion of variation of graduation rates with these variables see "Placing Graduation Rates in Context," NCES, U.S. Department of Education, October 2006, NCES 2007-161 <http://nces.ed.gov/pubs2007/2007161.pdf>

university or community college to increase its graduation rate is to increase its selectivity. Low-income and minority students are generally underrepresented in both the populations of college students and college graduates and efforts by higher education institutions to increase selectivity by focusing admission on those most likely to graduate would reduce their participation in both populations still further.

Efforts to increase overall graduation rates must either focus on the processes within higher education institutions or in the preparation to attend college that occurs in high school or earlier. Education Sector, in their 2008 publication *Graduation Rate Watch: Making Minority Student Success a Priority*, identified a number of colleges and universities that have generated minority graduation rates that are above those of their majority student population. They focus on Florida State University and describe its effort over time that led to dramatic increases in black student graduation. The result of those efforts was achievement of a 2006 black student graduation rate that was a full three percentage points above that of white students.²⁸

Over the last decade the National Collegiate Athletic Association purposely targeted increasing the graduation rates of student athletes. By 2008 the collective efforts of NCAA schools produced a Division I student-athlete graduation rate of 64 percent, the highest rate ever for this group of students and a rate that is two percentage points higher than that of the general student body. The rate was two percentage points higher than in 2007 and up four percentage points over the past seven years.²⁹ Concerted efforts have improved graduation rates for minority and majority students and for specific populations like student athletes. Both four- and six-year graduation rates can be improved over time by diligently working on internal university processes.

Lack of preparation or inappropriate preparation of high school students for college combined with lack of information about appropriate preparation was identified as a major barrier to increasing participation for and success in college by the Commission on the Future of Higher Education. The Commission's first recommendation in their final report was addressed to this finding:³⁰

“We propose to dramatically expand college participation and success by outlining ways in which postsecondary institutions, K-12 schools systems, and state policymakers can work together to create a seamless pathway between high school and college. States’ K-12 graduation standards must be closely aligned with college and employer expectations and states should also provide incentives for postsecondary institutions to work actively and collaboratively with K-12 schools to help underserved students improve college preparation and persistence. While better high-school preparation is imperative, admitted students and colleges themselves must jointly take responsibility for academic

²⁸ “Graduation Rate Watch: Making Minority Student Success a Priority,” Education Sector, 2008, pp. 4 to

6

²⁹ http://web1.ncaa.org/app_data/gsrAggr2008/1_0.pdf

³⁰ “A Test of Leadership,” Commission on the Future of Higher Education, U.S. Department of Education, 2006

success. Improving the information about college available to students—and reducing financial barriers to attendance . . . are also crucial to improving access.”

Numerous efforts are underway now at state and national levels such as the American Diploma Project³¹ to achieve greater curricular alignment. A great many colleges are working directly with school districts to improve articulation. Likewise many pilot programs are addressing the quality of instruction high school students receive. These efforts to produce alignment are difficult inherently because the thousands of local school boards that control vital facets of the high school curriculum and experience, as well as the 50 state education departments, do not have a structured relationship with the several thousand institutions of higher education in this country.

The United States does not have a Ministry of Education dictating alignment between high school and college curricula. That “lack” is generally conceded to be in our favor in that it has permitted the great experiment that is American education (with its “thousand flowers blooming”) to produce what is considered to be the world-class higher education system and what until recent years was generally thought to be a satisfactory primary and secondary education system. But this lack of structure and connectivity now obligates higher education to work aggressively with their secondary education counterparts in the absence of a guiding structure to produce much needed alignment on a national level.

Our projections implicitly assume that the ratio of graduate to undergraduate students remains unchanged as enrollment grows. Since undergraduate education is far less expensive per degree or per student than graduate education, reduction in the ratio of graduate to undergraduate education would reduce costs below those in our projections. While we do not know whether such a reduction is wise, it is at least a variable that should be considered. Figure XV displays the data on the variation in the graduate/undergraduate ratio among both public and private very high research universities in 2006.

Figure XV

	Mean Ratio of Graduate to Undergraduate Enrollment	Standard Deviation	Coefficient of Variation	Maximum Ratio Graduate to Undergraduate	Minimum Ratio Graduate to Undergraduate
Very High Public	0.31	0.13	0.42	0.90	0.10
Very High Private	0.86	0.53	0.62	0.29	2.45

Source: Calculated from IPEDS

The coefficient of variation for both public and private universities is quite high and the range from minimum to maximum ratios is large. Clearly, research universities can and do operate with a large range of graduate to undergraduate ratios. Rather than simply replicating the existing ratio as universities expand total enrollment, it would be

³¹ See the web description of this impressive project at <http://www.achieve.org/>

well to look to the labor market to determine prospectively the relative need for those receiving the various graduate and undergraduate degrees the institution offers. Variation in that ratio could either increase or decrease costs from those estimated.

Can Assumption II be Relaxed?

The primary exhibits here are our Figures X and XI that demonstrate the enormous differences in cost per FTE and per degree granted across groups of higher education institutions. The actual range of cost is, of course, even greater if the focus of examination is the individual institution rather than group averages. There is almost always some institution with a lower cost per FTE or per degree than one's own institution. With such a wide-ranging cost structure there ought to be many less expensive institutions that produce educational products of equal or higher quality those other schools might emulate. There are two barriers to such imitative behavior: a) we have no agreed upon measures of quality and b) our complex cost structures do not enable a sufficiently sophisticated understanding of cost at the program level to permit optimal management.

a) Measurement of Quality: The Lumina Foundation in its 2009 monograph, *A Stronger Nation through Higher Education*, identifies twin barriers to improvement of college education: "It is critical that colleges and universities define what is meant by a high quality education" and "States and institutions collect limited data on the results of higher education and almost none on learner outcomes."³² Imagine attempting to improve an industrial product when there is not agreement about what functions it is to perform and when there is no measure of the quality of the product produced. These factors are what Lumina recognized in higher education, leading it to identify these two challenges.

Until these challenges are met, contentions that universities with lower costs per student are producing an inferior education that prepares students poorly cannot be factually refuted (or for that matter, supported). Many presidents, provosts, deans and department heads effectively have been blocked from cost-reducing changes by charges from faculty and staff that their proposals would damage educational quality. In such an environment it is difficult to make progress on either cost management or quality improvement.

Many campuses have active and imaginative efforts underway on their campuses to measure and improve quality and to understand costs. These individual efforts might produce models that can be used nationally. What they are missing now is sufficient uniformity from campus to campus so that cross-campus comparisons of effectiveness or efficiency can be employed.

APLU and AASCU are engaged in trial efforts to remedy at least the measurement side of this problem with their Voluntary System of Accountability. The 320 universities participating in VSA have agreed to a four-year trial period in which they will use various instruments to measure the increase in higher order skills of critical thinking,

³² A Stronger Nation through Higher Education, The Lumina Foundation, 2009, p 4.

problem solving and written communications they produce in their students. If the trials succeed, we finally will have measurements for these three important skills and will be able to determine how educational programs of varying expense affect the production of those skills.

The Data Quality Campaign³³ is well on its way to assembling from individual state systems a national system that will permit the tracking of students from school to school and into careers. We may one day have definitive information from this system that helps evaluate whether alumni benefits, especially their future earnings, vary positively with the amounts their alma maters spent to educate them.

The European Bologna Process is developing precise specification of the elements each degree program must include and what knowledge a degree recipient must have. This is a new process and so far has had little effect on educational programs at European universities, but it is an effort worth monitoring. A tentative effort has just begun to conduct a Bologna-like process in a few select locations in the United States.³⁴ The European solution may not be appropriate to the less centralized U.S. system of higher education; experimentation on a small scale with it will provide valuable information that will aid in the decision to employ it full scale or to find other more appropriate means of refining degree definition. The Commission on Access, Admissions and Success in Higher Education's recommendation of a "national, ongoing forum to explore and make recommendations about how to facilitate ease of movement among institutions . . . while maintaining institutional autonomy and program integrity"³⁵ is a sensible way to develop and evaluate options.

Efforts like these three are necessary to meet the twin challenges identified by Lumina. Until progress is made on them, tenacious academic administrators will continue experimenting with quality improvement methods that they believe to be cost effective. In the spirit of "no crisis should be wasted," the current fiscal circumstances will permit administrators latitude to eliminate costs that they believe to be unnecessary to the maintenance of quality. Thus progress continues under current circumstances but could be much more rapid were definition and measurement in place.

b) Complexity of Cost Structures. Our observation that IPEDS does not track costs within individual degree programs but instead lumps into a single figure costs for all degree programs is emblematic of the problem. Most universities are extraordinarily complex organizations that produce many different "products," e.g., undergraduate, masters, professional and doctoral degrees, research, service, clinical services. Each of these products may be produced using the same personnel, libraries, computer systems, personnel staff, buildings, etc. Allocating those costs to the individual products is extraordinarily difficult with the result that few universities know the true cost of each of their activities.

³³ For a description of the program see <http://www.dataqualitycampaign.org/>

³⁴ "Tuning College Degrees," *Inside Higher Education*, April 9, 2009
<http://www.insidehighered.com/news/2009/04/08/tuning>

³⁵ Commission on Access, Admissions and Success in Higher Education, *ibid.* p. 33.

We observe in our earlier paper, *University Tuition, Consumer Choice and College Affordability*, that less complex Carnegie classification institutions, i.e., public non-research universities and associates institutions, have lower cost per student than do more complex Carnegie classification institutions, i.e., public high and very high research universities. This is perhaps because the less complex institutions can more readily identify and therefore control the cost of their educational programs. In essence, we observed that “unbundling” of products is generally associated with lower cost and better cost management. Because complex universities produce many products jointly that probably cannot be produced effectively in an unbundled environment, our advice to such institutions was:

We do not propose to tell our colleagues at very high research universities (the type of institution in which we both have considerable experience) that they should unbundle and use separate personnel, equipment, facilities for each of the various products they produce. We merely point out that costs of producing an undergraduate education are lower in less complex settings and that reduced complexity is at least partly the reason for the cost difference. We do suggest that the unbundled research university would have a better chance of understanding the quality and costs of each of the “products” produced. Further we argue that a principal reason why community colleges provide services in the first two years of university instruction with the use of fewer resources than other types of institutions of higher education is that undergraduate instruction is bundled with fewer things in the community college environment than it is bundled with in other higher education environments.³⁶

While some work has been done that permits finer grained understanding of cost by program, much work remains to be done. Until such systems are in place data-informed decision making cannot be effectively practiced. Industry routinely uses systems that permit simultaneous control of cost and quality. These systems permit their managers to understand cost/quality tradeoffs and make decisions on cost fully informed about the quality results that will be produced. Developing systems that permit data-informed decision making in the academy would help us make the best use of resources as we expand enrollment or work to increase graduation rates.

Despite these problems, there are efforts underway that hold the promise of producing lower costs. Innovations like course redesign that have been piloted and propagated by the National Center for Academic Transformation demonstrate that per student costs can be reduced dramatically while effectiveness actually increases.³⁷ Their reduction in cost per student has averaged about 40% in pilot applications of redesign of actual courses in more than 30 universities and community colleges. The techniques they have piloted require scale for maximum return, producing significant savings in multiple-section courses with large enrollments. Many college courses are single section,

³⁶ Peter McPherson and David Shulenburg, “University, Tuition, Consumer Choice and College Affordability,” NASULGC, 2008 <https://www.nasulgc.org/NetCommunity/Document.Doc?id=1296>

³⁷ For a description of this effort and pilot projects at universities around the nation see http://www.center.rpi.edu/PCR/Proj_Success.html

low enrollment, so widespread adoption will not produce savings for the academy of 40%, but savings could be still be quite significant.

Similarly, much has been learned about distance education that holds promise for its effectiveness in both promoting learning as well as reducing cost. Work on utilizing games to enable learning that relies on the scholarly literature also holds promise. Again, failure to measure ultimate outcomes of learning arising from the use of such techniques will retard application of these potentially cost-reducing teaching methods.

Conclusion on Cost Reduction: Our belief is that cost per FTE and cost per graduate can probably be reduced below those used in Figure IV. Improvements can be made in four- and six-year graduation rates that will reduce cost per FTE. We doubt improvements in graduation rates and changes in other variables will be great enough to permit achievement of the attainment goals without the need to increase the size of the cohort of students attending college. Thus, there will be need for some expansion of higher education enrollment if the attainment goals are to be met. While measuring quality remains a big hurdle to reducing cost per FTE, much effort is underway that will almost certainly force costs downward from those we have estimated. How great the potential reduction in cost may be we cannot estimate with any precision.

RECOMMENDATIONS FOR PUBLIC RESEARCH UNIVERSITIES IN PREPARATION FOR EXPANSION OF ENROLLMENT

The goal of increasing the degree attainment of the 25 to 34 age group from 41.7% to 55% between now and 2025 is one that research universities should seriously consider undertaking, either individually or as a group. Doing so will permit planning and action to make it both possible and more financially affordable to achieve desired growth goals by 2025. Below are nine suggested areas of consideration or action research universities might explore productively in the effort to prepare themselves for enrollment expansion:

I. Planning for Growth in Enrollment

- A. Overall Levels: Consider developing plans to begin expanding research university enrollments to accommodate the growth that will be required to achieve the degree attainment goal within each state.** Many public research universities have been at static enrollment levels for some time. Growing college enrollment in the 50% to 70% range over the next 15 years while maintaining the same proportion of students in research universities as now will be realized only if existing universities grow in enrollment or if new research universities are created. The latter route is far more expensive than the former as it implies the development of massive new campuses, libraries, infrastructure and creation of new administrations. The former will require primarily expansion of the faculties, student services and support staff. While some physical expansion will be required if existing campuses are to accommodate the growth, strategies such as

expanding the hours of classroom and laboratory use and making full year-round educational program use of our campuses could permit expansion with far less new physical investment. Thus, campuses need to evaluate the desirability of growing enrollment and their willingness to pursue it.

- B. *Doctoral Programs: Because research universities produce the faculty needed by all institutions of higher education, assess how much doctoral programs need to expand to accommodate higher education's overall enrollment increase and consider beginning that expansion.*** The availability of qualified faculty need not limit achievement of the tertiary degree attainment goal but it may do so unless we begin planning for the needed growth in these cohorts now. Doctoral programs take time to complete so lead time must be built in to ensure that more students are admitted now so that faculties can expand later.
- C. *Graduate/Undergraduate Division of Effort: Purposely decide which degree programs and levels of degree offerings within those programs one might most productively expand.*** The distribution across disciplines and degree levels are determined by many factors, not always the need for more graduates. The 15-year timeframe makes this expansion a long-term decision, a period long enough to vary the size of faculties up or down, to acquire equipment, to modify facilities, etc. The *ad hoc* factors that frequently affect such decisions in the short run ought to be given no weight and the long-term community need for graduates within specific fields should dominate decision making. Whether such purposeful decision making results in increases in science and professional fields rather than humanities and arts or in undergraduate rather than graduate degrees is not intuitively obvious at this time.
- D. *Teacher Education Expansion: Research universities should consider reinvigorating and expanding their teacher education programs to ensure that adequate numbers of the best and brightest students who are fully grounded in the disciplines receive high quality teacher preparation.*** President Obama articulated it this way: “*To complete our race to the top requires the third pillar of reform -- recruiting, preparing, and rewarding outstanding teachers. From the moment students enter a school, the most important factor in their success is not the color of their skin or the income of their parents, it's the person standing at the front of the classroom.*”³⁸ Teachers who receive top quality, discipline-based research university undergraduate educations and commensurate preparation to teach will be in the best position to ensure that the public schools produce students who can later successfully earn degrees. Research universities have a huge self-interest in the success of the public schools so this should be a natural way of preparing for the future. APLU's Science Mathematics Teacher Imperative (SMTI) has more than 100 universities and systems involved to develop knowledge about science and mathematics teacher education from which all research universities may benefit.

³⁸ President Obama, *op. cit.*

- II. ***Increase efforts to ensure that research university students and faculty are fully representative of the future populations of our states.*** The educational and societal reasons for diversity remain compelling. In addition, rapid demographic change is underway with Hispanic populations growing everywhere, while white populations proportionally decline. Only if we work diligently to increase Hispanic enrollments will our institutions remain stable in student enrollments. In a period in which we need to expand enrollments, we must be very aggressive.
- III. ***Improved graduation rates must become a high priority goal on public research university campuses.*** There are many reasons to want success for our students. Getting more of the students who enter our schools to earn degrees launches them on career paths that will ensure tangible and intangible returns throughout their lives. Doing so will also reduce cost per degree and eliminate the need for some enrollment expansion. Thus it may well be one of the most cost-effective exercises in which we can engage. The Commission on Access, Admissions and Success in Higher Education reinforces Ed Trust's seven step plan to improve graduation rates; it is a common-sense route that is likely to produce positive results in most research universities.³⁹
- IV. ***Work to increase the rate at which students who begin at community colleges transfer to research universities and their graduation rates once they transfer.*** Nearly half of tertiary enrollment is at associate's degree institutions and over half of minority enrollment is at those institutions. A recent study by Long and Kurlaender found that only 26% of those who enter a community college with the demonstrated intention to get a four-year degree have earned the degree within nine years of initial enrollment.⁴⁰ Only about 29% of community college students ever transfer to a four-year college. ⁴¹Perhaps no more cost-effective route to increasing the numbers of tertiary degrees granted exists than improvement of the degree-earning and transfer rates of these students.
- V. ***Measurement of student outcomes must become a priority.*** Fortunately, APLU and AASCU now have a national learning outcomes measurement trial program underway and many diverse and important measurement efforts exist on our campuses. States may invest in enrollment expansion making disproportionate use of the cheapest per credit hour forms of higher education available in the belief that they are also the most cost-effective. The ability to objectively demonstrate that an educational approach produces value commensurate with its cost would likely avoid decisions based on false economies. It is imperative that we provide acceptable measurement of the quality of learning outcomes so expansion plans are not made on the basis of costs alone.

³⁹ Commission on Access, Admissions and Success in Higher Education, *ibid.* pp. 17, 18.

⁴⁰ Bridget Terry Long and Michael Kurlaender, "Do Community Colleges Provide a Viable Pathway to a Baccalaureate Degree?," NBER working paper 14367, 2008, p. 17.

⁴¹ Natalia Kolesnikova, "Community Colleges, A Route of Upward Mobility", Federal Reserve Bank of St. Louis, March 2008, p. 6.

- VI. ***Work with state and local school districts to improve high school to college articulation must be pursued vigorously.*** Much of this effort will fall upon the leading institutions of higher education in each state as there are few mechanisms to accomplish articulation nationally. Surely it is best to have the universities with the highest expectations of their students working with school districts to ensure that high school graduates are genuinely well prepared.
- VII. ***Form partnerships with K-12 to improve education along the pipeline (alignment teams, more emphasis on teacher prep, more summer enrichment academies for existing teachers, more information flow into the middle schools) so kids get on the right track and get the right info on financial aid early on.*** The report of the Commission on Access, Admissions and Success in Higher Education represents a review of the entire pipeline from preschool to college. It emphasizes roles for higher education in each of the facets mentioned here.⁴² While this paper focuses on what higher education needs to do largely within the college and immediate precollege period, we would be remiss if we did not include the citizenship responsibility of higher education to contribute to problem solution all along the pipeline.
- VIII. ***Research universities should develop or acquire from others very sophisticated cost measurement and tracking systems so that they can understand and control cost at the educational program level without diminution of quality.*** The imperative to achieve an ambitious enrollment increase goal undoubtedly will place pressure on us to maintain or reduce cost per student. Our ability to do this effectively will depend on our ability to measure cost at the program level.
- IX. ***Experiment with reduced cost methods of instruction and implement them on broad scale if they prove to be educationally effective.*** Our tradition is to permit faculty members full discretion in teaching their courses. Many techniques being developed today cannot be implemented by faculty members acting alone. They want and need administrative support. This is particularly true of course redesign and may well be true of the implementation of technologically advanced methods of instruction.

APPENDIX: THE USE OF THE FULL EDUCATIONAL COST DATA ELEMENT IN ESTIMATING COST OF ATTAINING THE TERTIARY GOALS

We choose to use “full educational cost” per FTE student as the measure for these comparisons. This is the sum of the instruction, instructional support, student services and institutional support expense categories as reported by the institutions in IPEDS divided by the number of Full Time Equivalent students. This figure does not include the cost of other activities in which the institutions engage such as public service,

⁴² Commission on Access, Admissions and Success in Higher Education, *ibid.* pp. 21-30.

provision of clinical services, support of auxiliary enterprises such as residence halls and cafeterias, research, and intercollegiate athletics. Nor does it include the capital cost of buildings. Thus full educational cost includes all the direct costs that arise from the instructional program and the support of students engaged in the instructional program and excludes costs associated with other activities at the institution. We do not use the more inclusive "Educational and General" cost category that includes most activities of the institution because many cost included in that definition are not related to educational activities and most of the non-educational costs included in that definition are funded from revenue streams that may be used only to support the activities that generated them.

In evaluating this data element one must remember that full educational cost per FTE student reflects an average cost across each degree level in which each institution's students are enrolled. Thus the data for the public four- year, non-research universities primarily reflects the cost of producing bachelor's and master's level education. At the public and private high and very high research universities the cost is an average over all bachelors, master's, professional and Ph.D. students. At public 2-year institutions the cost is spread primarily over associate degrees and certificate programs. While it would be most helpful to have information on full educational cost for students pursuing each of the various degrees offered by the institution, this is not possible as every institution has joint costs that can not easily be divided among degree programs. For example, a faculty member may divide time among undergraduate, graduate and research programs that have computer systems and libraries that are used by students in all programs. At best only arbitrary assignments of cost to such programs are possible. For this reason and others, IPEDS, the ultimate source of the data used here, does not ask institutions to report functional cost by individual degree program.