Committed to Excellence:

An Assessment of the Conditions and Outcomes of Undergraduate Education at the University of Texas at Austin and at Texas A&M University

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Preface and Acknowledgements

This report summarizes the findings of an independent study, conducted in late 2011 and in 2012, of the performance of the University of Texas at Austin (UT Austin) and of Texas A&M University (Texas A&M) in the realm of undergraduate education.

Clearly, no single study can address all of the issues in undergraduate education that warrant thoughtful discussion – nor is the report that follows an effort to do so. For example, because a number of reports published in 2010 and 2011 had already addressed the topics of instructional efficiency and faculty productivity at UT Austin and at Texas A&M, the present study places its focus elsewhere.

The availability – and the limitations – of data also helped establish the parameters for the study. Much of the analysis examines the *relative* performance of UT Austin and of Texas A&M, with a focus on how well the two universities perform as compared to their benchmark peers and to the nation's other top public research universities on select indicators of the conditions and outcomes of undergraduate education on the campuses. This particular focus necessitated the use of performance indicators for which reliable, replicable data exist both across the institutions and over time. As a result, and as described in the report, the study made extensive use of data from the U.S. Department of Education's Integrated Postsecondary Education Data System (IPEDS).

On many important dimensions, however, comparative data of such a nature do not presently exist. There is indeed much about U.S. higher education, and about the conditions and the performance of its colleges and universities, that only partially can be understood as a result of present data limitations. This factor imposed several conditions on the study.

On a number of pertinent questions, such as the quality and the innovativeness of the undergraduate curriculum, the study turned to other forms of information, including a close review of institutional documents and a variety of reports by national professional associations. Consequently, this study relies on a range of data drawn from different sources. This is as it should be; assessments of educational institutions – whether conducted externally or internally to the institution – should strive to use multiple measures and data sources.

The project was undertaken and completed during my tenure on the faculty of Vanderbilt University's Peabody College of Education and Human Development. I appreciate the support that I received from several graduate students at that institution. As lead analyst, Justin Shepherd provided expert assistance in the organization and analysis of the IPEDS data that underpin the series of institutional comparisons presented in Section Four of the report.

Likewise, Morrie Swerlick, Ashley Nichols, and Amanda Ochoa collected information found in various sections of the report. Patricia Whatley Stewart provided invaluable editorial assistance.

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Executive Summary

Public research universities in the United States today face many serious challenges to their continued capacity in fulfilling what certainly is one of the most important and complex missions the nation has ever handed to an educational institution – the charge simultaneously to educate undergraduate and graduate students; to prepare the nation's next generation of scholars and scientists; to produce and refine knowledge and research for the betterment of society; to function as the nation's infrastructural backbone for science, research and development; to catalyze and contribute to economic growth; and, to serve local, state, and national needs in a variety of highly-specialized ways.

For public universities everywhere, maintaining these commitments has become even harder, in part, because of the austere budgetary and fiscal conditions the institutions and their states face. Additionally, there is well-documented and recently growing public concern over such issues as access to and affordability of U.S. higher education. As a result, debate has arisen in some states over the extent to which public research universities today are accomplishing their complex mission – in particular, the critical aspect of educating undergraduate students.

For UT Austin and Texas A&M, pressures on the institutions to evidence their performance in the undergraduate educational realm have become heightened in recent years. These exigencies have arisen against the backdrop of a forceful debate in Texas over the extent to which UT Austin and Texas A&M represent a good value for students, taxpayers, citizens, and the state as a whole. The debate is an important one, with crucial implications for the present and future vitality of the universities, as well as Texas itself.

This report contains the findings of an independent study that examined many of the conditions and outcomes associated with undergraduate education at UT Austin and at Texas A&M. Specifically, it examines how well the universities perform on such crucial dimensions as academic quality, student racial and ethnic diversity, student retention, graduation rates, pricing, degree productivity, and student success, among others. Overall, the findings indicate that both universities are excelling in many aspects of their undergraduate educational missions and that they remain an excellent value for students and for the state. The findings include the following:

- Student quality, selectivity, and demand at the University of Texas at Austin and Texas A&M University are outstanding. The universities today boast record numbers of applicants, enjoy high admissions yield rates, and attract among the highest caliber of students in the nation who choose to attend public research universities. Additionally, the academic quality of their undergraduate student bodies has improved relative to peers.

- UT Austin and Texas A&M rank among the very top public research universities nationally in the percent of the undergraduate Hispanic/Latino student enrollment.

- UT Austin and Texas A&M are among the nation's foremost leaders in the number of Bachelor's degrees awarded annually. As a result, the universities produce for the state of Texas an enormous volume of "human capital" that is crucial both to the state's economic prosperity and to its capacity to cultivate civic awareness and engagement.

- The six-year graduation rates of UT Austin and Texas A&M are right on par with those of the institutions' peers and stand well above the average of other Public Research I universities.[1]

- Additionally, Texas A&M performs above the median of its peers in terms of improvement to its six-year graduation rate over time, while UT Austin is improving at a rate faster than all but three of its peers and well above the average of all Public Research I institutions.

- By more than 10 percentage points, the six-year graduation rates for Hispanic students at UT Austin and Texas A&M exceed the average rates of graduation of Hispanic students for all Public Research I institutions.

- Although the four-year graduation rates at both UT Austin and Texas A&M lag behind peer averages, both universities exceed the average of Public Research I institutions and both recently have made noteworthy gains to their four-year graduation rates – gains that exceed those of peers and of other top-tier research institutions.

- While the state's share of the total institutional revenues at the two universities continues to decline, the University of Texas at Austin and Texas A&M University remain a good bargain. Each university charges prices (i.e., the total of tuition and fees) that are competitive with the finest universities of their kind in the United States. UT Austin charges roughly $1,000 less than the average of its peers, while Texas A&M charges roughly $2,000 less than the average of its peers.

- Over the past five years, from 2006 to 2011, the rises in tuition and fees at UT Austin and Texas A&M have been less than the average of the increases seen at the universities' peers and at the nation's 70 other Public Research I institutions. Indeed, the tuition increases at UT Austin have been the fourth-lowest out of the 12 members that comprise this university's peer group, while tuition increases at Texas A&M have been the third-lowest of the 16 institutions that comprise its peer cohort.

- Seniors at UT Austin and Texas A&M report high levels of engagement in their studies and in other educationally focused activities that a large volume of research over time has shown as being linked to the desired outcomes of college. In many areas, these students report levels of engagement in learning that exceed the averages reported by students attending peer universities, other public research universities, and other types of public schools.

- Seniors at UT Austin and Texas A&M report very high levels of satisfaction with their undergraduate experience, overall.

- At exceptionally high levels, seniors at UT Austin and at Texas A&M report they likely would choose to attend their institution, if they could start over again.

- There is strong evidence that the undergraduate curriculum at UT Austin and at Texas A&M is of very high quality. Moreover, the curricular changes and improvements that are underway at each university will likely enhance the quality of the undergraduate educational experience and improve student learning. In particular, UT Austin and Texas A&M are increasingly leveraging their research resources and infrastructure to support undergraduate learning, a promising development both for students and for the universities.

- Overall, the University of Texas at Austin and Texas A&M University create enormous educational value for their students. Furthermore, this value is rising. Not only have the universities recently kept tuition increases relatively modest, but they are improving their performance on a variety of measures of student quality and success. Even as UT Austin and Texas A&M become more affordable in relation to their peers, they simultaneously are improving the quality of the undergraduate educational experience.

There are a number of areas in which the University of Texas at Austin and Texas A&M University must improve. As is the case with many public and private colleges and universities throughout the United States, the four-year rates of undergraduate degree completion are too low. The universities also must work harder in recruiting, retaining, and graduating African-

American students, in particular. Additionally, in an era of heightened competition for scarce public funding, UT Austin and Texas A&M must strive to hold down costs, all the while articulating even more effectively than in the past the compelling rationale for public- and private-sector investment.

Through the continued investments from generations of Texans, UT Austin and Texas A&M, over time, have emerged as two of the nation's premier public research universities. Today, they stand as crowning achievements in the state's long-standing aspiration to build and preserve a postsecondary educational system possessed of universities of the "first class."

Rather than disengage one from the other, as some critics have urged, the universities and the state of Texas must work together in ways that serve the best interests of the public. For the universities to maintain – and indeed, improve upon – their records of strong educational quality and of outstanding public service, UT Austin and Texas A&M must continue to meet the shifting challenges and needs of society. These efforts include experimenting with curricular change in an effort to improve student learning outcomes. The state, in turn, should reaffirm its support, financially and in other ways, of the high-performing public research university as an institution of vital importance to Texas and to its citizenry.

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I.

America's Public Research Universities: Unique Roles, Unparalleled Contributions

Research universities in the United States stand as one of the nation's crowning educational, cultural, and scientific achievements. The formation of the American research university, around the turn of the 20th century, together with its subsequent evolution, expansion, and record of extraordinary accomplishment over the past 100 years, represents one of the foremost successes in the history of higher education worldwide. The rise of research universities in the U.S. not only mirrored, but, also shaped and fueled America's ascent to global prominence and leadership. Today, research universities uniquely contribute to the economic prosperity and social welfare of the United States, and they remain imperative to the nation's present and future vitality.

Of the roughly 4,000 public and private, non-profit colleges and universities in the United States, a mere five percent are research universities. These 201 universities, both publicly and privately governed, play a unique role in American higher education. They share with virtually all other postsecondary education institutions the essential functions of educating undergraduates and serving society in ways suitable to their distinctive missions and capabilities. Only research universities, however, also hold the additional concurrent responsibilities for the production of high-quality research; the systematic transmission and application of existing research into improved practice; the education of graduate students; the preparation of the next generation of scholars and scientists; and, the perpetuation of the nation's infrastructure for conducting science, research and development.

In fashioning a distinctive role for research univeristies to perform within the broader framework of American higher education, and in financially fueling the research enterprise on these campuses, the U.S. has followed a long-standing principle that helped guide the development of higher education in this country. The principle is that of "mission differentiation:" the view that different types of colleges and universities can, and should, hold distinct missions, thereby making different kinds of contributions to American society.

Time and again, the nation has rejected uniformity of institutional mission, purpose, and function and a "one-size-fits-all" mindset to the provision of higher education. The consensus is that homogeneity and standardization leach richness from the postsecondary landscape; constrain the choices of students; undermine distinctive learning traditions and environments; reduce market incentives; erode quality; and, render higher education less capable overall of adapting to shifting external conditions and societal demands. In effect, the nation long ago decided that the public good is significantly advanced by the existence of different types of colleges and

universities, each performing certain responsibilities; functions that are both distinctive from and shared with the other institutions.

Today, the U.S. maintains one of the most institutionally and educationally diverse systems of higher learning in the world. Upon its landscape stride four-year and two-year institutions of widely varying sizes and scope, including community and technical colleges, private and public liberal arts colleges, single-sex institutions, military academies, seminaries and rabbinical institutions, proprietary schools, comprehensive state colleges and universities, and the roughly 200 research universities, which themselves vary with respect to the nature, breadth, and intensiveness of the research activities that occur on their campuses.

Although, wise civic and political leaders in the nation long ago foresaw the need for institutions capable of advancing the cause of scientific improvement,[2] as a type or, model, of postsecondary education, the research university arrived fully on the American scene only in the first several decades of the 20th century. Following pioneering efforts by Johns Hopkins University, the nation's first postsecondary institution devoted exclusively to research and graduate education, research universities in the U.S. arose amidst numerous societal, economic, and scientific convergences. Of particular importance was mounting concern that the nation lacked the scientific and technological infrastructure needed to realize its burgeoning economic and global aspirations.

The United States then was an emerging world power and, increasingly, the acquisition of global power and leadership necessitated for the ability to harness science, technology, and new forms of knowledge in service to national ambitions. Also, the recent scientific revolution in Europe had deepened America's awareness of its lingering, pressing need for a societal institution capable of organizing and putting to use the many scientific discoveries that had rapidly begun accumulating. The nation's answer to both sets of challenges took the form of the modern research university.[3]

The research university first gained crucial momentum during the extraordinary period of university building by states that occurred from the 1860s through the 1880s. The Morrill Act of 1862 (Public Law 37-108) provided federal grants of land to the states to establish public universities. As the Act states, the legislation's purpose was, "without excluding other scientific and classical studies and including military tactic, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."[4] Most such institutions established were the first public universities in their states, thus becoming known as state "flagship" universities. In time, some states, including Texas, built separate institutions for different functions: one land-grant university focused on agriculture and the "mechanical arts," as well as on general education, while a second university focused on classical education and professional fields of

study. Other states (e.g., California) adjoined the two functions under the umbrella of a single campus.[5]

In the years following the Second World War, public research universities began their rapid ascent as being among the nation's most prominent and vibrant of postsecondary institutions. Congressional passage, in 1944, of the "GI Bill of Rights" and the federal government's growing subsidization of science and research on university campuses did much to spur this development. With the landmark GI Bill legislation, the U.S. federal government provided funding for millions of veterans and their families to attend college. This action introduced an era of record growth in American higher education. The rising social and economic mobility of Americans and the robust economic development of this era in turn fortified even greater demand for postsecondary education: in the 20-year period spanning the early 1950s through the early 1970s, the college population in the U.S. swelled by more than 400 percent.[6] Much of this enrollment surge was concentrated at public universities.

This was so, in large part, because state governments had begun making annual investments of historic proportions in public colleges and universities. Recognizing that growth in the college-attainment levels of their populace, as well as growth in the research enterprise of higher education, led to large increases in economic activity, individual wealth, and social mobility, the states began appropriating to higher education billions of dollars annually in the form of operating subsidies for public campuses.

Clearly, state financial investment in higher education took other forms, such as the establishment of student financial aid programs to incentivize college attendance by students from low-income backgrounds. In many states, students attending private colleges and universities also benefitted from these new need-based, state financial aid programs. Additionally, some states even made direct appropriations to private colleges and universities. Yet, the largest single outlay in state postsecondary education budgets came in the form of annual appropriations intended to subsidize the operating costs of two-year and four-year public colleges and universities.

In expanding funding for two-year community or technical colleges, states sought to "democratize" higher education by giving many students who would otherwise have been excluded from higher education the chance to attend college.[7] The states also viewed investment in two-year colleges as a means by which to address their workforce-development needs. By providing funding for occupational training that would prepare entry and mid-level employees in certain industries, state governments positioned community colleges as a crucial component in the economic development strategies of local communities, municipalities, and the state overall.

During this period, the nation also fostered the growth of so-called "comprehensive state colleges and universities," through the conversion of over 200 existing institutions – most having been professional schools – and the establishment of nearly 150 new institutions.[8] Intended

primarily as open-access institutions, comprehensive state colleges and universities emphasized teaching and primarily awarded baccalaureate and master's degrees, although in time many of these institutions became increasingly engaged in research. As with the other kinds of public postsecondary education institutions, these schools received robust funding from their states, which enabled administrations to maintain low tuition charges and thus ensure broad access to higher education.

It was the investments made in "flagship" universities, however, which most prominently highlighted the states' growing financial stake in public higher education. During this era, the states struck an explicit social compact with their universities: in exchange for stout state financial support, public research universities would fulfill a distinctive mission by simultaneously serving as the backbone for R&D, while providing high-quality graduate and undergraduate education at low direct costs to students. This compact guided the rapid expansion of public research universities and contributed to their emergence among the most highly regarded universities in the nation and in the world.

Today, public research universities continue to play an outsized role in the nation's diverse system of postsecondary education. Public research universities benefit the nation by educating a large swath of its college-going population. The 72 Public Research I universities, for example, enroll more than 1.7 million undergraduate students, or about 21 percent of undergraduates enrolled at all four-year public and private postsecondary institutions in the country.[9] By comparison, the nation's 1,000 private, four-year colleges and universities collectively enroll about 30 percent of the nation's total undergraduate enrollment.

Furthermore, public research universities serve as training grounds for many of the nation's college graduates who proceed into the important professional fields of business, education, law, and medicine. These universities also perform a vital societal role in preparing current and future generations of scientists and researchers, furnishing them with the skills they require to help spur innovation and technological progress in many areas of benefit to science, the economy, and society overall.

In this latter respect, public research universities join their private-sector counterparts in distinctive service to society through the research missions they perform. Indeed, research universities are the linchpin of America's system of scientific discovery, technological innovation, and knowledge application. Because typically, the private sector does not invest in long-term R&D, the nation's research universities fulfill this crucial function. For example, universities performed 56 percent of the nation's basic research in 2008, or accounted for about $39 billion of the $69 billion spent nationally in pursuing research. With respect to applied research, universities performed 12 percent of the nation's total in 2008, or about $11 billion of the national total of $89 billion.[10]

Working in collaboration with industry, the nonprofit research sector, and government agencies and laboratories, America's public research universities make indispensable contributions both to the creation of new knowledge (i.e., basic research) and to the enhanced effectiveness of existing knowledge (i.e., applied research). The research activities underway at public universities comprise 67.2 percent of total research funding on college and university campuses. Over one-third of federal funding for academic R&D goes to 25 top research universities, of which 18 are public. These figures highlight the importance of public research universities in providing the research capacity the nation requires to foster scientific breakthroughs, remain economically competitive, and help solve societal problems.

Public research universities remain one of the nation's most consequential of institutions, yet today they also face unprecedented challenges. These challenges include declining state funding effort, rising costs on campuses, growing concerns over college affordability in higher education as a whole, mounting interest in newer forms of accountability for public higher education, and swelling demands that colleges and universities improve the conditions and outcomes of student learning. As the third section of this report discusses, these challenges threaten the foundations of public research universities and pose serious implications for the future of Texas and the nation as a whole.

It is in the context of the distinctive history and roles that public research universities over time have acquired, as well as of the challenges they now face, that the report profiles the two institutions that are the subject of this study: the University of Texas at Austin and Texas A&M University.

II.

The University of Texas at Austin and Texas A&M University in Profile: Institutional Characteristics, Markers of Academic Excellence, and Evidence of Societal and Economic Impacts

This section of the report provides profiles of the University of Texas at Austin and Texas A&M University. It provides an overview of the organization and other major features of the two universities, examines certain markers of their academic excellence, and considers evidence of the universities' impacts both on their local communities and the state of Texas.

Institutional Characteristics of UT Austin

Founded in 1883, the University of Texas at Austin is one of the largest universities in the nation. The mission of the university, as expressed in its own words, is "to achieve excellence in the interrelated areas of undergraduate education, graduate education, research and public service." This espoused commitment to and emphasis on excellence is long-standing, and can be found in the university's founding charter and in the reports of several high-profile, blue-ribbon commissions throughout the years.[11]

The university consists of 17 academic schools and colleges, with a combined undergraduate and graduate enrollment of almost 51,000 students. The university annually awards more than 13,000 degrees. It employs 24,000 faculty and staff, including slightly more than 2,700 full-time instructional faculty, thus yielding a student-to-faculty ratio of 17.8 to 1. The university generates more than $700 million annually in research funding. Indeed, with the exception of the Massachusetts Institute of Technology (MIT), UT Austin garners more federal research grants than any other American university that lacks a medical school.[12]

The university oversees seven museums and 17 libraries, including the Lyndon Baines Johnson Presidential Library and Museum, the Harry Ransom Center, and the Blanton Museum of Art. The collections of these museums and libraries, totaling more than nine million volumes, make UT Austin the seventh-largest academic library in the nation.

UT Austin also operates several prominent auxiliary research facilities. Included among these is the J. J. Pickle Research Campus, home both to the Texas Advanced Computing Center and the Microelectronics Research Center. Additionally, the university operates the McDonald Observatory, one of the world's leading centers for astronomical research, teaching, and public information and outreach. The university manages 300 acres of biological field laboratories, including the Brackenridge Field Laboratory, a leading urban field-research station for studies in biodiversity, ecosystem change, and natural history. The Center for Transportation Research, also located at UT Austin, is a premier research station that focuses on transportation research and public service. Founded in 1946, UT Austin's Applied Research Laboratories is

dedicated to improving U.S. national security through applications of acoustics, electromagnetics, and information sciences. It has been responsible for the development of most of the high-frequency sonar equipment used by the U.S. Navy and, in 2007, the Laboratories was granted a research contract by the Navy to be funded up to almost one billion dollars over 10 years.

In 2010, UT Austin opened the Norman Hackerman building, a premier facility for chemistry and biology research that also contains numerous teaching laboratories. In 2010, the university also established the $120 million Bill & Melinda Gates Computer Science Complex, Dell Computer Science Hall, and the $51 million Belo Center for New Media.

For the Fiscal Year 2011-2012, UT Austin's operating budget stood at $2.284 billion. Contracts and grants, private gifts, and other forms of income collected for special academic purposes comprised the university's single largest source of revenues, equaling $693 million, or approximately 30 percent of the institution's total operating funds. Tuition-generated revenue was the second largest source of funding, amounting to $567 million, or 25 percent of university funds. Auxiliary and other forms of self-supporting income by the university generated $373 million, or 16 percent of total funds. At $297 million, or 13 percent of total revenues, state appropriations comprised the university's fourth-largest source of income. This level of subsidy makes UT Austin one of the least state-dependent universities in the country. UT Austin also has the largest endowment among the nation's public universities.

Of the university's total enrollment, more than 39,000, or 75 percent, are undergraduates. In terms of ethnicity/race, slightly more than 50 percent of UT Austin's undergraduate students are white, 20 percent are Hispanic, and 17 percent are Asian-American. Almost 91 percent of UT Austin's undergraduates are residents of Texas, an uncommonly high percentage among universities of the reputational regard as UT Austin.

The university offers more than 100 undergraduate and 170 graduate degrees, and operates seven honors programs spanning a variety of academic units. In the 2010-2011 academic year, the University of Texas at Austin awarded a total of 13,332 degrees. Of these 67.7 percent were bachelor's degrees, 22.0 percent were master's degrees, 6.4 percent were doctoral degrees, and 3.9 percent were professional degrees (e.g., law).

The five largest undergraduate degree-producing schools and colleges at the university are Liberal Arts (2,892 degrees), Natural Sciences (1,671), Communication (1,222), Business Administration (1,064), and Engineering (1,040). With respect to student enrollments, the 10 largest undergraduate majors are biology/biological sciences (3,361 students), undergraduate studies/undeclared (1,753), business (1,524), psychology (1,388), advertising (1,291), electrical engineering (1,256), computer science (1,208), economics (1,174), government (1,111), and mechanical engineering (1,073).

The tenured and tenure-track faculty of UT Austin are highly engaged in the teaching of undergraduate students. More than 88 percent of these professors teach undergraduate students. The tenured and tenure-track faculty at UT Austin generate almost one-half of all undergraduate student credits hours taught at the university, while also delivering about 90 percent of graduate-level instruction, providing mentorship for graduate students, producing research, and helping govern the university.[13]

Institutional Characteristics of Texas A&M

Texas A&M University was established in 1871 under the provisions of the United States Congress' Morrill Act, thus making the institution Texas' "land grant" university. The university admitted its first students five years later. The university's founding as a land grant institution in 1871 was supplemented with "sea grant" status in 1971 and "space grant" status in 1989, distinguishing Texas A&M as one of the first four universities to hold all three designations.

Texas A&M has grown to become the sixth-largest university in the nation, with almost 50,000 students enrolled in 10 academic colleges and a full-time faculty numbering 1,695.[14] Of the campus' total student population, nearly 40,000 are undergraduates. Texas A&M has long maintained both an espoused and realized commitment to a set of core institutional values that reflect the spirit of the university's land grant mission of public service. A particular emphasis of the university is placed on leadership development. The university maintains over 120 undergraduate degree programs and 240 graduate programs. The university's faculty generate almost $700 million in federal research funding each year, ranking the university as one of the top public producers of federal research funding in the nation.

Texas A&M also maintains a 400-acre research park housing a variety of research sites and centers, such as the Institute for Genomic Medicine and the Institute for Preclinical Studies. It has the only school of veterinary medicine in the state; one of 28 nationwide. In 1997, the George Bush Presidential Library and Museum opened its doors on campus. Texas A&M partners with UT Austin in projects such as Texas Digital Libraries and the Giant Magellan Telescope.

Consistent with its historic land grant mission, Texas A&M maintains a large, prominent infrastructure of research and public outreach tied to the agricultural sciences. For example, Texas AgriLife Research is a renowned research agency affiliated with the university. It conducts research into agriculture and nutrition, life sciences, environmental quality, natural resources, and renewable energy. Current programs at the station include those aimed at improving the quality of the state's water supply by reducing water contaminants and at developing a healthier food supply by preventing food-borne pathogens. The agency's 13 research centers located across the state employ over 500 scientists with doctoral degrees in their fields and 1700 employees overall. There are six research institutes affiliated with Texas

AgriLife Research: the National Center for Foreign Animal and Zoonotic Disease Defense, the Institute for Obesity Research and Program Evaluation, the Institute of Plant Genomics and Biotechnology, the Institute of Renewable Natural Resources, the Norman E. Borlaug Institute for International Agriculture, and the Texas Water Resources Institute.

Texas A&M's Fiscal Year 2011-2012 operating budget is $1.194 billion. Revenues from tuition ($258 million) and fees ($178 million) represent the single largest source of funding for the university. These funds, however, are offset by tuition discounts for students equaling more than $100 million. State appropriations comprise the second-largest source of institutional revenue, at $286 million, or roughly 24 percent of the university's budget. Sales and services, which amount to $240 million in revenue, follow. Contracts and grants, amounting to $239 million, constitute the fourth-largest revenue source. Texas A&M also boasts one of the largest public endowments in the country, consistently ranking in the top five endowments for public universities.

The university's faculty is also distinguished. Three hundred of the 2,600 faculty at Texas A&M hold endowed professorships. Additionally, these faculty hold memberships in the National Academy of Sciences, the National Academy of Engineering, and the National Academy of Medicine, and have been awarded the Wolf Prize, National Medal of Science, and the Nobel Prize.

With respect to the racial/ethnic composition of the undergraduate student population, approximately 71 percent of students at the campus are white, 17 percent are Hispanic, 5 percent are Asian, and 3 percent are African-American.[15] The largest undergraduate enrollment is found in the college of engineering (20.9 percent), followed by that of liberal arts (16.1 percent) and agriculture (14.1 percent). Over 95 percent of undergraduates at Texas A&M are Texas residents.

The 10 largest undergraduate majors at the university include, in order of the size of enrollments, general studies (4200 students), biomedical sciences (1699), business (1603), psychology (1341), biology (1259), animal science (823), bilingual and special education (818), education (769), mechanical engineering (765), communication (736), and political science (700).

Markers of Academic Excellence at UT Austin and Texas A&M

There are a number of markers of academic excellence and of high quality at UT Austin and Texas A&M. For instance, both of the institutions enjoy the esteem of the nation's most prestigious research universities, both having been inducted into the Association of American Universities (AAU), an organization of 61 private and public universities of the highest academic standing in the United States and Canada.[16] Additionally, three decades ago, UT Austin was

named one of the original eight "Public Ivys," a term used to designate universities that "provided an Ivy League [undergraduate] collegiate experience at a public school price."[17]

UT Austin and Texas A&M possess outstanding faculty, including many recipients of the most prestigious professional and field awards in the humanities, social sciences, and the natural sciences. Included among the faculty at UT Austin, for example, are 63 members of the American Academy of Arts and Sciences, as well as winners of the Nobel Prize, the Pulitzer Prize, the National Medal of Science, and a variety of other internationally prestigious awards. Among the university's faculty, present and past, are nine Nobel laureates.

Texas A&M's current and former faculty include seven members of the American Academy of Arts and Sciences and 23 members of the National Academy of Engineering. Additionally, three faculty members have won the National Medal of Science, 15 have been named Guggenheim Fellows, and 13 have won the Humboldt Prize. An additional five faculty members have been deemed Nobel laureates.

Both influential and controversial, external rankings of the universities also can serve as markers of the undergraduate academic quality that is believed to exist at UT Austin and at Texas A&M. For instance, UT Austin was listed 13th in the 2011 *U.S. News and World Report*'s rankings of public universities, while Texas A&M in 2011 broke into the top 20 list, ranking as the nation's 19th best public university. The universities have also been ranked by the *Princeton Review*, *Wall Street Journal*, and *New York Times* as among the top 10 public universities nationally in terms of quality, affordability, or value.[18]

More impressive, perhaps, is the standing of the two universities in *Washington Monthly*'s annual college rankings. This particular rankings service places more combined weight than any of the others on three factors: the social mobility of students, research production and success, and public service.[19] With these emphases, the *Washington Monthly* rankings may best capture the contributions of American universities to society overall. In the latest edition of these rankings, Texas A&M and UT Austin rank as the 15th and 19th best national universities, respectively, positioning them ahead of Johns Hopkins University, University of Pennsylvania, Rice University, University of Chicago, Princeton University, and Northwestern University, as well as in front of such leading public research universities as the University of Washington and the University of Wisconsin.

UT Austin and Texas A&M also boast a number of highly-regarded undergraduate programs and fields of study. Among the highest-ranked programs at UT Austin are accounting (1st), architecture (2nd), education (2nd), environmental engineering (5th), civil engineering (6th), business management (7th), and chemical engineering (7th). Among the programs most highly ranked at Texas A&M are biological and agricultural engineering (1st), petroleum engineering

(1st), landscape architecture (2nd), industrial and systems management (7th), business management (8th), and civil engineering (10th).

Of course, external rankings of institutions and programs are only one kind of indicator – and arguably, too limited – of the quality of the academic environment at a college or university. This report returns in greater depth to the topic in sections four and five, where it examines certain conditions and outcomes relating to student achievement and learning at UT Austin and Texas A&M.

Evidence of the Economic and Societal Impacts of UT Austin and Texas A&M

There are numerous ways in which different types of colleges and universities can evidence their impact on the local, state, and national communities they serve. For example, all colleges and universities impact their regions economically. In the cases of UT Austin and Texas A&M, the magnitude of this effect is astoundingly large.

Studies suggest that the economic impact of the University of Texas at Austin on the state of Texas annually exceeds $5.8 billion, including more than $1.95 billion from direct university expenditures and $760 million from student expenditures in the local economy. Considering both direct and indirect employment, UT Austin accounts for almost 43,000 jobs, which in turn generate more than $1.7 billion in personal income. Furthermore, economic analyses indicate that, every one dollar of state investment in UT Austin yields approximately $18 dollars of spending in Texas' economy.[20]

The economic impact of Texas A&M University likewise is enormous. Studies have shown the university has a $3.7 billion economic impact on the state of Texas, including a $1.5 billion direct impact on the immediate College Station area in which the university is located. The university's 24,000 employees generate $885.6 million dollars in employee salaries and wages.[21]

For research universities, these economic impacts invariably flow in part from the research activities of the universities and from the research accomplishments of their faculty. The faculty at UT Austin and Texas A&M are prodigiously productive and inventive in their research. One finds countless examples of research discoveries and products by the faculty at the two universities that today contribute in important ways to the welfare of Texans and of the nation as a whole. Tables 1 and 2 illustrate only a fraction of such recent discoveries by the faculty and researchers at UT Austin and Texas A&M, respectively.[22]

Table 1. Select, Recent Discoveries of Researchers at UT Austin

Discovery/Invention	Discoverer	Description
Slow release Oxycontin	James McGinity	McGinty developed a material that, when mixed with Oxycontin, makes it tamper-proof. Prior to this discovery, the medication had to be removed from the market because individuals could crush the pills up and inject them. The material developed by McGinty solved this public health problem.
Skin cancer detection device	James Tunnell	This device improved the detection methods for melanoma, a deadly form of skin cancer. Previous methods were inaccurate or time consuming. The new device allows doctors to accurately determine whether a patient has cancer during his or her appointment.
HIV detection device	John McDevitt	This small, portable device allows doctors to quickly identify signs of HIV. The test run by this device is also cheaper than other available methods.
Lower cost fuel cells		Fuel cells are seen by many as a potential alternative to gas-run combustion engines used in cars today. The issue with fuel cells has been that they are cost prohibitive. The technology developed by UT Austin

		researchers makes fuel cells less expensive and improves their performance.
Real-time quantitative imaging of blood flow during surgery	Andrew K. Dunn, William J. Tom, Ashwin B. Parthasarathy	This technology allows doctors to monitor blood flow status in real-time during surgery. Previous blood flow mapping technologies did not offer the real-time characteristic, which limited applicability in surgical situations.
"Goldilocks" planets	N/A	UT Austin researchers have worked on the NASA Kepler program, which searches for planets in the "habitable zone" around stars (where the conditions may be conducive to life).
Discovery of the largest black holes found to date	Karl Gebhardt, Jeremy Murphy (graduate student)	Astronomers at the University of Texas Austin's McDonald Observatory discovered the two largest black holes identified so far in the Universe. The two black holes weigh as much as 10 billion suns.
"Parkinsonian Worms"	Joe Pierce Shimomura	Using Dopamine deficient worms, researchers at UT Austin have developed a screening test for potential drugs to help patients with Parkinson's Disease. These worms present motor dysfunctions which researchers believe are comparable to symptoms of Parkinson's patients.
Texas Advanced Computing Center (TACC)	N/A	The TACC has become a leading super computer center in the realm of science. The center has helped with research on simulations of the gulf oil spill,

		modeling of the H1N1 virus, and modeling of the formation of the Universe.
Folic acid	Esmond Snell	Folic acid is given to pregnant women as a safeguard against various birth defects, including spina bifida.
Dangers of radiation	H.J. Muller	While working at UT Austin, Muller found that X-rays could cause genetic mutations in living things.
Drug creation software	Robert Pearlman	This software allows for computer modeling of drug-target interactions, allowing for quicker and more efficient development of drugs.
Avalanche photodiodes	Joe Campbell	This device is used to translate electrical signals into pulses of light that can be sent long distances. The process is time-efficient, making long distance communication feasible.

Table 2. Select, Recent Discoveries of Researchers at Texas A&M

Discovery/Invention	Discoverer	Description
Stable Perimeter Monitoring System	Christi Madsen	The system designed at Texas A&M has application in security across a wide range of fields (military, home, etc.). This technology improves on previous technology by reducing the number of false alarms.
Glass strengthening method	Charles Wayne Smith, Catherine Sincich	This method uses Methyltrimethoxysilane (MTMS) to create glass strong enough to stop armor-piercing bullets. This technology also has possible

		application within the building industry.
Bio fuels from algae	Roy L. Lehman	Using Botryococcus Braunii Kutzing, researchers have found a more efficient way to extract oil from algae.
Pre-hospital data collection tool	Rural Community Health Institute	This tool allows for emergency responders to collect and send injury information to health care providers.
Corrected sun path diagrams	N/A	For over a quarter of a century, architects who built energy-efficient buildings were relying on incorrect sun path diagrams. Researchers at Texas A&M discovered the error and created corrected path diagrams, which are now included in the American Institute of Architects handbook.
ET-2000	Texas Transportation Institute	The ET-2000 is a device placed at the end of highway guardrails. It helps bring vehicles impacting guardrails to a more controlled and safer stop.
Star Rotor engine	Mark Holtzapple	The Star Rotor engine is more efficient than standard engines found in cars. It uses heat from the engine, which is wasted in normal engines, to help power the car. Beyond being more efficient, the Star Rotor engine emits very little pollution.
Digital Feeder Monitor	B. Don Russell	This device identifies the location of a broken or downed power line. The device was honored with a R&D 100 Award in 1996.

"Golden hour" treatments	Matthew Miller	In injuries with large amounts of blood loss, it is imperative that the individual receive trauma care within an hour (the "golden hour"). Researchers are working on development of medications which extend the "golden hour" for injured military personnel injured in remote locations.
Changing the structure of cancerous cells	Gonzalo Rivera	Researchers at Texas A&M (in conjunction with other universities) are investigating ways to change the structure of cancer cells and how this affects the development and movement of cancerous cells. The research could lead to new approaches in cancer treatment.
Micro Channel Networks	Victor Ugaz	Using the patterns from discharged electrical charges, Victor Ugaz has developed Micro Channel Networks that hold promise in the field of tissue engineering. These micro channels may help address issues of creating artificial circulatory structures in building manmade organs.
Dual noncanonical amino acid introduction	Wenshe Liu	Researchers at Texas A&M inserted two different noncanonical amino acids in a protein of E. coli bacteria. While in the past, researchers had been able to introduce one of these amino acids into E. coli proteins, this marked the first time that two different amino acids were successfully incorporated. This discovery holds promise for applications in medicine and basic research.

Enhanced DNA separation technique	Victor Ugaz	Using a gel substance, researchers at Texas A&M have developed a way to more effectively separate varying sized DNA fragments. This method shows promise for advancements in DNA analysis.
HIV dissolving compound	Zhilei Chen	A compound known as "PD 404,182" has been able to essentially dissolve the HIV virus. Unlike other HIV treatments, this compound does not act on parts of the cell encoded by the virus, making the virus less likely to form resistance to the compound.

While some of these and other research discoveries are important because of the fundamental insights they provide into the inner workings of science or of society, much of this work can hold immediate, practical applications for the improvement of society. The conversion of scientific or technological discoveries into useful commercial and societal applications has become a primary function of modern research universities. Such applications can take the form of patents, licensing agreements with commercial entities, or even company start-ups based around a university's research or technological products. UT Austin and Texas A&M make important contributions to their regions in all of these areas.

UT Austin's Office of Technology Commercialization is a technology transfer center that effectively serves as a conduit between laboratory research and commercial development. This office, along with its counterpart entity at Texas A&M has a strong record of helping catalyze economic development through the successful application of research discoveries to commercial practice. In Fiscal Year 2010-2011, alone, UT Austin's Office of Technology Commercialization processed more than 150 invention disclosures and 300 patent applications. Thirty-four U.S. and 28 foreign patents based on the research of the university's faculty were issued in that year. Additionally, its licensing agreements with industry generate more than $26 million annually in revenue for the university. UT Austin has also played a role in the start-up of more than 200 companies.[23]

Texas A&M likewise boasts an impressive record of research commercialization. Since 1992, the university has processed approximately 3,000 disclosed technologies and discoveries,

and issued 1,083 patents on 463 inventions. The university also has issued 931 licenses and 125 option agreements with nearly 800 companies.[24]

The research undertaken at the two universities significantly contributes to the public good in other important ways. For instance, the research that faculty at the Texas AgriLife Research centers produce has been credited with saving the state of Texas billions of dollars through the development of alternatives to pesticides, the dissemination throughout the state of improved horticulture practices and methods, and the improvement of food safety.

In one instance, studies undertaken at Texas AgriLife Research resulted in a more drought and pest-resistant strain of corn that produced 10 – 14 percent higher yields, while using 10 percent less water. Similar results occurred with potatoes, with an estimated increase in farm gate values from $20 million to approximately $120 million.

The Texas Engineering Experiment Station (TEES), located in College Station, also serves Texas through research and education initiatives centered on engineering and technology. The multifaceted mission of TEES includes efforts to enhance economic development, build better educational networks, encourage basic and applied research, and assist in applying research breakthroughs to practical problems in Texas and beyond. In 2010 alone, TEES was involved in almost 4,400 research projects with 14 partner institutions. At Texas A&M these partnerships include those in fields such as biomedical, civil, and nuclear engineering.

Many of these projects receive grant funding from a variety of agencies including NASA, the National Science Foundation, and the Department of Defense, among others. Recent research out of TEES has addressed problems in the fields of health, water needs, energy, and Homeland Security. Through attracting funding sources from outside of Texas, TEES brought a return of $17 for each $1 of in-state appropriations in 2010. These few examples evidence how, in the areas of agriculture, energy, health, and conservation, the research discoveries associated with UT Austin and Texas A&M have helped increase the productivity and the efficiency of industries that are of vital commercial and societal significance to Texas.

There are other crucial ways in which the universities contribute to the Texas economy and society. As discussed in section four of the report, UT Austin and Texas A&M greatly benefit their regions and state through the production of vital “human capital,” one principal form being the graduation each year of many thousands of new Bachelor’s (and Master’s, Professional, and Doctoral) degree-holders, whose entry into the labor market improves the knowledge and skills base of the population. This production of human talent in turn enables the state of Texas to compete for those knowledge-economy jobs and industries that today have become essential to the state’s and the nation’s economic prosperity. In fact, the two universities are among the nation’s foremost producers each year of new college graduates.

III.

Unprecedented Challenges for Today's Public Research Universities

Despite the vitally important contributions of the University of Texas at Austin and Texas A&M University to the economic prosperity and the social fabric of the state, they and the nation's other public research universities today face unprecedented challenges. Undoubtedly, public research universities have encountered problems in the past, at times surmounting them, while at other times, enduring the difficulties until they receded in their seeming urgency. Yet the concurrent emergence and compounding force of the particular array of challenges that today's public research universities face threaten both the present and future vitality of the public research-university sector. At stake is the continued capability of the universities to accomplish the multiple, complex purposes to which society has called them.

This section of the report undertakes a discussion of six contemporary (and interrelated) challenges that confront public research universities. These six challenges are: steepened college demand and shifting state demography; rising costs at research universities; declining state funding effort for higher education; decreasing affordability, a product of the three prior-named developments; stagnant federal financial support for university research; and, newer forms of accountability in public higher education. To some extent, all colleges and universities grapple with some of these problems, yet it is public research universities upon which these developments appear to have fallen hardest.

Challenge of Steepened College Demand and of Shifting State Demography

One set of challenges that public research universities face is that of growing demand for college, alongside continued shifts in the demographic profile of college attendees. Since the late-1990s, higher education in the U.S. has witnessed large undergraduate enrollment growth, particularly among students from racial and ethnic groups that traditionally have been underrepresented.[25] Growth in the Hispanic undergraduate student population over this period was almost 95 percent, as compared with rates of growth for African-American students of 75 percent and for white students of 24 percent. Growth in enrollment for women slightly exceeded that of men, with rates of 40 percent and 35 percent, respectively.

The private, four-year sector of higher education experienced the largest enrollment increases (61percent), followed by public two-year colleges (33 percent) and public four-year colleges (29 percent). The percent of young Americans who are choosing to attend college after graduation from high school has been growing, as well. In 1979, slightly more than 30 percent of young adults who had graduated from high school attended postsecondary education. In 2009, this figure stood at well over 45 percent.

Texas had the nation's sixth- largest increase (4.6 percent) in first-time, full-time students at two-year and four-year institutions between 2009 and 2010. It trailed only Utah, Montana, Idaho, South Dakota, and Mississippi, states with very small postsecondary enrollments. From 2005 to 2010, Texas saw an 18.2 percent growth in the number of first-time, full-time enrolled students, ranking it 22nd among the states.

The U.S. Department of Education's National Center for Education Statistics forecasts undergraduate enrollments to grow approximately 12 percent over the period of 2009 to 2020, an increase due primarily to growth in the share of the population that is between 18 and 29 years of age. Hispanic student enrollments are forecast to rise the fastest, at 46 percent, as compared to 25 percent increases for African-American students. The rates of postsecondary enrollment growth for women are expected to double those of men.

The ongoing surge in demand for college will continue to produce substantial enrollment pressures for public research universities. Meanwhile, the changing demography of the college student population necessitates that universities increase their vigilance in helping ensure the academic success of African-American and Hispanic student populations, those that traditionally have seen lower rates of undergraduate student retention and completion than that for Caucasian/white students.

The Challenge of Rising Costs at Research Universities

Rising costs associated with the delivery of higher education has been one of the main factors driving up college prices. This trend can be attributed, in part, to several factors. First, rising costs can be attributed to the choices of campuses, whose decisions over programs and prestige, have contributed to the cost rises. There are, however, also a number of cost accelerants in higher education that exist largely beyond the control of individual campuses, and are also responsible for the industry having become more expensive.

There are numerous costs over which colleges and universities usually have some direct control. Postsecondary institutions, even ones subject to rigid governmental oversight and regulation, typically have some discretion over a range of strategic and tactical choices with financial consequences for the institutions, as well as for their students. For example, most institutions often can choose whether to invest in a given academic initiative or degree program. They can also make decisions about divestments – choosing to close existing programs in light of data suggesting poor program quality or low-completion rates. Too few institutions took such painful but often-needed actions prior to the economic downturn that began in 2008.

In fact, program proliferation and "mission creep" are the byproducts of decisions made by many colleges and universities that, over time, have led to increased college costs. The creation and continued subsidization of academic programs for which there is insufficient demand or, which cannot be justified as serving the core educational purposes or the strategic

goals of the institution, have inflated the costs associated with running many colleges and universities. Likewise contributing to the cost factor is the well-documented shift at many comprehensive institutions towards increased investments in research activities that, albeit enhancing of an institution's prestige, are ill-aligned with the institution's mission. States as well have contributed to price increases through the subsidization of research activities on campuses that lack the necessary infrastructure or culture sufficient to sustain research excellence. Also, by investing in research at some campuses that effectively duplicates research that is already underway at other campuses, states have sometimes detracted from other forms of needed public investment in higher education, such as financial aid for low-income students.

The costs to operate public and private colleges and universities also have grown as a result of a trend in higher education toward what some observers have characterized as an "Amenities Arms Race," referring to the heightened competition to provide enhanced amenities for students.[26] These actions often are deemed as having increased the competitiveness of some campuses in recruiting students with outstanding academic credentials. Although it is a cost-saving measure, the choice to *not* compete as aggressively as another institution in this area can weaken a school's ability to attract a desired enrollment profile.

These kinds of decisions – over amenities, programs, and other such aspects of the manner in which institutions choose to commit their financial resources – hold important implications for the cost of maintaining and delivering their educational programs. Consequently, these decisions influence the prices that institutions charge students to attend. These are also examples of the kinds of decisions over which colleges do have some direct control, and of areas in which institutions should, and must, work harder to constrain costs associated with activities that are peripheral to their core missions.

A second kind of cost accelerant exists in higher education, one that lies largely beyond the direct control of colleges and universities, and yet has led significantly to higher operating costs for institutions. Higher education institutions, especially research universities, are labor-intensive, capital-intensive, and energy-intensive enterprises. As such, the higher-than-average inflation rates associated with these particular kinds of activities – highly skilled labor, capital investment, and energy consumption – have increased the operating costs of institutions throughout higher education, although most worryingly so at the research universities.

The first of these factors involves the high costs of compensating and retaining highly skilled labor. It is important to note that these high labor costs do not derive primarily from the salaries of faculty and staff, but rather from the expenses associated with employee benefits, especially those that are health-related benefits. Indeed, the labor-intensiveness of higher education has made postsecondary institutions especially vulnerable to the inflationary costs of providing health care for employees. Average faculty salaries grew by an inflation-adjusted annual increase of only about 0.5 percent over the 30-year period ending in 2007.[27] Average benefit expenditures per full-time faculty member, on the other hand, grew by more than five

times that rate. High rates of inflation in employee health coverage and thus, in benefits expenditures have been the source of much of the labor costs at colleges and universities over the past several decades.

Today, escalating health care costs continue to pose serious problems for the competitiveness of U.S. businesses, non-profit organizations, and government. They are no less problematical for colleges and universities, where employee compensation is an essential component enabling institutions to successfully compete for top talent.

As has been the case with countless businesses, colleges and universities have undertaken a variety of actions aimed at reducing health care expenditures. Types of recent cost-saving actions include taking measures to reduce health benefits previously afforded employees; increasing employee insurance premiums, deductibles and co-pays; and, laying off faculty and staff. In an attempt to realize greater savings in labor costs, many colleges and universities also have resorted to replacing full-time faculty with adjunct or part-time instructors, although some research clearly has shown that a too-heavy reliance on contingent faculty can impede student learning, college persistence, and degree completion.[28]

A second cost driver is the capital-intensive nature of higher education. The demand for technology in colleges and universities is illustrative in this regard. Information technologies today are the subject of prodigious attention, as campuses and policymakers search for pathways to deliver higher education that are educationally meaningful and cost-effective. Unquestionably, the rapid evolution of information technologies has improved campus efficiencies and reduced the costs of certain functions (e.g., the emergence of the library as more a "center for knowledge navigation," and less a physical warehouse for collections).[29] They also have provided an important tool for furthering college learning, providing new means by which students can learn in a more collaborative and interactive fashion.

The cost savings associated with newer learning technologies, however, are often overstated. Indeed, in higher education, technology often increases costs, rather than lowering them, as occurs in some industries through the substitution of capital for labor.[30] This is true, in part, because in higher education, technology often is used to enhance or to complement learning, rather than to replace the teachers who traditionally have presided over the learning. It is this "human element" that students and their families highly value, as suggested by the preference for low student-faculty ratios or for high levels of interactions between students and faculty.

Learning technologies have indeed enhanced higher education's value, yet demanded of campuses are the related, ever-higher levels of financial investment. There are the costs, for example, of purchasing computers, maintaining and updating hardware, obtaining software licenses, and networking. Beyond these kinds of investments, technology invariably imposes its

own labor costs, evidenced by the growing numbers of information-technology (IT) staff on campuses and by the many off-campus vendors whose services are also required.

In conclusion, while the introduction of new informational and learning technologies on college and university campuses has helped reduce costs to institutions in some areas and has enhanced learning in demonstrably important ways, technology-related costs have grown exponentially, far exceeding the general inflation rate. These developments have contributed in their own ways to the growing expenses associated with running universities.[31]

For research universities, a significant source of increasing capital costs involves research itself, particularly in the physical sciences and engineering. The challenge goes beyond that of crucial investments in human talent alone, and includes the costs associated with recruiting and retaining world-class scientists and related research personnel, whose projects and laboratories produce both the knowledge breakthroughs and the insights that inform the enhanced performance of existing products.[32] The ongoing challenge for research universities also includes paying for needed infrastructural investments, including the maintenance of existing research facilities, as well as the building of new ones.

Particularly in the fields of bioscience and bioengineering, where so many scientific advances are being made, the cost of building and maintaining state-of-the-art science facilities and laboratories can be enormous. Costing tens of millions of dollars are the research facilities that can house the laboratories and the multiple, scientific disciplines that increasingly must collaborate to solve the complex problems of basic and applied science. Also in demand are the classrooms and teaching spaces that are sufficiently equipped to educate undergraduate and graduate students in those specialized fields.[33]

While much of the new construction and facilities at public universities is paid for by gifts from individual, foundation, and corporate donors in collaboration with funding from state government and from the institutions, universities increasingly bear the costs of the maintenance of these facilities, as well as those associated with the fundraising apparatus that is required to successfully garner necessary private-sector capital. The challenges have become intensified because of dampened federal and state funding for higher education and for research on university campuses. Indeed, today it is more expensive than ever before for research universities to carry out the most distinct component of their missions: the conduct of world-class research in service to the nation's continued economic prosperity and its competitiveness as a world leader in science, technology, and R&D.

The Challenge of Declining State Funding Effort for Higher Education

By far, the most significant challenge to college affordability in the public sector of higher education is the failure of governmental revenues to maintain their share of the investment in higher education, which traditionally had served to help keep tuition levels low. In fact, the diminishing role of the state in funding higher education has exacerbated the impacts on institutions and on their students of the previously-described cost accelerants. Although many public universities have failed to do all they can to limit price increases, the present trend of states' shifting much of the costs for higher education from state budgets directly on to colleges and to the students who attend them is a watershed moment in the finance of American higher education.

For much of the 20th century, especially during higher education's era of rapid expansion from the late 1940s through the early 1970s, state government investment in the form of institutional subsidies stood as *the* principal funding source for public campuses.[34] Robust public funding served as the foundation of America's distinctive model of postsecondary education finance, one in which state governments were the primary financial stakeholders. Because the states were the primary sources of revenue in the day-to-day financing of public colleges and universities, only a small fraction of the direct costs associated with educating college students fell to the students themselves. The federal government certainly played a vital role in providing financial aid for low-income students and in subsidizing the direct and indirect costs of research on university campuses. The funding for the day-to-day operations of public colleges and universities, however, was the responsibility of states.

Continued high levels of state investment, therefore, was key to ensuring low tuition and fee levels at public campuses. The social compact that bound the nation's burgeoning flagship public universities to their citizenries was explicit: in exchange for robust financial support from state government, the universities would provide high-quality graduate and undergraduate education, both at-scale and at low direct costs to students, and would produce the research and scientific discoveries to power local, state and national economies.[35] Over the past 30 years, this financing model has gradually eroded to the point of near collapse.

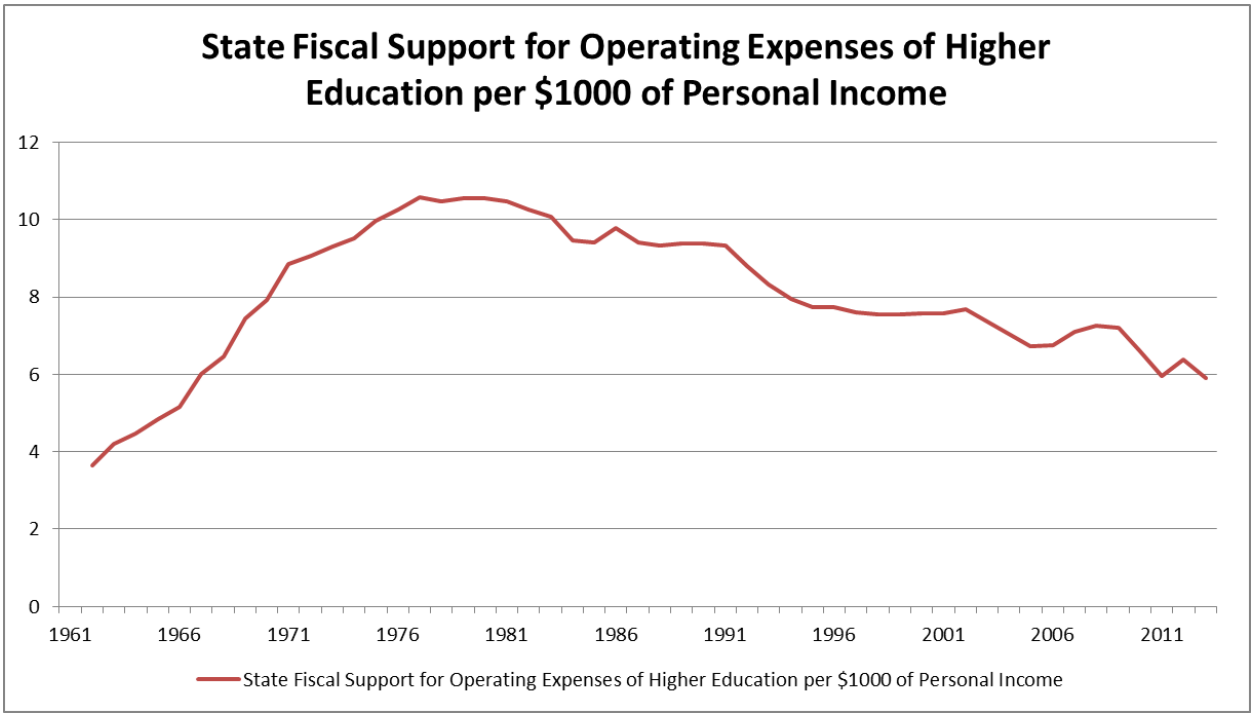
Since the early 1980s, higher education has experienced a substantial decline in the state funding effort for public colleges and universities. The 50 states appropriated almost $72.6 billion in tax receipts for higher education in 2011, a decrease of more than 6 percent from the historic high-water mark of $77.4 billion three years earlier.[36] Over time, the states have retreated in the share of the financial investment in higher education they once held, resulting in the shifting of costs for higher education from state governments to the colleges and universities themselves, and ultimately to students. Specifically, state funding for higher education has declined relative to the size of state budgets, per capita wealth in the states, and student enrollments on campuses.

First, *state funding has declined relative to the size of state budgets*. Whereas, in the 1970s, the states spent almost $16 on higher education out of every $100 in state tax receipts, today they spend fewer than $8 – a powerful sign of higher education's diminished importance as a budget priority. Many observers and analysts have attributed this development to the growing view among state policy makers that, because higher education is voluntary (i.e., state law does not compel a student's attendance), because its financing essentially is "discretionary" (i.e., the absence of federal funding requirements or funding matches), and because it alone among public-sector agencies is capable of generating its own revenue (e.g., tuition and private donations), scarce public dollars might be better spent on other state needs.

This development has exacerbated the long-standing tendency for higher education to serve as the "balance-wheel" for state finance; during recessionary periods, state funding for higher education fell faster than funding for other areas, yet recovered more quickly when state revenues again climbed. Recent research, however, has shown a need for revision of the "balance-wheel" concept, suggesting that funding cuts to higher education go deeper and last longer than do cuts to other areas of state spending during recessionary times, such as the kind witnessed today.[37]

State funding also has declined relative to per capita wealth in the states. As seen in Figure 1, state funding for the operating expenses of higher education has declined precipitously over the past three decades. In the early 1980s, more than $10 out of every $1000 of personal income was spent in support of higher education. By 2012, levels of spending on higher education had declined to less than $6 out of each $1000 in personal income, again illustrating lessened state funding effort for higher education.[38]

Figure 1



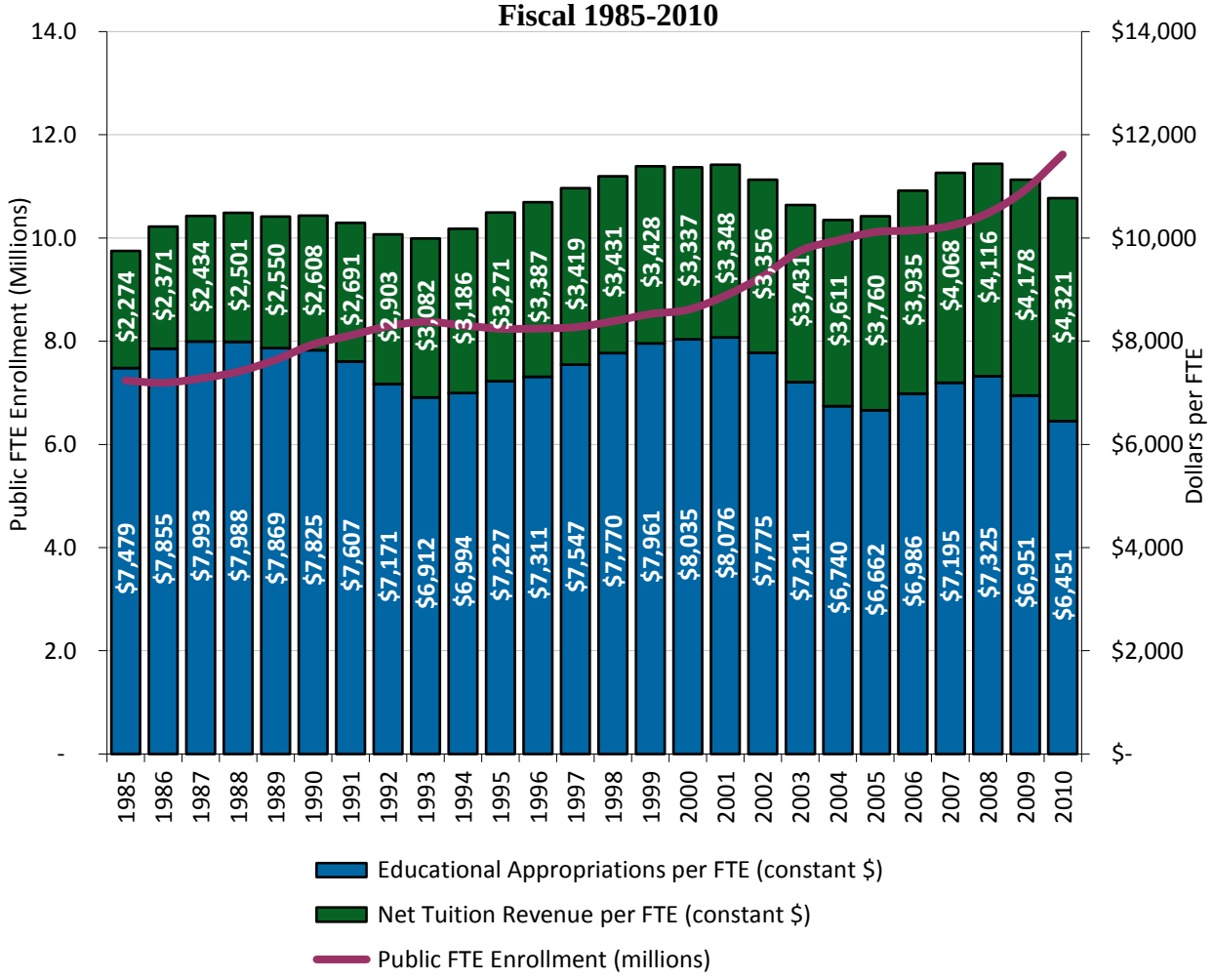
The third visible sign of declining state financial support for higher education involves *diminished funding relative to full-time student enrollments* in public colleges and universities. This factor is perhaps the most consequential of the three funding trends cited because it has had direct impacts on the kinds and the quality of educational services that public postsecondary institutions can provide their students.

Since 1986, full-time equivalent (FTE) enrollment at public institutions of higher education has surged from 7.2 million to nearly 12 million. In the two-year period from 2009-2011 alone, enrollments grew by more than eight percent.[39] Although state funding for higher education grew during this period overall, (at least until the recession of 2008, which nullified much of the funding growth over the preceding five years) state governmental spending on higher education has not kept equal pace with the rate of enrollment increases at public institutions. [40]

As a result, public colleges and universities are receiving less state funding than before with which to educate more students than before. Figure 2 illustrates these divergent and widening trend lines. The figure shows that educational appropriations per FTE student have markedly declined over the past 25-year period, especially so since 2001. In that year, educational expenditures by state and local government per FTE student stood at nearly $8,100, adjusting for inflation.

Since that time, however, government spending per full-time equivalent student has sharply declined as student enrollments have grown. By 2005, educational appropriations per FTE student had shrunk to only $6,662. In fiscal years 2006-2008, educational expenditures grew to $7,325 per FTE student. Yet over the past three years, government funding has dropped to historically low levels. Indeed, state and local appropriations per FTE student fell to less than $6,290 in 2011, a decline of more than 14 percent from 2008 and the lowest level of public support in the last quarter century. Today, in the majority of the states, state government no longer is the primary financial stakeholder in public, four-year institutions of higher education.

Figure 2
Public FTE Enrollment and Educational Appropriations per FTE, U.S., Fiscal 1985-2010



Note: *Constant 2010 dollars adjusted by SHEEO Higher Education Cost Adjustment (HECA).*
Source: "State Higher Education Finance FY 2011," *State Higher Education Executive Officers Association*

Tuition revenue, therefore, has become a far more important source of funding for public universities than ever before. When state and local revenue lags enrollment growth and inflation, net tuition revenue for public colleges and universities usually grows because the institutions tend to charge more to offset declining public revenues per student. This trend is most pronounced at a growing number of state flagship universities, where the state's share of total institutional revenue has fallen to historically low levels. Several dozen major public universities, including the University of Michigan and the University of Virginia, for example, have seen their state shares of institutional revenues decline over time to well below 20 percent. For some institutions, the proportion of state funding has reached the single digits.

These developments are underway at Texas' two premier, public research universities. For UT Austin, the state contributes $297 million to the institution's total budget of approximately $2.3 billion, or about 15.1 percent of UT Austin's revenues. For Texas A&M, the state's share of total revenues is about 24 percent, or about $286 million out of a total institutional budget of approximately $1.19 billion. In both instances, the state's share of the operating budgets of the institutions has fallen over the past quarter century. .[41]

In some areas, reductions in state support for public universities have been met with calls for a restructuring of the financial and regulatory relationships between universities and the state, typically in the direction of greater campus autonomy in exchange for reduced public funding. Some states have experimented with structural reforms, sometimes known as "privatization" efforts, although the term itself is misleading, because no such efforts anywhere have entailed changes in ownership form. Although rhetorically appealing, these privatizing efforts have shown little evidence of success and, in a number of instances, have entailed negative outcomes for students.

For instance, Colorado in 2005 became the nation's first (and to date remains the sole) state to distribute taxpayer dollars to its public higher education institutions through a voucher program. The vouchers, proponents argued, would produce greater market competition among institutions, which therefore would lower costs to students, improve campus efficiencies, and increase academic quality. In reality, however, when the state encountered hard economic times, the value of the voucher Colorado had promised college students was cut from $4000 to $2400, tuition at both two-year and four-year institutions skyrocketed, underrepresented populations became less likely to enroll in college, and enrollments in higher education fell.[42]

In other states, the consequences of "charter college" initiatives, or other such efforts designed to distance public universities from public funding and oversight in exchange for greater operating freedom, have been unclear. In general, while these initiatives often have made it easier for institutions to raise needed, non-state sources of revenue via large tuition increases on campuses, and sometimes have increased efficiencies on campuses, the measures have also tended to undercut student affordability and access.

Despite the seeming allure of "privatization," in fact the preponderance of evidence suggests these initiatives may hold negative consequences for students. The better path forward might be a harder one for public research universities and their sponsoring states to tread, yet it is one that may best serve the public's interest. It entails a mutual awareness by state governments and by public universities of the need for continued, shared obligation in helping to sustain financially the institutions. In the midst of fiscal austerity, states must do more to help maintain and, indeed, deepen their investment in public universities, whose contributions to the public good are of inestimable value. Likewise, the universities, particularly those grappling with painful cuts in public funding, must do what they can to help improve the conditions of affordability, access, and student success on their campuses.

The Challenge of College Affordability

It is in the broader context of these trends in decreasing state funding effort for higher education that the issue of student affordability can best be understood. Due to the diminished funding effort for higher education, students and families have grown to rival state governments as the primary financial stakeholder in public higher education. Among public doctoral institutions, for example, net tuition as a percentage of total revenues from tuition, appropriations, and contracts, increased from 25 percent in 1998-99 to 32 percent in 2008-09, while state and local appropriations decreased from 49 percent to 34 percent of revenues from these combined sources.[43] Specific trends in tuition and fees at public research universities, including at UT Austin and at Texas A&M, are discussed in the following section of the report, beginning on page 57.

In the ten-year period from 2001-02 to 2011-12, published in-state tuition and fees at public four-year institutions increased at an average rate of 5.6 percent per year beyond the rate of general inflation.[44] These tuition and fee rises have affected middle- and lower-income Americans disproportionately over the past thirty years, as the share of income required to pay the costs of attending an average-priced, four-year college or university increased the most for families that belong to the lower income levels.[45]

An important but often-underreported distinction, however, involves the difference between "sticker prices" and "net prices" in attending higher education. Net price is the difference between the full cost ("sticker price") for a student to attend a particular college, less any grants and scholarships for which the student may be eligible. To help offset the costs of college attendance, the federal government, institutions of postsecondary education, and state governments provide various forms of student financial assistance. For instance, according to The College Board, average published tuition and fees at public four-year colleges and universities between 2006-07 and 2011-12 increased by about $1,800 in inflation-adjusted dollars: an annual rate of growth of 5.1percent beyond inflation. Yet the average net tuition and fees in-state students pay after considering grant aid from all sources increased by about $170 in 2011 dollars, amounting to an annual rate of growth of 1.4 percent beyond inflation.

Undergraduate students received an average of $12,455 in aid per full-time equivalent (FTE) student in 2010-11, according to the College Board, including $6,539 in grants from all sources and $4,907 in federal loans.[46] Total grant aid per full-time equivalent undergraduate student increased at an average rate of 3.5 percent per year in inflation-adjusted dollars from 1995-96 to 2000-01, 3.4 percent per year from 2000-01 to 2005-06, and a rate of precisely twice that at 6.8 percent per year from 2005-06 to 2010-11. In 2010-11, the federal government contributed more than 66 percent of the total $178 billion in undergraduate student assistance allocated in the U.S. Postsecondary education institutions contributed 17 percent of this total and state governments contributed about 5 percent of the total undergraduate aid awarded. These sources of financial support are crucial in helping defray the direct costs of student attendance in college.

Contributing to the affordability problem in Texas, for instance, is the fact that the state awards relatively low levels of need-based, student financial aid.[47] In 2009-2010, the state's expenditure on undergraduate need-based grant dollars per full-time equivalent student was almost $630. This level of support in Texas for financially needy students exceeded the national average of $455. Yet, a comparison of need-based award levels per FTE in Texas with the levels found in other large and diverse states that have well-developed systems of public postsecondary education, finds Texas' funding levels as lagging that of many of its peers. For example, in 2009-2010, the average, per FTE student aid award in Texas of approximately $630 trailed the averages in New Jersey ($1,125), New York ($1,027), Washington ($868), North Carolina ($823), Pennsylvania ($743), Minnesota ($742), and Illinois ($696), among others.[48]

The Challenge of Stagnant Federal Support for Research

The federal government provides the largest share of funding for university-based research. Indeed, roughly 60 percent of the research that is conducted today on university campuses is supported by the federal government, while universities themselves underwrite 20 percent of the research, nonprofit organizations fund 8 percent, and the remaining 12 percent of funding comes from a variety of other sources.[49] Following large, multi-billion dollar annual increases in federal funding through the early 2000s, however, federal support has flattened. The federal share of support for research conducted at universities declined by 7.2 percent between 2004 and 2009.[50] Of course, these trends in federal support also vary across fields. While areas such as life sciences, engineering, and biomedical research have seen large increases in research funding from the federal government, such fields as the visual and performing arts and the social sciences recently have seen declines in federal support.

Across the board, universities are underwriting more of the costs of research on their campuses. From 2004 to 2009, universities increased their share of total funding for research by over 13.7 percent. Also alarming is the fact that a substantial portion of federal funding for research at universities since 2009 has flowed from monies made available under the American Recovery and Reinvestment Act of 2009 (ARRA). These one-time funds constituted $2.7 billion

of the reported $37.5 billion in federal funding in 2010.[51] Universities, therefore, now face a period of likely prolonged uncertainty with respect to the federal government's financial commitment to research on university campuses.

Together with the rising costs that are associated with conducting research in many fields, the uncertain climate could pose serious problems for the nation and its economic security. The United States is badly in need of new investments in both basic and applied research. In 2007, the National Academy of Sciences published a milestone report recommending courses of action to improve the future competitiveness of the U.S. economy. Among their proposals is that research universities should "sustain and strengthen their commitment to long-term basic research [and] become the most attractive setting in which to study and perform research so that we can develop, recruit, and retain the best and brightest students, scientists, and engineers from within the United States and throughout the world."[52] The worrisome trends in federal support for research at universities, alongside the degraded financial condition in which many public universities today find themselves, threaten the institutions' ability to perform their research missions as well as, and as comprehensively as, they did in the past.

The Challenge of Newer Forms of Accountability in Higher Education

A sixth major challenge today for all of higher education, yet especially for public colleges and universities, involves increased accountability pressures, particularly the emergence of newer forms of performance-based accountability. Accountability pressures are nothing new to higher education. Indeed, accountability has been the subject of enormous interest and attention throughout the past 60 years, since the dramatic growth of the public sector of higher education, following the Second World War.

As the size of higher education during that period grew, so did state governmental interest in the close monitoring, coordination, and regulation of the sector's activities. Almost all of the states created new systems of external oversight and control (i.e., state coordinating and statewide governing boards) with which to pursue the goals of efficient and effective statewide planning and budgeting for higher education. Over this period, the pendulum of control swung forcefully in the direction of enhanced state-level authority and, consequently, of lessened institutional autonomy over the academic programs, budgets, and resource flows of public colleges and universities.

A noteworthy change of recent years has been the growing expectation by many states that public colleges and universities should be able to demonstrate their accountability to the public through their performance on pre-specified outcomes measures. The emphasis on accountability policy for higher education, therefore, has shifted from the monitoring and regulation of resource inputs to the assessment of institutional outcomes or outputs. As a result of this shift, states have experimented with a variety of new performance-based accountability programs and policies in the context of higher education.

One such program involves "performance funding," which ties state appropriations to the performance of campuses on predetermined metrics. Popular performance criteria include retention and completion rates, the levels of production of new graduates in certain fields, rates of student success on national and state certification or licensure examinations, measures of institutional cost effectiveness, and a variety of indicators of student diversity on campuses.[53]

Even in states where money, measures, and outcomes are not tightly or explicitly linked, the newer focus on institutional performance has created far more pressure than in the past on colleges and universities to be able to detail and to make public certain aspects of the conditions of education on their campuses. For public research universities, including UT Austin and Texas A&M, this development requires of institutions a heightened need for the following: the close monitoring of educational conditions and outcomes, the ability to demonstrate how actions undertaken to improve educational outcomes have or have not worked, a greater institutional focus on improving student learning, and a commitment to accomplishing the aforementioned goals during a period of diminished financial capacity.

IV.

Assessing the Performance of UT Austin and Texas A&M on Select Indicators of Performance in Undergraduate Education

In an era in which increasing emphasis in U.S. higher education is being paid to questions of institutional performance, the extent to which the University of Texas at Austin and Texas A&M University adequately perform their undergraduate educational missions bears review. This section of the report undertakes such an assessment by examining how well UT Austin and Texas A&M perform, as compared with their benchmark peers and with all other Public Research I Universities nationally. The assessment focuses on five areas of institutional performance of broad interest to the public: academic preparedness and quality of undergraduate student populations; the extent of racial/ethnic diversity within undergraduate student populations; recent levels and rises in undergraduate tuition and fees; undergraduate student retention and degree completion; and, levels of degree production at the universities.

The analysis incorporates a principle that is widely followed in U.S. higher education, as well as in other educational sectors and in other industries: when assessing organizational performance, the mission, size, and scope of organizations are important factors for consideration and must properly be taken into account. Meaningful analytic results, in other words, depend on the use of meaningful organizational comparisons.

As noted, public research universities play a distinctive role and purpose in the broader framework of American higher education. Dating indeed from their establishment, research universities have served a complex, multi-layered mission, distinct from the missions performed by other types of postsecondary education institutions. The nature and the scope of operations of public research universities, spanning undergraduate and graduate education, instruction, basic and applied research, and public service, make these universities stand apart. Their size and scale, with respect to enrollments, academic programs, and physical features, also distinguish public research universities from other types of postsecondary institutions. In light of these factors, the analysis draws principally on comparisons made between UT Austin and Texas A&M and other public-sector universities with similar missions.

The state of Texas has long maintained that UT Austin and Texas A&M should strive toward distinction as being among the country's top public research universities. In doing so, the state also has defined for each university its own set of peer institutions against which UT Austin and Texas A&M should benchmark their performance.[54] The analysis that follows capitalizes on the existence of these established peer groupings for purposes of drawing the proper institutional comparisons.

The analysis also relies on data from the U.S. Department of Education's Integrated Postsecondary Education Data System or, IPEDS. This is the most reliable and widely used data source for drawing the relevant comparisons, those between and among universities, over time, on dimensions such as student credentials, college costs, and degree completion rates. IPEDS consists of a collection of surveys of institutions of higher education and is maintained by the National Center for Education Statistics. In order for the students of a postsecondary education institution to become eligible to receive federal sources of financial aid, [55] the institution must complete periodic IPEDS surveys. It is the data which these annual surveys yield that permit campus and system officials, policymakers, and researchers to make comparisons among the many thousands of institutions that provide postsecondary education across the U.S.

The results presented in the tables that follow examine the relative performance of the University of Texas-Austin and Texas A&M University in five key areas: (1) student quality, selectivity, and demand; (2) student racial/ethnic diversity; (3) levels and rises in student tuition and fees; (4) rates of student retention and graduation; and, (5) Bachelor's degree production, including production in the STEM (science, technology, engineering, and math) degree fields. In total, these factors convey useful information about the conditions of undergraduate educational quality, access, affordability, and productivity at public universities.[56]

On each of the indicators, the performance of UT Austin and of Texas A&M is compared with the performance of each institution's benchmark peers,[57] as well as with the performance of the nation's 70 other Public Research I universities. UT Austin's peer group consists of 11 other public research universities, including Indiana University, Michigan State University, Ohio State University, University of California-Berkeley, University of California-Los Angeles, University of Illinois at Urbana-Champagne, University of Michigan, University of Minnesota, University of North Carolina-Chapel Hill, University of Washington, and University of Wisconsin.

Texas A&M's peer group encompasses eight of the 11 members of UT Austin's cohort, excluding the University of Washington, Michigan State University and Indiana University. In addition to the eight remaining schools, the peer group for Texas A&M includes six universities that share both Texas A&M's distinctive mission as a Land Grant University and its commitment to agricultural and engineering education. These six other benchmark peers are the Georgia Institute of Technology, Pennsylvania State University, Purdue University, University of California-San Diego, University of California-Davis, and University of Florida.

Throughout the analysis, UT Austin and Texas A&M University also are compared with the nation's 70 other Public Research I universities. Research I universities are those classified as having "very high" levels of research activity underway on their campuses, while also being extensively involved in undergraduate education and instruction.[58] In an effort to draw the most meaningful comparisons possible, we limited our analysis to Public Research I universities, rather than the 72 Public Research II universities, because the former group most resembles the

University of Texas at Austin and Texas A&M University in both their research and educational profiles.

Before proceeding to the results and interpretations of the analysis, a brief description of the content of the tables is in order. For each dimension of performance, separate tables exist for UT Austin and for Texas A&M. The tables illustrate how each university performs relative to its own peers and to all of the other Public Research I universities. For each set of comparisons, the tables indicate performance, both for the most recent year for which data are available and over a period of time lasting typically at least five years.[59]

The first and second columns of every table provide a "peer ranking," indicating how UT Austin or Texas A&M perform relative to other members of the institution's own peer cohort. The second column represents the university's overall peer average and the Public Research I university ("PRI") average on each performance indicator. The third column then provides a ranking of UT Austin or Texas A&M relative to all Public Research I universities. The fourth column contains the actual value (e.g., an examination percentile score or the percentage of students graduating the university) reported for each institution for the most recent year in which the data exist. The table's final column shows percent changes over time in these values, for the peer universities, for the averages of the peer group, and for all PRI universities.

As the data and the corresponding discussion suggest, the University of Texas at Austin and Texas A&M University rank at or above the performance levels of their cohort peers on many of the studied dimensions of undergraduate performance; the two universities often rank even higher when compared to the nation's 70 other Public Research I universities.

Clearly, there are areas of underperformance that need to be addressed – for example, in the areas of student degree completion within four years of entering college and of undergraduate participation rates and four-year graduation rates by African-Americans. Yet, the overall picture that emerges from these data shows that the University of Texas at Austin and Texas A&M University are performing at comparatively high levels nationally, in the realm of undergraduate education.

Student Quality, Selectivity, and Demand

For public universities, such as UT Austin Texas A&M, whose missions explicitly compel them to pursue educational excellence and distinction at the highest possible levels, the overall academic quality of the undergraduate student body is crucial in several respects. Institutions whose student populations are academically accomplished and well prepared for college possess an even stronger foundation on which to build academic programs of the highest caliber. Also, an institution's effectiveness in competing for high-ability students often is an indicator of the extent to which external audiences may regard the education the institution delivers as being of high quality.

Competition for bright and well prepared students, however, has never been fiercer. With increasing access to information about college, less cumbersome application processes, and greater student mobility than ever before, students today can apply to and select from a broad range of schools, including colleges and universities outside of a student's local community or region. Declining levels of state subsidy at many public colleges and universities, rising prices at many of these institutions, and the increasing practice over the past 30 years of tuition discounting at many private postsecondary institutions, have intensified the challenges for public universities in their recruitment of outstanding students.

As illustrated in Tables 3 and 4, the University of Texas at Austin and Texas A&M University nevertheless have performed exceedingly well in their recruitment of talented undergraduates. In fact, these two universities rank among the nation's top public research universities in the quality of the students that apply.

The ACT Composite 75th percentile score of incoming students at UT Austin was a 31 in 2010, meaning that 25 percent of the students who applied to the University of Texas received a composite score of 31 or higher on this widely-used, college entrance examination. A score of 31 indicates a student would have achieved a composite score that is higher than 97 percent of all other test takers nationally.[60] UT Austin's ACT Composite 75th percentile score ranked the university 2nd among its peers and 3rd out of all Public Research I universities. For that same year, Texas A&M's ACT Composite 75th percentile score of 30 positioned this university as 9th best among all PRI universities. In other words, both universities ranked among the top 10 in the nation in the college readiness of their undergraduate students, as indicated by students' ACT scores.[61]

Table 3. ACT Composite 75th Percentile Score at UT Austin and at Peer and Other Public R1 Universities

Peer Rank	Institution	Public R1 Rank (70)	2010	Percent Change 2005-2010
1	University of California Berkeley	T-1	32	6.67%
T-2	University of Texas at Austin	T-3	31	6.90%
T-2	University of California Los Angeles	T-3	31	3.33%
T-2	University of North Carolina at Chapel Hill	T-3	31	3.33%
T-2	University of Michigan	T-3	31	0.00%

T-2	University of Illinois at Urbana-Champaign	T-3	31	3.33%
	Peer Average of University of Texas at Austin		30.27	4.39%
T-7	University of Minnesota Twin Cities	T-9	30	7.14%
T-7	Ohio State University	T-9	30	7.14%
T-7	University of Washington	T-9	30	7.14%
T-7	University of Wisconsin at Madison	T-9	30	0.00%
11	Indiana University Bloomington	T-17	29	7.41%
	PR1 Average		28.19	3.64%
12	Michigan State University	T-31	28	3.70%

Table 4. ACT Composite 75th Percentile Score at Texas A&M and at Peer and Other Public R1 Universities

Peer Rank	Institution	Public R1 Rank (70)	2010	Percent Change 2005-2010
1	University of California Berkeley	T-1	32	6.67%
T-2	University of California Los Angeles	T-3	31	3.33%
T-2	University of North Carolina at Chapel Hill	T-3	31	3.33%
T-2	Georgia Institute of Technology	T-3	31	3.33%
T-2	University of Michigan	T-3	31	0.00%
T-2	University of Illinois at Urbana-Champaign	T-3	31	3.33%
	Peer Average of Texas A&M University		30.29	3.92%
T-7	Texas A & M University	T-9	30	7.14%
T-7	University of Minnesota Twin Cities	T-9	30	7.14%
T-7	Ohio State University	T-9	30	7.14%
T-7	University of California San Diego	T-9	30	3.45%

T-7	University of Florida	T-9	30	3.45%
T-7	University of Wisconsin at Madison	T-9	30	0.00%
T-13	University of California Davis	T-17	29	7.41%
T-13	Pennsylvania State University	T-17	29	3.57%
T-13	Purdue University	T-17	29	3.57%
	PR1 Average		28.19	3.64%

Both universities also have seen recent gains to the ACT scores of incoming students greater than those of their peers. During the period from 2005-2010, the gains to Texas A&M's ACT 75th percentile scores ranked as the 2nd-highest within the university's peer group, while the increases to UT Austin's scores were the 5th-highest within the university's cohort. These consistent gains show that the academic caliber of students entering UT Austin and Texas A&M is not only high, but is improving relative to the nation's other premier public research institutions.

Beyond these markers, there are signs of strong market demand for the education that UT Austin and Texas A&M provide their undergraduates. For example, applications to freshmen admission at the two universities have been very strong. In the ten-year period ending with the freshman classes admitted for fall 2010, admission applications at UT Austin and Texas A&M grew by 48 percent and 40 percent, respectively.

Furthermore, the percentages of full-time students choosing to enroll at the two universities upon admission are among the highest found at any Public Research I university. In 2010, the University of Texas yielded (that is, enrolled) 50 percent of its accepted students, a rate that was 2nd highest among the school's peers and 7th highest out of all Public Research I universities. The 47 percent admissions yield rate for Texas A&M placed the university 3rd among its peers and 10th nationally. With respect to the charge given UT Austin and Texas A&M, that each should assemble student undergraduate populations that are academically talented and highly prepared for college, the data indicate each university has performed near the top of its class.

Student Racial/Ethnic Representation

There are a number of compelling reasons for the presence of racially and ethnically diverse undergraduate student climates. Mounting scientific evidence shows, for example, that the racial/ethnic diversity of an undergraduate population can increase certain desired student outcomes, including students' cognitive development.[62] What is more, in states like Texas, which has seen marked demographic change and rapid increases to its Hispanic population,

educational opportunity for diverse student populations can help ensure future economic and social opportunity for these populations. For these reasons and others, it is also important to examine the extent to which UT Austin and Texas A&M have successfully matriculated students from racially and ethnically diverse backgrounds, in particular students who are Hispanic or African-American.[63]

As Tables 5 and 6 indicate, UT Austin and Texas A&M are among the highest-ranked universities in their respective peer groups in the percentage of undergraduate student enrollment that is Hispanic. Students of Hispanic background comprised almost 20 percent of the undergraduate body at the University of Texas in fall 2010, as compared with peer Hispanic enrollments of 16 percent at UCLA, 12 percent at University of California-Berkeley, 10.6 percent at the University of North Carolina, and about 7 percent at the University of Illinois. Texas A&M's undergraduate Hispanic enrollment of 15.9 percent ranked the institution third among its peers, trailing only by a slight margin the Hispanic enrollments at UCLA and the University of Florida; in fact, less than one percentage point difference separated the three universities. This level of enrollment of Hispanic undergraduates placed the university ahead of peers UC-Davis, UC-San Diego, and UC-Berkeley, three outstanding public universities that, like Texas A&M, are also located in a state that has seen tremendous growth in its Hispanic population.

Of the nation's 72 Public Research I universities, UT Austin ranked 8th and Texas A&M 14th in the representation of Hispanic students at the undergraduate level. The large increases over time in Hispanic undergraduate enrollments at the two universities are even more impressive when compared to increases seen elsewhere because most of the other institutions showing high rates of growth in the enrollment of these students (e.g., UNC) had a lower proportion of Hispanic students to begin with.

Table 5. Percent of Undergraduate Enrollment that is Hispanic at UT Austin and at Peer and Other Public R1 Universities

Peer Rank	Institution	Public R1 Rank (72)	Fall 2010	Percent Change 2005-2010
1	University of Texas at Austin	8	19.42	21.01%
2	University of California Los Angeles	13	15.92	4.27%
3	University of California Berkeley	19	11.92	12.71%
4	University of North Carolina at Chapel	21	10.67	225.32%

	Hill			
	R1 Average		8.49	32.96%
5	University of Illinois at Urbana-Champaign	30	6.86	7.82%
	Peer Average of University of Texas at Austin		6.49	25.57%
6	University of Washington	33	5.88	39.30%
7	University of Michigan	45	4.32	-9.49%
8	University of Wisconsin at Madison	47	3.83	36.27%
9	Indiana University Bloomington	53	3.36	55.86%
10	Michigan State University	57	3.15	10.98%
11	Ohio State University	61	2.86	14.90%
12	University of Minnesota Twin Cities	63	2.62	25.81%

Table 6. Percent of Undergraduate Enrollment that is Hispanic at Texas A&M and at Peer and Other Public R1 Universities

Peer Rank	Institution	Public R1 Rank (72)	Fall 2010	Percent Change 2005-2010
1	University of Florida	12	16.51	30.73%
2	University of California Los Angeles	13	15.92	4.27%
3	Texas A & M University	14	15.89	45.01%
4	University of California Davis	16	14.41	33.23%
5	University of California San Diego	17	13.70	27.58%
6	University of California Berkeley	19	11.92	12.71%
7	University of North Carolina at Chapel Hill	21	10.67	225.32%
	R1 Average		8.49	32.96%

	Peer Average of Texas A&M University		8.33	27.60%
8	University of Illinois at Urbana-Champaign	30	6.86	7.82%
9	Georgia Institute of Technology	37	5.38	42.56%
10	Pennsylvania State University	42	4.57	41.91%
11	University of Michigan	45	4.32	-9.49%
12	University of Wisconsin at Madison	47	3.83	36.27%
13	Purdue University	59	3.06	18.17%
14	Ohio State University	61	2.86	14.90%
15	University of Minnesota Twin Cities	63	2.62	25.81%

While the percent of Hispanic undergraduate enrollment at UT Austin and at Texas A&M is very high for Public Research I universities, the two universities rank even higher when one considers the *numbers* of Hispanic students enrolled on campus. In fact, UT Austin and Texas A&M rank 5th and 6th, respectively, out of the 72 Public Research I universities in terms of the number of undergraduates who are of Hispanic origin.

With respect to the enrollment of African-American students during this period, UT Austin and Texas A&M performed slightly worse than their peers and, alongside most of them, ranked in the bottom half of Public Research I universities nationwide. As shown in Tables 7 and 8, fewer than five percent of the undergraduate students who were enrolled at UT Austin were African-American in Fall 2010; a mere three percent of the Texas A&M student body in that year was African American.

These figures are alarming, as is the overall low representation of African-American students in U.S. research universities. The Public Research I average for African-American undergraduate enrollment is less than seven percent; at *private* Research I universities, enrollment of African American students averaged only 5.7 percent in Fall 2010. These rates of representation are much lower than the representation of African-Americans in the U.S. population or in its higher-education system overall. For those African-Americans who enter in to higher education, too few study at highly-selective research universities.

The performance of UT Austin and Texas A&M in cultivating racially and ethnically diverse student climates on their campuses, therefore, is mixed. Both universities lead their peers and outpace most other Public Research I universities in the representation on their campuses of Hispanic students. Yet, as compared with those same peers, as well as with the

same population of PRI universities, UT Austin ranks in the middle of the pack and Texas A&M toward the bottom in the enrollment of African-American undergraduates.

Table 7. Percent of Undergraduate Enrollment that is African American at UT Austin and at Peer and Other Public R1 Universities

Peer Rank	Institution	Public R1 Rank (72)	Fall 2010	Percent Change 2005-2010	Percent Change 2000-2010
1	University of North Carolina at Chapel Hill	18	9.15	-15.25%	-18.06%
2	Michigan State University	23	7.42	-13.64%	-15.44%
	R1 Average		7.04	-5.50%	-4.61%
3	Ohio State University	32	6.48	-15.03%	-16.91%
4	University of Illinois at Urbana-Champaign	34	5.71	-12.98%	-17.14%
	Peer Average of University of Texas at Austin		4.97	-11.98%	-14.02%
5	University of Texas at Austin	40	4.69	16.58%	37.74%
6	University of Michigan	41	4.49	-37.83%	-42.44%
7	Indiana University Bloomington	42	4.46	-1.86%	13.73%
8	University of Minnesota Twin Cities	43	4.45	1.51%	12.42%
9	University of California Los Angeles	46	3.68	14.30%	-13.80%
10	University of Washington	50	3.30	8.19%	26.34%
11	University of California Berkeley	53	3.04	-13.83%	-29.60%
12	University of Wisconsin at Madison	58	2.47	-3.72%	20.61%

Table 8. Percent of Undergraduate Enrollment that is African American at Texas A&M and at Peer and Other Public R1 Universities

Peer Rank	Institution	Public R1 Rank (72)	Fall 2010	Percent Change 2005-2010	Percent Change 2000-2010
1	University of Florida	15	9.39	7.09%	16.02%
2	University of North Carolina at Chapel Hill	18	9.15	-15.25%	-18.06%
	R1 Average		7.04	-5.50%	-4.61%
3	Ohio State University	32	6.48	-15.03%	-16.91%
4	Georgia Institute of Technology	33	6.22	-16.61%	-26.82%
5	University of Illinois at Urbana-Champaign	34	5.71	-12.98%	-17.14%
	Peer Average of Texas A&M University		4.76	-9.46%	-12.28%
6	University of Michigan	41	4.49	-37.83%	-42.44%
7	University of Minnesota Twin Cities	43	4.45	1.51%	12.42%
8	Pennsylvania State University	44	3.91	-4.15%	-1.08%
9	University of California Los Angeles	46	3.68	14.30%	-13.80%
10	Purdue University	48	3.48	-0.02%	12.06%
11	University of California Berkeley	53	3.04	-13.83%	-29.60%
12	Texas A & M University	55	2.91	10.12%	18.46%
13	University of California Davis	56	2.67	4.79%	-1.34%
14	University of Wisconsin at Madison	58	2.47	-3.72%	20.61%

15	University of California San Diego	68	1.48	10.34%	10.22%

Tuition and Fee Levels

As discussed, the past 30 years have witnessed a dramatic decline in state funding for higher education, relative to state budget capacity, per capita wealth in the states, and full-time equivalent student enrollments at public colleges and universities. Over the same period, the costs to providing higher education have risen, in large part as a result of inflation in underlying cost drivers, such as labor costs, capital infrastructure costs, and energy costs.

Today, state funding per student at both UT Austin and Texas A&M is lower than that at most of the institutions' peers – by as much as two-thirds in comparison with the University of North Carolina and UCLA, for example. Alongside the steepened enrollment pressures and the severe budget strains that exist for many states, these relatively low levels of public funding per student have placed upward pressures on tuition and fee levels. Public colleges and universities can and should do more to hold down their costs, and to raise still more private philanthropy in support of the undergraduate mission of the universities but, inevitably, tuition and fees must rise or, universities will leach quality.

Yet, the analysis of prices at UT Austin and Texas A&M from 2006 to 2011 reveal that tuition and fee levels for full-time, undergraduate students at the universities have remained competitive with peer institutions. According to IPEDS data, UT Austin charges roughly $1,000 less than its peers, while Texas A&M charges roughly $2,000 less than its peers, making that university the fourth-least expensive within its cohort (Tables 9 and 10). Of key importance, each university charges less than that of the median institution within its own peer group.

In the early- to mid-2000s, UT Austin and Texas A&M adopted some of the nation's steepest increases in tuition and fees, as was authorized by the Texas legislature.[64] These increases came after passage in 2004 of a tuition decentralization bill similar to ones that have been enacted in other states, for example in Virginia.

Since that earlier period, however, the average annual tuition and fee increases at UT Austin and Texas A&M have remained below five percent after adjusting for inflation. These rises are less than the averages of the increases seen at the two universities' peers and at the nation's 70 other Public Research I institutions. In fact, the data show that the increases in tuition and fees at UT Austin have been the fourth-lowest out of the 12 members comprising the university's peer group, while tuition and fee increases at Texas A&M have been the third-lowest of the 15 other institutions comprising its cohort.

Table 9. Average In-state Tuition and Fees for Full-Time Undergraduates Attending UT Austin and Peer and Other Public R1 Universities

(Note: Universities are ranked from least-to-most expensive)

Peer Rank	Institution	Public R1 Rank (72)	2010-2011	Percent Change 2006-2011
1	University of North Carolina at Chapel Hill	14	6,665	29.40%
2	University of Washington	41	8,701	38.91%
	PR1 Average		8,781.31	28.61%
3	University of Wisconsin at Madison	43	8,983	28.11%
4	Indiana University Bloomington	44	9,028	13.69%
5	University of Texas at Austin	46	9,418	20.99%
6	Ohio State University	47	9,420	4.39%
	Peer Average of University of Texas at Austin		10,358.27	28.71%
7	University of California Los Angeles	55	10,781	48.46%
8	University of California Berkeley	57	10,940	50.47%
9	Michigan State University	62	11,670	28.91%
10	University of Michigan	65	11,837	15.07%
11	University of Minnesota Twin Cities	68	12,203	26.76%
12	University of Illinois at Urbana-Champaign	70	13,713	42.25%

*****Adjusted for inflation according to the Bureau of Labor Statistics. The 2006 dollars were adjusted to 2010-2011 for the percent change calculation.

Table 10. Average In-state Tuition and Fees for Full-Time Undergraduates Attending Texas A&M and Peer and Other Public R1 Universities

(Note: Universities are ranked from least-to-most expensive)

Peer Rank	Institution	Public R1 Rank (72)	2010-2011	Percent Change 2006-2011
1	University of Florida	2	5,044	46.01%
2	University of North Carolina at Chapel Hill	14	6,665	29.40%
3	Georgia Institute of Technology	28	7,519	44.89%
4	Texas A & M University	34	8,387	17.39%
	PR1 Average		8,781.31	28.61%
5	University of Wisconsin at Madison	43	8,983	28.11%
6	Purdue University	45	9,070	25.79%
7	Ohio State University	47	9,420	4.39%
	Peer Average of Texas A&M University		10,334.93	31.82%
8	University of California Los Angeles	55	10,781	48.46%
9	University of California Berkeley	57	10,940	50.47%
10	University of California San Diego	60	11,306	51.48%
11	University of Michigan	65	11,837	15.07%
12	University of California Davis	66	11,958	43.62%
13	University of Minnesota Twin Cities	68	12,203	26.76%
14	University of Illinois at Urbana-Champaign	70	13,713	42.25%
15	Pennsylvania State University	72	15,250	18.69%

*Adjusted for inflation, as noted in Table 9

Student Retention and Graduation Rates

Interest in improving undergraduate degree completion in the U.S. recently has attained a high degree of intensity among the public and within the policy communities of the federal and state governments. Several factors have contributed to the heavy emphasis that today is being placed on improving the timeliness of student degree completion at colleges and universities.

The growing awareness of the financial importance to individuals in obtaining a college degree has been one factor. College graduates are more likely than non-degree holders to find and hold employment and to earn higher incomes. Timely degree completion, therefore, helps ensure students receive higher returns on their investment in college and enables them to better withstand economic downturns. Conversely, delayed completion of college, or worse, non-completion, can translate into foregone income, higher levels of loan indebtedness, and greater vulnerability in the jobs market.

The states also have a vested interest in increasing Bachelor's degree completion. With higher levels of college attainment among a state's citizenry, there comes a larger tax base. College graduates tend to pay more taxes on their typically higher incomes, and rely less on government social programs. States also stand to reap numerous social and civic benefits that flow from a more educated populace; college graduates, for example, are less likely to be incarcerated, are more likely to engage in civic activities, and tend to have both better health outcomes and healthier children.[65]

Although the topic of undergraduate student degree completion appropriately is one that attracts enormous attention today, much confusion also surrounds the subject. Understanding at least three important facets to the issue is essential to effectively drawing and interpreting comparisons among postsecondary education institutions.

The first source of confusion involves the time period that colleges and universities officially use to calculate rates of degree completion by undergraduates. In 1990, the U.S. federal government declared the period of six years as the basis for determining the proportion of students that have completed their Bachelor's degree at a given institution.[66] In 1997 the federal government began systematically to collect these calculations through IPEDS.

The reasons for focusing on institutions' six-year graduation rates are numerous. The average college-going age of students has risen in recent decades, as have the numbers of part-time students, who often take longer than full-time students to complete their degrees. Cuts in public funding of higher education and rises in college prices have contributed to this development. In some cases, the curriculum requirement of certain college majors has grown, in part because of the explosion of knowledge that occurred in many fields over the past half century. For these reasons and others, many national policy organizations, state agencies, and analysts focus on the six-year student graduation rate for institutions, as well as on the traditional, four-year graduation rate statistic. This report likewise examines the performance of

the institutions on their success in graduating students in both the six-year and four-year time periods.

A second poorly-understood facet to graduation rate reporting is that graduation statistics rely on incomplete measures of student participation and completion. For example, the figures institutions report do not count the individuals who begin college as part-time students, nor do they include students who begin at community colleges and later transfer to four-year institutions. Neither do the reported graduation rates include any of those students who completed college seven or more years after they began their studies, even though it is well documented that undergraduates are taking longer than ever to complete their degrees.[67] These factors may well contribute to underreporting of Bachelor's degree completion.

Finally, graduation rates must be viewed in their proper institutional contexts. Completion rates can vary enormously by type of institution.[68] Students graduate at the highest rates from private, not-for-profit institutions, followed by public colleges and universities; completion rates, on average, are lowest at for-profit schools. Nationally, the average, 6-year graduation rate at private, not-for-profit institutions in 2010 was 52 percent, as compared with 46 percent at public institutions and 29 percent at for-profit schools. Graduation rates, however, can also vary substantially within a sector. Completion rates at state universities, for example, can range from as high as 92 percent to as low as the single digits.

Some experts, in fact, have argued that expectations for exceedingly high completion rates are misplaced. Factually, it is sometimes in the best educational, career, and personal interests of students for them to depart one college for another.[69] The problem that campus officials and policymakers should seek to stem, such analysts have argued, is unwanted college departure, which the present data systems of the states are unable to parse.

These caveats underline an essential point: undergraduate completion-rate data should be viewed in context. Comparisons are most meaningful when made between and among colleges and universities that serve equivalent missions and educate broadly similar student populations. How have UT Austin and Texas A&M University performed, relative to peer schools, in graduating the students they enroll?

Before proceeding, there is a precursor question: how well do the institutions retain full-time students from the spring semester to the following fall? On this dimension of student retention, the University of Texas at Austin and Texas A&M University perform quite well. They boast some of the nation's best undergraduate retention rates for full-time students – rates that are well above the national average of other public research institutions. The undergraduate retention rate for UT Austin in 2010 was 92 percent; for Texas A&M, the rate was 91 percent. It is also worth bearing in-mind that a very narrow band separates the public research universities at the top of the rankings. In 2010, only five percentage points separated UT Austin, ranking 17th out of 72 Public Research I universities, from the number-one ranked, UCLA.

Returning to Bachelor's degree completion, Tables 11-18 compare the six-year graduation rates of UT Austin and Texas A&M with those of their peers and of all other Public Research I universities. Specifically, Tables 11 and 12 present findings on the overall six-year graduation rates of students enrolled at the University of Texas and at Texas A&M. Tables 13 and 14 show the relative performance of the two universities in graduating Hispanic students within six years of enrollment. Tables 15 and 16 indicate the universities' relative performance in graduating African-American students within six years. Finally, Tables 17 and 18 display the performance of UT Austin and Texas A&M, respectively, in graduating their students within the span of four years.

Both UT Austin and Texas A&M perform about on-par with their peers in graduating students within six years. For 2010, the University of Texas ranked 7th out of its 12-member peer cohort, and within the top 25 percent of all Tier I public research universities in the rate at which students completed their Bachelor's degrees within this time frame. Texas A&M ranked 11th in its 15-member peer group, joining UT Austin among the top quartile of performers nationally. With respect to improvements over time in graduation rates, both universities fell right in the middle of their peer categories.

Table 11. Six-Year Graduation Rates at UT Austin and at Peer and Other Public R1 Universities

Peer Rank	Institution	Public R1 Rank (72)	Aug. 2010	Percent Change 2004-2010
1	University of California Berkeley	2	91	4.60%
T-2	University of California Los Angeles	T-3	90	3.45%
T-2	University of Michigan	T-3	90	3.45%
4	University of North Carolina at Chapel Hill	5	88	8.64%
5	University of Illinois at Urbana-Champaign	T-8	84	5.00%
6	University of Wisconsin at Madison	T-10	83	9.21%
	Peer Average of University of Texas at Austin		82.00	8.54%
T-7	University of Texas at Austin	T-15	80	8.11%
T-7	University of Washington	T-15	80	9.59%

9	Ohio State University	T-22	78	25.81%
10	Michigan State University	T-24	77	8.45%
11	Indiana University Bloomington	30	71	0.00%
12	University of Minnesota Twin Cities	T-31	70	25.00%
	PR1 Average		68.07	7.60%

Table 12. Six-Year Graduation Rates at Texas A&M and at Peer and Other Public R1 Universities

Peer Rank	Institution	Public R1 Rank (72)	Aug. 2010	Percent Change 2004-2010
1	University of California Berkeley	2	91	4.60%
T-2	University of California Los Angeles	T-3	90	3.45%
T-2	University of Michigan	T-3	90	3.45%
4	University of North Carolina at Chapel Hill	5	88	8.64%
5	University of California San Diego	6	86	3.61%
6	Pennsylvania State University	7	85	2.41%
T-7	University of Illinois at Urbana-Champaign	T-8	84	5.00%
T-7	University of Florida	T-8	84	7.69%
9	University of Wisconsin at Madison	T-10	83	9.21%
	Peer Average of Texas A&M University		82.86	7.71%
10	University of California Davis	12	82	1.23%
T-11	Texas A & M University	T-15	80	5.26%
T-11	Georgia Institute of Technology	T-15	80	11.11%
13	Ohio State University	T-22	78	25.81%

14	University of Minnesota Twin Cities	T-31	70	25.00%
15	Purdue University	T-34	69	7.81%
	PR1 Average		68.07	7.60%

In 2010, both UT Austin and Texas A&M graduated 71 percent of the Hispanic students who had enrolled at the institutions within the prior six years; these completion rate figures are shown in Tables 13 and 14. The peer leader for both universities (UC-Berkeley) graduated 86 percent of its Hispanic students, while the University of Minnesota graduated 57 percent of its students. With completion rates of 71 percent, UT Austin and Texas A&M trailed the average of their peers by about two to four percentage points, although few of those peers had Hispanic student enrollments of a size comparable to that of the two Texas universities. The graduation rates of Hispanic students at both UT Austin and Texas A&M beat the average rate of all public Research I universities by more than ten percentage points.

Table 13. Six-Year Graduation Rates for Hispanic Students at UT Austin and at Peer and Other Public R1 Universities

Peer Rank	Institution	Public R1 Rank (72)	Aug. 2010	Percent Change 2004-2010
1	University of California Berkeley	3	86	10.26%
T-2	University of Michigan	T-4	84	6.33%
T-2	University of California Los Angeles	T-4	84	5.00%
4	University of North Carolina at Chapel Hill	8	81	-8.99%
5	University of Washington	15	74	21.31%
6	University of Illinois at Urbana-Champaign	T-16	73	5.80%
	Peer Average of University of Texas at Austin		72.55	10.99%
7	University of Texas at Austin	T-19	71	7.58%
8	University of Wisconsin at Madison	T-22	70	25.00%

9	Ohio State University	31	66	24.53%
10	Michigan State University	33	64	30.61%
	PR1 Average		61.53	12.04%
11	Indiana University Bloomington	T-40	59	-6.35%
12	University of Minnesota Twin Cities	T-46	57	35.71%

Table 14. Six-Year Graduation Rates for Hispanic Students at Texas A&M and at Peer and Other Public R1 Universities

Peer Rank	Institution	Public R1 Rank (72)	Aug. 2010	% Change 2004-2010
1	University of California Berkeley	3	86	10.26%
T-2	University of Michigan	T-4	84	6.33%
T-2	University of California Los Angeles	T-4	84	5.00%
4	Georgia Institute of Technology	6	83	22.06%
5	University of Florida	7	82	10.81%
6	University of North Carolina at Chapel Hill	8	81	-8.99%
7	University of California San Diego	9	79	-1.25%
8	Pennsylvania State University	T-10	77	16.67%
	Peer Average of Texas A&M University		75.50	10.45%
T-9	University of Illinois at Urbana-Champaign	T-16	73	5.80%
T-9	University of California Davis	T-16	73	2.82%
11	Texas A & M University	T-19	71	7.58%
12	University of Wisconsin at Madison	T-22	70	25.00%
13	Ohio State University	31	66	24.53%
14	Purdue University	T-34	62	19.23%
	PR1 Average		61.53	12.04%

15	University of Minnesota Twin Cities	T-46	57	35.71%

Turning to graduation rates for African-American students, the data for 2010 indicate wide variability in institutional performance (Tables 15 and 16). The peer leaders for UT Austin and Texas A&M, UNC and UC-San Diego, respectively, graduated slightly more than 80 percent of their African-American students, while the University of Minnesota graduated 45 percent of its African-American students.

The 66 percent rate of Bachelor's degree completion among African-American students at UT Austin placed the university almost 10 points above the average of all Public Research I universities, yet slightly below the average of its peers. Texas A&M's graduation rate for African-Americans (69 percent) likewise exceeded the average of all Public Research I universities by nearly fourteen percentage points, while it trailed slightly the average of its cohort peers. Of concern is the decline since 2004 in the graduation rates of African-American students at the two Texas universities, this being a period during which some peers made substantial gains in the graduation rates of this student population.

Table 15. Six-Year Graduation Rates for African-American Students at UT Austin and at Peer and Other Public R1 Universities

Peer Rank	Institution	Public R1 Rank (72)	Aug. 2010	Percent Change 2004-2010
1	University of North Carolina at Chapel Hill	T-3	81	15.71%
2	University of Michigan	6	78	13.04%
T-3	University of California Los Angeles	T-7	77	10.00%
T-3	University of Illinois at Urbana-Champaign	T-7	77	32.76%
5	University of California Berkeley	T-9	76	5.56%
6	University of Washington	21	70	16.67%
7	Ohio State University	T-22	69	53.33%
	Peer Average of University of Texas at Austin		67.64	15.89%

8	University of Texas at Austin	26	66	-5.71%
9	University of Wisconsin at Madison	T-34	61	12.96%
	PR1 Average		58.14	10.59%
10	Michigan State University	T-38	58	7.41%
11	Indiana University Bloomington	T-48	52	-1.89%
12	University of Minnesota Twin Cities	T-55	45	21.62%

Table 16. Six-Year Graduation Rates for African-American Students at Texas A&M and at Peer and Other Public R1 Universities

Peer Rank	Institution	Public R1 Rank (72)	Aug. 2010	Percent Change 2004-2010
	University of California San Diego	2	82	12.33%
	University of North Carolina at Chapel Hill	T-3	81	15.71%
	University of Michigan	6	78	13.04%
	University of California Los Angeles	T-7	77	10.00%
	University of Illinois at Urbana-Champaign	T-7	77	32.76%
	University of California Berkeley	9	76	5.56%
	Pennsylvania State University	T-11	75	13.64%
	University of California Davis	T-11	75	4.17%
	Georgia Institute of Technology	T-13	74	32.14%
	University of Florida	T-16	73	8.96%
	Peer Average of Texas A&M University		71.85	16.57%
	Texas A & M University	T-23	69	-5.48%
	Ohio State University	T-23	69	53.33%
	Purdue University	T-29	63	16.67%

	University of Wisconsin at Madison	T-34	61	12.96%
	PR1 Average		58.14	10.59%
	University of Minnesota Twin Cities	T-55	45	21.62%

Finally, Tables 17 and 18 examine the rates of student graduation within four years of the date of initial enrollment. The four-year graduation rates at UT Austin and at Texas A&M for 2010 stood at 53 percent and 46 percent, respectively.[70] Although these rates beat the average of all Public Research I universities, they lagged substantially behind the averages of UT Austin's and Texas A&M's peers. For instance, UT Austin's peer leader in 2010 was the University of North Carolina at Chapel Hill, whose four-year graduation rate, of 75 percent was second-highest among Public Research I universities. The performance gap between UT Austin and its peer leader, therefore, exceeded 20 percentage points. The gap between Texas A&M and UNC was even larger – almost 30 percentage points.[71] These disparities between UT Austin and Texas A&M and their peers in the four-year graduation rates of students are concerning.

The wide gap should not, however, obscure the noteworthy strides these two universities have made. Texas A&M University improved its graduation rate by more than 40 percent between 2004 and 2010, while the University of Texas showed completion gains of nearly 36 percent over the same period. These rates of improvement readily exceed those of nearly all of institution's peers, as well as the average of all Public Research I universities.

More improvement in this area is needed and consequently major institutional initiatives aimed at producing large increases in the universities' four-year graduation rates recently have been undertaken. For example, a February 2012 report by a task force on improving four-year graduation rates at the University of Texas recommended dozens of detailed strategies for elevating the rates of Bachelor's degree completion to 70 percent over the forthcoming five-year period.[72] Many of these proposals have since been adopted by the university and are actively being implemented.

Table 17. Four-Year Graduation Rates at UT Austin and at Peer and Other Public R1 Universities

Peer Rank	Institution	Public R1 Rank (72)	Aug. 2010	Percent Change 2004-2010
1	University of North Carolina at Chapel Hill	2	75	11.94%

2	University of Michigan	3	72	7.46%
3	University of California Berkeley	4	69	30.19%
4	University of California Los Angeles	5	68	19.30%
5	University of Illinois at Urbana-Champaign	6	67	15.52%
	Peer Average of University of Texas at Austin		58.91	24.62%
6	University of Washington	17	54	28.57%
7	University of Texas at Austin	T-18	53	35.90%
T-8	University of Wisconsin at Madison	T-24	50	28.21%
T-8	Indiana University Bloomington	T-24	50	21.95%
10	Ohio State University	28	49	58.06%
11	Michigan State University	29	48	33.33%
12	University of Minnesota Twin Cities	T-30	46	58.62%
	PR1 Average		42.15	23.57%

Table 18. Four-Year Graduation Rates at Texas A&M and at Peer and Other Public R1 Universities

Peer Rank	Institution	Public R1 Rank (72)	Aug. 2010	Percent Change 2004-2010
1	University of North Carolina at Chapel Hill	2	75	11.94%
2	University of Michigan	3	72	7.46%
3	University of California Berkeley	4	69	30.19%
4	University of California Los Angeles	5	68	19.30%
5	University of Illinois at Urbana-Champaign	6	67	15.52%
6	Pennsylvania State University	T-9	62	29.17%

7	University of Florida	14	59	15.69%
8	University of California San Diego	15	57	14.00%
	Peer Average of Texas A&M University		56.86	22.27%
9	University of California Davis	23	51	15.91%
10	University of Wisconsin at Madison	T-24	50	28.21%
11	Ohio State University	28	49	58.06%
T-12	Texas A & M University	T-30	46	43.75%
T-12	University of Minnesota Twin Cities	T-30	46	58.62%
	PR1 Average		42.15	23.57%
14	Purdue University	42	38	22.58%
15	Georgia Institute of Technology	T-48	33	26.92%

Bachelor's Degree Production

As discussed in the report's opening sections, colleges and universities make many direct economic contributions to the communities in which they are located, including, for example, employment and expenditure effects. Yet, postsecondary institutions also play a vital role in helping build the collective knowledge and skills of a state's citizenry. This contribution to human-capital formation is a crucial factor in the economic success of states because those areas that possess more human-capital tend to have more economic activity, experience faster economic growth, and witness less job loss during periods of economic downturn.

Because producing skilled graduates is one of the main ways in which colleges and universities help their communities and states build human-capital, an important consideration in assessing the performance of public higher-education institutions involves the magnitude of the institutions' production of Bachelor's degrees. Although the quality of the education that students receive certainly is vital, the sheer numbers of graduates that a university produces also has important consequences.

On the dimension of Baccalaureate degree production, the University of Texas at Austin and Texas A&M University perform outstandingly well, both in absolute terms and in comparison to other research universities. UT Austin and Texas A&M each year graduate vast numbers of Bachelor's recipients, and thus make invaluable contributions to human capital formation in Texas.

As indicated in Tables 19 and 20, UT Austin in 2010 alone awarded 8,838 bachelor's degrees, while Texas A&M awarded 8,451 degrees. These levels of degree production are among the very highest in all of U.S. higher education. In fact, UT Austin and Texas A&M ranked 2nd and 4th, respectively, among their peers in the number of students the institutions graduated in that year. More impressive, perhaps, is that UT Austin graduated the 6th largest number of college students out of all Public Research I universities, while Texas A&M graduated the 7th largest number of degree holders.

Table 19. Bachelor's Degree Production at the UT Austin and at Peer and Other Public R1 Universities

Peer Rank	Institution	Public R1 Rank (72)	2010	Percent Change 2004-2010
1	Ohio State University	4	9,503	14.66%
2	University of Texas at Austin	6	8,838	-0.89%
3	Michigan State University	8	8,223	5.65%
4	University of Washington	10	7,753	7.77%
5	University of California Los Angeles	11	7,543	7.36%
6	University of Illinois at Urbana-Champaign	12	7,422	9.74%
	Peer Average of University of Texas at Austin		7,149.18	9.38%
7	University of California Berkeley	13	7,092	6.65%
8	University of Minnesota Twin Cities	14	6,942	14.76%
9	Indiana University Bloomington	15	6,752	9.40%
10	University of Wisconsin at Madison	18	6,558	3.50%
11	University of Michigan	20	6,457	9.02%
	PR1 Average		5,112.60	13.55%
12	University of North Carolina at Chapel Hill	38	4,396	18.33%

Table 20. Bachelor's Degree Production at Texas A&M and at Peer and Other Public R1 Universities

Peer Rank	Institution	Public R1 Rank (72)	2010	Percent Change 2004-2010
1	Pennsylvania State University	2	11,496	25.86%
2	Ohio State University	4	9,503	14.66%
3	University of Florida	5	9,301	8.48%
4	Texas A & M University	7	8,451	6.79%
5	University of California Los Angeles	11	7,543	7.36%
6	University of Illinois at Urbana-Champaign	12	7,422	9.74%
7	University of California Berkeley	13	7,092	6.65%
	Peer Average of Texas A&M University		7,011.64	12.79%
8	University of Minnesota Twin Cities	14	6,942	14.76%
9	University of Wisconsin at Madison	18	6,558	3.50%
10	University of Michigan	20	6,457	9.02%
11	Purdue University	21	6,385	2.29%
12	University of California Davis	22	6,369	13.57%
13	University of California San Diego	25	5,857	41.78%
	PR1 Average		5,112.60	13.55%
14	University of North Carolina at Chapel Hill	38	4,396	18.33%
15	Georgia Institute of Technology	63	2,842	9.56%

There are reasonable limits, of course, to the possible enrollment size and growth that any university can sustain, beyond which, further enlargement can only undercut academic excellence, dilute the quality of teaching and learning, erode services provided to students, and compromise an institution's capability in fulfilling other crucial aspects of its mission. This is especially so for public research universities because their missions entail the education of undergraduate and graduate students, the discovery of new knowledge, the improved application of known discoveries, and the conduct of specialized forms of public outreach and service – truly, a remarkable and a diverse array of functions.

In seeking to preserve for public research universities a proper balance among these different, important roles, state policymakers and other stakeholders must, on occasion, be willing to reexamine the trade-offs that are at-stake. Texas seemingly made such a choice when, in 2009, the Legislature authorized UT Austin to limit future enrollment increases to their undergraduate population. This action, in part, accounts for the slight enrollment declines seen at that university in the past few years.

Bachelor's Degree Production in STEM Fields

Public universities can strategically serve both the labor-force and economic-development needs of their states, regions, and localities in a variety of ways. One such need involves the imperative today for more college graduates in the "STEM" fields of science, technology, engineering, and mathematics. According to a widely cited report, the U.S. in 2009 ranked 27th (i.e., next to last) among the world's developed nations in the proportion of college students that receive undergraduate degrees in science or engineering.[73] The consequences of the nation's underproduction of college graduates in STEM fields could prove profoundly adverse to the nation's economic prosperity and to its global competitiveness in science, technology, and innovation.

How well have the University of Texas at Austin and Texas A&M University performed in helping Texas and the nation meet their needs in this area? As might be expected of universities whose individual academic programs in the STEM fields rank among the country's finest, UT Austin and Texas A&M also produce very large numbers of college graduates in the fields of science, technology, engineering, and math (Tables 21 and 22). In 2009, the most recent year for which comprehensive data exist, Texas A&M graduated the second-largest number of STEM degrees nationally, while UT Austin graduated the fourth-largest number.

Table 21. Undergraduate STEM Degrees Awarded at UT Austin and at Peer and Other Public R1 Universities

Peer Rank	Institution	Public R1 Rank (72)	2008-2009	Percent Change 2001-2009
1	University of California Berkeley	3	2,257	73.48%
2	The University of Texas at Austin	4	2,108	19.16%
3	University of Illinois at Urbana-Champaign	7	1,929	1.31%
4	University of Michigan	11	1,822	18.54%
5	University of Washington	13	1,779	43.35%
6	University of Wisconsin at Madison	14	1,725	13.49%
7	Michigan State University	17	1,539	18.20%
8	University of Minnesota Twin Cities	18	1,533	27.43%
	Peer Average of University of Texas at Austin		1,527.27	26.01%
9	University of California Los Angeles	19	1,513	24.42%
10	Ohio State University	20	1,508	29.44%
	PR1 Average		1,045.78	26.65%
11	University of North Carolina at Chapel Hill	50	646	31.03%
12	Indiana University Bloomington	T-57	549	22.00%

Table 22. Undergraduate STEM Degrees Awarded at Texas A&M and at Peer and Other Public R1 Universities

Peer Rank	Institution	Public R1 Rank (72)	2008-2009	Percent Change 2001-2009
1	Pennsylvania State University	1	2,496	30.07%
2	Texas A & M University	2	2,405	16.24%
3	University of California Berkeley	3	2,257	73.48%
4	University of California San Diego	5	2,004	74.26%
5	University of California Davis	6	1,976	51.07%
6	University of Illinois at Urbana-Champaign	7	1,929	1.31%
7	Georgia Institute of Technology	8	1,919	25.51%
8	Purdue University	10	1,857	5.57%
9	University of Michigan	11	1,822	18.54%
10	University of Florida	12	1,800	20.24%
	Peer Average of Texas A&M University		1,784.64	28.12%
11	University of Wisconsin at Madison	14	1,725	13.49%
12	University of Minnesota Twin Cities	18	1,533	27.43%
13	University of California Los Angeles	19	1,513	24.42%
14	Ohio State University	20	1,508	29.44%
	PR1 Average		1,045.78	26.65%
15	University of North Carolina at Chapel Hill	50	646	31.03%

Because STEM degree production partially is a function of the large number of undergraduates the universities produce, an examination of the *share* of STEM degrees that UT Austin and Texas A&M produce, out of the total number of Bachelor's degrees awarded annually, can be another helpful gauge of STEM degree production on the two campuses.

In 2009, Texas A&M graduated almost 29 percent of its students in a STEM-related field, ranking the university sixth among its peers and 11th out of all Public Research I universities. The University of Texas graduated slightly more than 24 percent of its class in a STEM related field, ranking the university sixth among its peers and 22nd nationally. Placing together the two sets of figures, those for the number of STEM degrees and those indicating the share of STEM degrees awarded annually by the two universities, UT Austin and Texas A&M clearly emerge as being among the country's foremost leaders in STEM degree production.

Section Findings

This section of the report has examined how well the University of Texas at Austin and Texas A&M University have performed relative to their peers and to the nation's 70 other Public Research I universities on five important dimensions relating to undergraduate education. The results have shown that on most of the dimensions, UT Austin and Texas A&M rank substantially ahead of many other public research universities, while also faring competitively with and sometimes besting their cohort peers, a group that encompasses many of America's most highly-esteemed public research universities.

To be certain, UT Austin and Texas A&M must do more to improve both the representation within their undergraduate populations of African-American students and the rates at which these students graduate. Furthermore, the universities must work harder to assist students in the goal of graduating within four years of college, despite the economic, financial, and societal cross-currents that have weakened students' abilities to do so.

The data indicate that there are numerous metrics in the realm of undergraduate education on which UT Austin and Texas A&M perform well. Included among these are the following:

- UT Austin and Texas A&M attract the highest caliber of students in the nation who attend public research universities. The academic quality of the undergraduate student body at the two universities is remarkably high and recently has improved even relative to peers. Additionally, both universities boast record numbers of applicants and enjoy high admissions yield rates. All of these conditions are markers of very strong student demand for the undergraduate education UT Austin and Texas A&M provide.

- UT Austin and Texas A&M rank first and third, respectively, among peers in the percent of the undergraduate student enrollment that is Hispanic/Latino.

- UT Austin and Texas A&M produce enormous human-capital for their communities and their state. Their awarding annually of large numbers of

Bachelor's degrees showcases the two universities as being among the nation's foremost leaders in the volume of Bachelor's degrees earned.

- While UT Austin and Texas A&M clearly remain committed to providing their students a liberal arts education, of which more is to be said in the following section, the universities also are among the nation's leaders in the production of Bachelor's degrees in the high-need, STEM fields.

- UT Austin and Texas A&M boast some of the highest rates of undergraduate retention in the country; the scores of the two universities rank well above the national average of other Public Research I institutions.

- With respect to six-year graduation rates, both UT Austin and Texas A&M perform right on par with their cohort peers and well above the average of Public Research I institutions.

- Texas A&M performs above the median of its peers in terms of improvement to its six-year graduation rate over time, while UT Austin is improving at a rate faster than all but three of its peers and well above the average of all Public Research I universities.

- The six-year graduation rates for Hispanic students at UT Austin and Texas A&M exceed the average rate of all Research I institutions by more than 10 percentage points.

- Although the four-year graduation rates at both UT Austin and Texas A&M lag behind peer averages, both universities exceed the average of Research I institutions. The universities also have realized gains to their four-year graduation rates that exceed the gains of peers and of other top-tier research institutions. In an effort to improve these rates further still, the universities recently have launched a variety of initiatives aimed at improving the four-year graduation rates of their students. Some of these efforts are described in the following section of the report.

- The universities provide excellent education at a price that is competitive with the finest universities of their kind in the U.S. In effect, UT Austin and Texas A&M offer their students enormous educational value. Not only have the universities recently kept tuition increases relatively modest, but they are improving their performance on a variety of measures relating to student quality and success. Thus, even as UT Austin and Texas A&M are becoming more affordable in relation to their peers, they also are simultaneously improving their quality and performance.

These gains are unlikely to be sustained, however, and could well be reversed should UT Austin and Texas A&M endure a prolonged fiscal climate in which state financial support fails to keep pace with previous appropriations expenditures per FTE student and tuition levels are suppressed relative to either student demand or the tuition levels of peer universities.

V.

Evidence of Student Learning and of High-Quality Environments Supporting Student Learning at UT Austin and at Texas A&M

There is an abundance of evidence with which to conclude that the University of Texas at Austin and Texas A&M University perform as well as or better than their peers on a variety of important dimensions of undergraduate education. Whether on indicators of the quality and the academic preparedness of the undergraduate student population, prices, or degree productivity, UT Austin and Texas A&M perform well in comparison both with peers and the nation's other leading research universities.

This final substantive section of the report turns to a different kind of question: What is the evidence of undergraduate student learning and of the existence of academic environments fostering student learning at UT Austin and at Texas A&M? In addition, what evidence exists of efforts actively undertaken at both UT Austin and Texas A&M that would improve student learning on those campuses?

Interest in defining, understanding, and improving undergraduate learning is by no means new to American higher education, although it recently has attained a notably high degree of intensity. Indeed, debates over the goals of a college education, over what colleges should teach, and over what students should learn, date to the founding of the nation's earliest colleges, and have endured, if intermittently, through to the present day.[74]

As America has changed and its colleges and universities have grown, societal expectations regarding the nature and purposes of undergraduate learning likewise have evolved.[75] No longer, for example, do faculty, students, and external stakeholders believe, as the faculty authors of the famous "Yale Report of 1828" once believed, that all undergraduates should follow a single curriculum, with mastery of the classics at its center. Rather, there is widespread agreement today favoring flexibility, openness, and student choice in undergraduate education, if also a growing view among many parties of the need for a recommitment to liberal arts education across the postsecondary education landscape.

Yet, there is much about undergraduate education that remains unsettled, including a widening public debate over the educational outcomes of college. This can be attributed, in part, to the arrival on the scene of a series of unflattering assessments of college student learning, which in general assert that students today do not make as much progress as they should toward many of the widely-accepted goals of undergraduate education: e.g., critical thinking, complex reasoning, quantitative skills, and moral development. For instance, one study, based on a sample of 2,300 undergraduates at 24 schools, found that 45 percent of students showed no

significant improvement in a variety of such skills during their first two years of college.[76] This report and others like it have helped fuel public debate over the value of college.

In public higher education, the point of contention sometimes has surrounded the lack of systematic data from direct measures of college-level learning that are comparable on a state-by-state basis. To be sure, myriad programs at public and private colleges and universities have explicit, direct measures of college learning, which are used for purposes of ongoing program improvement and for professional accreditation, among other valuable uses. At the state level, however, there have not been sufficient data to enable meaningful state-by-state comparisons.[77]

Many states over the past 30 years have encouraged, incentivized, or mandated use of a wide array of direct and indirect measures of college-level learning in public higher education. This development arose alongside the heightened demands for newer, outcomes-focused accountability systems in higher education.[78] As a consequence, states and public campuses have experimented with a number of different types of assessments, to varying degrees of success.

One keen analyst, Peter Ewell, has characterized the trend in state-mandated assessments of college level learning as being "fitful and complex."[79] He notes that one of the limitations of such efforts is the existence of a perennial, perhaps inherent, "tension" that is at work in the different ends to which the states and public universities have put these learning assessments. The strain is between accountability, on the one hand, and institutional improvement, on the other. Ewell observes that this tension has persisted since assessment of undergraduate learning first arose as a major policy focus of the states, nearly 30 years ago. It is so, Ewell argues, because:

> "the two purposes are antithetical… On the one hand, effective accountability systems demand comparative standards of performance – usually embodied in the form of standardized quantitative measures and transparent public reporting. Assessment intended primarily for improving teaching and learning, on the other hand, demands much more fine-grained and frequently qualitative bodies of evidence, as well as protected forums in which faculty can discuss in detail the implications of this evidence and what should be done about it. The basic purpose of accountability is defeated if results are kept secret. The basic purpose of improvement is threatened if results are so widely broadcast that institutions are induced to hide them if they are deficient."

For this reason and for others, there is a paucity of *direct* measures of student learning that can systematically be examined across states or across a large number of similarly-purposed public colleges and universities over a substantial period of time, although institutions that use such assessments can examine how well their own students have performed over time.[80]

There are of course many useful approaches taken today by colleges and universities for the purpose of assessing and improving educational outcomes. In fact, researchers, higher-education organizations, and many postsecondary institutions have been paying close attention to questions surrounding college-level learning. A large volume of research, for example, has accumulated around such important questions as, what college students learn, how students learn, how learning by students can be deepened, and how learning can and should be assessed.[81]

Additionally, several initiatives to improve undergraduate learning have generated noteworthy insights into the factors and conditions that foster student learning on college campuses. Particularly noteworthy are the efforts associated with the Wabash National Study of Liberal Arts Education and the American Association of Colleges and Universities, focusing explicitly on improving liberal arts education.[82] Much of the work is ongoing.

In the remainder of this section, the report examines several kinds and sources of available evidence relating to undergraduate learning and to the conditions that may facilitate or hinder student learning at UT Austin and at Texas A&M. This evidence entails: (1) the success of undergraduates on national and state certification and licensure examinations in certain professional fields; (2) the extent of undergraduate student engagement in educationally-purposeful activities; and, (3) the degree of institutional attentiveness both to the undergraduate curriculum and ways the curriculum can be modified so as to improve student learning. Each of these forms of evidence can usefully contribute to an assessment of institutional performance in the area of undergraduate educational outcomes and learning.

Student performance on field certification and licensure examinations is a useful gauge of institutional performance in undergraduate education because it can indicate the extent to which students at a given college or university have been adequately prepared for entry into their chosen field, according to externally-determined standards of quality that are established by the field itself. Second, student engagement in learning is an important facet to institutional performance in undergraduate education because undergraduates who are more engaged in educationally-purposeful activities have been shown as registering higher levels of development in such areas as critical thinking and complex reasoning.[83] Finally, the degree to which a university pays close attention to its curriculum, undertaking curricular change where such is likely to improve educational outcomes and student learning, is a strong sign of the institution's commitment to providing students a high-quality education.

Student Performance on National and State Certification/Licensure Exams

The rates at which an institution's undergraduates pass certification or licensure examinations for entry into professional fields is an important gauge of student success and is a useful marker of institutional quality. In fact, a field's certification or licensure of an individual to practice in that field represents a form of quality assurance in several different respects. Certification and licensure help to identify those individuals who do, and those who do not,

possess the educational foundations, expertise, and skills that should enable them to perform well. In such fields as those of engineering, nursing, and teaching, certification or licensure helps ensure the welfare and safety needs of society.

Student performance on professional certification or licensure examinations provides quality assurance for prospective employers as well. It sends useful signals to the labor market about the effectiveness of different college and universities in preparing their students for entry into a given field. Examination pass rates thus point indirectly to the effectiveness of an institution's educational programs.

In a related fashion, certification and licensure connote institutional value. Because of the variability that exists among colleges and universities in the rates at which students are able to demonstrate field readiness, as defined by the professionals that populate the field itself, certification or licensure pass rates can provide prospective students with a valuable source of information about the likely returns on their investment in choosing to attend a given institution.

For purposes of illustration, one might consider the licensure practices in engineering-related fields. In Texas, only licensed individuals may legally perform engineering services for the public; in fact, the designation, "engineer," can be used only by those who are currently licensed. Individuals in the state must have attained certain significant professional achievements to be eligible to receive an engineering license. These requirements include graduating from a program that teaches an approved undergraduate curriculum in engineering or in a related field, attaining a specified amount of professional work experience, and passing several written examinations – all to indicate the individual's readiness for entry into the field.[84]

The gateway examination, known as the Fundamentals of Engineering (FE) Examination, is designed for students currently enrolled in the last year of a nationally-accredited engineering degree program, such as those offered at the University of Texas and at Texas A&M University. These are administered at hundreds of other public and private colleges and universities in the U.S. as well.[85] As Table 21 illustrates, the FE Examination pass rates of students at UT Austin and Texas A&M, 91 percent and 89 percent, respectively, far exceed the average national pass rate of 73 percent. They are also consistent with the pass rates of many of the university's benchmark peers.[86]

UT Austin's and Texas A&M's students likewise perform very well on the national nursing licensure examination, known as the National Council Licensure Examination for Registered Nurses (NCLEX-RN).[87] The 2010 pass rate for UT Austin's nursing students was 94 percent; for Texas A&M students, the rate was 97 percent. These impressively high levels of student success on the national nursing licensure exam clearly eclipse the averages for students both across the nation (87 percent) and in Texas (89 percent), and exceed the average RN licensure pass rates of students in all but a handful of states.

The success rates of those students at the University of Texas and at Texas A&M who complete the Texas Examinations of Educator Standards (the TExES exam) in pursuit of certification to teach in the state of Texas are nearly perfect. Table 21 indicates that 99 percent of students at each of the universities passed the TExES exam in 2010, a pass rate that exceeded the state average by eight percentage points.[88]

Table 23. Certification and Licensure Pass Rates of Students at UT Austin and at Texas A&M

PASS RATES	Engineering		Nursing		Teaching	
	UT Austin	Texas A&M	UT Austin	Texas A&M	UT Austin	Texas A&M
2010	91	89	94	97	99	99
2009	89	88	93	New	100	98
2008	89	89	92	X	100	99
2007	87	84	95	X	100	99
2006	88	81	97	X	99	98

Undergraduate Student Engagement in Learning at UT Austin and at Texas A&M

A second means by which to assess the quality of undergraduate education at UT Austin and at Texas A&M involves the degree to which students at the two universities are involved in educationally-purposeful experiences and activities. A widespread practice today in the area of undergraduate educational assessment entails measuring the engagement of students in their own learning, meaning the amount of effort students put into their studies and into other educationally-focused activities, which a large volume of research has shown is linked to many of the desired outcomes of college.

The National Survey of Student Engagement (NSSE) does this by collecting data annually from almost 500 colleges and universities on the ways in which undergraduates spend their time.[89] The NSSE survey investigates behaviors by students and institutions that are linked to certain educational outcomes, such as the ability of students to reason, to think critically, and to integrate and apply the knowledge they have gained. The survey also contains valuable data on student satisfaction with their undergraduate academic experience. It is the largest and the most comprehensive effort of its kind.

Measuring student engagement in these and in other educationally-beneficial experiences is important because it can provide colleges and universities with information about how they might best deploy their resources in promoting student learning. It also can point the way to

changes in both the undergraduate curriculum and other aspects of students' educational experiences that institutions might make to enhance and deepen learning.

Table 22 presents select results from the 2010 and 2011 NSSE survey of college seniors. It compares students' ratings of their engagement in educationally-purposeful activities and experiences at UT Austin and Texas A&M with the average ratings of students attending other types of public colleges and universities nationally. Specifically, the table reports the ratings of undergraduate seniors on 18 particular items found in the NSSE senior survey.[90]

Substantively, the items found in Table 22 include estimates of the amount of time students said they had engaged in certain experiences that are educationally meaningful; estimates of the extent to which students believe their experiences at their institution had contributed to the students' knowledge, skills, and personal development; ratings of the quality of students' academic experiences; and, assessments of the extent to which students stated they would attend their college or university, given the chance to start over. The proprietary nature of the NSSE data precludes direct institutional comparisons, however, comparisons between the responses of students attending UT Austin and Texas A&M and the average responses of students attending other Public Research I universities, as well as other types of public colleges and universities overall, can be drawn. The table presents these comparisons.

The groupings of institutions displayed horizontally along the top of the table of Table 24 are arranged according to the intensiveness of research activity that is present at each one of the different types of schools.[91] Shown directly to the right of the responses by seniors at UT Austin and Texas A&M are the mean responses of seniors who attended all other Public Research I universities participating in the NSSE survey. The next column includes the average survey responses of seniors attending Public Research II universities, in turn followed by the average responses of students attending Doctoral universities, then of those students attending Master's universities, and finally of those students attending Arts and Sciences-oriented Bachelor's colleges and universities. The last category – Bachelor's institutions – includes those schools with missions almost exclusively entailing the teaching of undergraduates, missions in which research plays a very limited role.[92]

The survey results indicate that seniors at UT Austin and Texas A&M report high levels of engagement in educationally-purposeful activities and strong satisfaction with their undergraduate academic experience. For many of the survey items, the levels reported by students at UT Austin and Texas A&M are higher than or are equivalent to the average responses of seniors attending other Public Research I universities and of seniors attending the other types of public colleges and universities. In particular, the results found in Table 24 suggest the following about students' engagement in learning at the University of Texas and at Texas A&M:

- Seniors at UT Austin and Texas A&M responded that their experiences in college had positively contributed to their knowledge, skills, and personal development, and at

reported levels that were higher than the averages reported for other types of public institutions. For example:

- Eighty-six percent of seniors at both universities characterized their experience at the institutions as having contributed "very much" or "quite a bit" to the students having *acquired a broad, general education*;
- Ninety percent of seniors at both universities said their experiences had contributed "very much" or "quite a bit" to the students having *developed critical thinking and analytical skills;*
- Seventy-one percent of seniors at UT Austin and 75 percent of those at Texas A&M reported their experiences in college as having contributed "very much" or "quite a bit" to the students' *ability to solve complex, real-world problems*. These rates are between seven to ten percentage points higher than that of the average of other Public Research I universities, and higher than the averages of other types of public institutions;
- Seventy-eight percent of seniors at UT Austin and 83 percent of those at Texas A&M said their experiences in college had contributed "very much" or "quite a bit" to their *ability to solve quantitative problems*.

- With respect to the extent of students' focus on academic matters, 83 percent of seniors at UT Austin and 87 percent of seniors at Texas A&M characterized their schools as having emphasized "very much" or "quite a bit" *significant amount of time on studying and on academic work.*

- Seniors at UT Austin and Texas A&M said their coursework had emphasized mental activities of the kind that many researchers today characterize as elements relating to *"deep learning*," an important concept in research on human learning.[93] Specifically:

  - Eighty-eight percent of seniors at UT Austin and 86 percent of seniors at Texas A&M said their educational experience had emphasized "very much" or "quite a bit" activities in which students had *analyzed ideas, experiences, and theories*;
  - Seventy-eight percent UT Austin seniors and 72 percent of Texas A&M seniors said their educational experience had emphasized "very much" or "quite a bit" activities that required the *synthesis of ideas, information, and experiences*;
  - Eighty-two percent of seniors at both universities indicated that their educational experiences had emphasized "very much" or "quite a bit" the *application of theories or concepts to practical problems*;
  - Of those surveyed seniors at UT Austin, 69 percent characterized their educational experience as having significantly emphasized (that is, "very much" or "quite a bit") those *activities in which students learned something that changed*

the way they understood an issue. Sixty-seven percent of seniors at Texas A&M responded similarly.

- UT Austin and Texas A&M seniors reported *levels of academic challenge* in their undergraduate experience consistent with the reported averages of students attending other Public Research I universities, as well as other types of public, four-year institutions.[94]

- Seniors at the two universities reported levels of engagement in *enriching educational experiences* slightly higher than those averages reported by students attending other Public Research I universities, as well as other types of public, four-year institutions.[95]

- Seniors at UT Austin and Texas A&M reported levels of *student-faculty interaction* (40 percent) consistent with reported student averages for other Public Research I universities, but slightly lower than the reported averages for other types of public colleges and universities, in particular Bachelor's colleges.[96]

- At levels generally consistent with those reported by students attending other types of public colleges and universities, seniors at UT Austin and Texas A&M said they believed their institutions had provided the *support needed for them to succeed academically*.

- While seniors at UT Austin characterized their university as having helped them *develop a personal code of values and ethics* at levels slightly higher (61 percent) than the reported averages for other types of public colleges and universities, seniors at Texas A&M reported their institution's contributions in this domain at levels far exceeding the averages found at other types of postsecondary institutions. Indeed, 76 percent of seniors at Texas A&M said their undergraduate experience had contributed "very much" or "quite a bit" to their ethical development, levels exceeding the reported averages of seniors attending other public institutions by almost 20 percentage points.

- Seniors at UT Austin and at Texas A&M also reported much higher levels of *participation in community service and volunteer work* than did students at other types of public colleges and universities, on average. UT Austin students engaged in community service at levels of between 11-15 percentage points higher than did students attending other types of public institutions. Meanwhile, Texas A&M seniors reported participation levels that far exceeded the averages of other types of schools – indeed, 20-25 percentage points higher than the others.

- Students at UT Austin and Texas A&M reported high levels of *engagement in internships, field experience, and practica*. This is a noteworthy finding because these

forms of applied learning can provide students the settings within which they can integrate classroom learning with real-world experiences, and serve as opportunities for students to enhance their skills and competitiveness for entry into the labor market. Seniors at UT Austin and Texas A&M reported having completed internships, field experience or practica at levels higher than the reported averages for other types of public colleges and universities. For instance, seniors attending UT Austin reported levels of completion of one of the kinds of learning experiences at rates of about 15 percentage points higher than the averages reported by seniors at other types of public institutions.

- Seniors at the two universities gave an *overall positive assessment* of their undergraduate experience at levels higher than the reported averages of other Public Research I universities and of other types of public colleges and universities: 91 percent of seniors at UT Austin and 93 percent of seniors at Texas A&M characterized their educational experience at the schools as having been "excellent" or "good."

- As one more indication of the high degree of student satisfaction with the quality of the undergraduate experience at the two universities, 90 percent of seniors at UT Austin and 93 percent of seniors at Texas A&M responded that they "definitely" or "probably" *would go to the same institution if they could start over again.* These rates are remarkably high, exceeding the averages reported by students attending other Public Research I universities, as well as by students attending other types of public institutions.

- Finally, seniors at UT Austin and Texas A&M reported their engagement in learning on many items of the NSSE survey at levels roughly equivalent to those reported by students at peer institutions, such as Ohio State University, University of Michigan, and University of Wisconsin. While the absence of publicly-accessible survey data at the level of the individual campus excludes the possibility of systematic institutional comparisons, some of UT Austin's and Texas A&M's peers have made certain items of their NSSE institutional reports available on-line. On those select survey items for which data are available, ones like "acquiring a broad education," "level of academic challenge," "significant time studying," and "would return again," seniors at UT Austin and at Texas A&M reported levels of engagement or satisfaction roughly equivalent to those reported by the seniors of the peer universities.[97]

Table 24. NSSE Survey Responses of Seniors at UT Austin and at Texas A&M as Compared with Seniors at Other Public Research I Universities and at Other Types of Public Colleges and Universities

			Public University Average					
	UT – Austin	Texas A&M	R1	R2	Doctoral	Large Master's	Science	Bachelor's
Acquiring broad general education	86%	86%	82%	81%	81%	83%		86%
Thinking critically	90%	90%	87%	86%	87%	87%		88%
Significant time studying	83%	87%	82%	81%	82%	82%		82%
Solves complex real-world problems	71%	75%	64%	62%	63%	63%		64%
Analyzes quantitative problems	78%	83%	76%	75%	76%	75%		76%
Analyzes idea, experience, or theory	88%	86%	86%	85%	85%	85%		87%
Synthesizes ideas, information, or experiences	78%	72%	76%	75%	77%	76%		79%
Applies theories or	82%	82%	80%	81%	83%	82%		83%

concepts to practical problems							
Learned something that changed the way student understood an issue	69%	67%	67%	66%	68%	68%	70%
Level of Academic Challenge	58%	56%	57%	56%	57%	57%	58%
Enriching Educational Experiences	46%	43%	43%	39%	39%	38%	41%
Student-Faculty Interaction	40%	40%	40%	41%	43%	41%	45%
Support to succeed academically	72%	78%	69%	68%	71%	71%	76%
Support to develop a personal code of values	61%	76%	57%	56%	58%	59%	61%
Completed community service	71%	80%	70%	58%	60%	56%	56%
Completed an internship	62%	53%	55%	48%	48%	46%	47%
Positive evaluation of educational experience	91%	93%	87%	85%	85%	85%	89%

Would attend again	90%	93%	86%	81%	81%	82%	84%

Evidence of Institutional Commitment to Improving Student Learning at UT Austin and at Texas A&M

Employers, business and civic leaders, and recent college graduates attest that the skills one needs to succeed in today's labor market include not only content knowledge, but also the ability to be able to apply this knowledge in practical ways, to reason through problems, to effectively communicate, to understand the world in which one lives, and to develop ethical insights and understandings; these being the hallmark features of the educational tradition in the United States known as a "liberal education." Indeed, much of the effort that is underway today both in strengthening undergraduate education and deepening student learning focuses around efforts aimed to revitalize liberal education on college and university campuses.

While some colleges and universities have maintained a fidelity to the core principles of a liberal arts education, there is growing concern that the knowledge and competencies associated with liberal learning at present are inadequately emphasized or are insufficiently integrated into the undergraduate curricula and programs at many institutions.

This is a charge on which research universities have sometimes seemed vulnerable. This is so, in part because the suitably heavy emphasis given to graduate education and to research on these campuses often has played to the stereotype that portrays undergraduate education as being of lesser importance or value there.[98]

As a response to concerns about the state of liberal learning throughout American higher education, a variety of professional associations and other national organizations have undertaken efforts to identify a set of best principles and practices for the strengthening of liberal education on all college and university campuses. Particularly important in this regard is a series of recent initiatives led by the Association of American Colleges and Universities (AAC&U).[99]

Since 2008, the AAC&U has focused its efforts on formulating and promoting best practices in the area of liberal learning on American college campuses in ways that are broadly applicable throughout higher education, even in those fields that traditionally have concentrated on professional, occupational, or workforce training. In fact, one of the main tenets underlying the reform efforts by this and other organizations is the view that liberal learning essentially involves one's attainment of knowledge and skills that should be embedded throughout the undergraduate experience. Thus, a liberal education should not be thought of as consisting of a rigid sequence of "lower-level, arts and sciences courses" that students must complete during their initial years in college.

Through the work of the AAC&U and that of other national groups and associations, along with a number of university-based research initiatives, broad agreement has begun to emerge around certain principles and practices that colleges and universities can follow in deepening student learning. The following six areas of emphasis embody much – although, certainly not all – of this latest thinking about how the competencies of a liberal education can best be situated at the center of student learning.[100]

- *Emphasis on essential learning outcomes.* At consecutively higher levels throughout their studies, undergraduates should acquire knowledge of human cultures and the physical and natural worlds. These understandings can be garnered through study in the humanities, social sciences, sciences and mathematics, languages, and the arts.

- *Focus on integrative and applied learning.* Also throughout their studies, students should gain experience in integrating and applying their learning to challenging questions and to real-world problems.

- *Existence of curricula that link rich content with students' progressive attainment of essential skills and competencies*. The courses, readings, projects, and assignments that anchor a curriculum should seek to build high levels of student mastery of essential knowledge and skill, and to do so progressively over the span of an undergraduate's studies.

- *Presence of powerful or, 'high-impact,' educational experiences.* Many such kinds of experiences exist. One involves first-year seminars, which enable faculty and students to collaborate in learning that emphasizes critical inquiry, frequent writing, and other skills that can develop the intellectual and practical competencies of students. A second kind of high-impact, educational experience involves "repeated-writing" strategies in which students complete writing-intensive courses across both the curriculum and levels of instruction. A third such form of experience involves undergraduate students in the research activities of faculty. Through these experiences, undergraduates learn how to ask and "answer" difficult questions, conduct empirical observation, and evaluate the reliability and the usefulness of data. Lastly, student internships and capstones can provide students experiences that enable them to integrate and apply what they have learned over the course of their studies.

- *Use of technology as a method for meaningfully engaging students.* Certain kinds of learning technologies can enhance the creative and problem-solving capabilities of students, and also provide them experience in analyzing information with which to weigh arguments and draw conclusions.

- *Use of rigorous assessment practices that demonstrate and deepen student learning.* Assessments of student learning should be formative and multifaceted. Among the

assessment strategies and instruments that an institution deploys should be ones that transcend the boundaries of a particular course. One such assessment practice is the student electronic portfolio. These portfolios, when rigorously designed and assessed, can enable students to build deep intellectual and practical connections among the different products associated with their learning throughout the course of their college career. Portfolios also can provide evaluators, whether at the program, the department, or the institution level, the means by which to undertake holistic assessments of student progress toward desired learning goals.

Although UT Austin and Texas A&M have long enjoyed reputations for providing their students with a high-quality education, several recent, large-scale curriculum initiatives at the universities evidence the institutions' commitment to improving undergraduate student learning. In fact, the curriculum changes the universities have undertaken align well with the "best practices" recommendations that are forming nationally in support of strengthened liberal education at America's colleges and universities.

In 2006, the University of Texas at Austin began implementation of a series of significant changes to its undergraduate curriculum. The changes arose, in part, from the recommendations of a prominent citizens' commission – the "Commission of 125" – that had previously completed a two-year study of the university. The group's report found that, although the undergraduate curriculum of the university afforded students myriad courses and other opportunities for study, the curriculum nonetheless "failed to equip undergraduates with a core body of knowledge essential to a well-balanced education."[101] Soon thereafter, a special university task force and faculty committees of the university proposed a series of changes to the undergraduate curriculum, with the intent of improving the educational experiences of undergraduates. These improvements took the form of various curricular innovations, as well as redesigns of existing programs and courses, emphasizing greater coherence, deeper learning, common experiences among students, and multidisciplinary and interdisciplinary approaches to learning.

The "Signature Course" initiative is one such effort. This program introduces UT Austin undergraduates (first-years and sophomores) to academic discussion and analysis of important, societal issues from an interdisciplinary perspective. Many of the courses in the program consist of small, 18-student courses taught by tenure-line faculty with proven records as excellent instructors.[102] The courses often draw from multiple related disciplines, or from disciplines that are not commonly thought to be closely related. Because the content of the Signature Courses ranges across fields and disciplines, they enroll students who may share the same interests, but who come from different majors of study within the university.

Recent titles (and topics) in the Signature Course series have included the following: *Astronomy and the Humanities; Biodiversity, Dynamics, and Crises; Catastrophe and Civic Responsibility; Dating Violence in America; Debates on Democracy in America; Growth and*

Development of Children and Adolescents Living with Chronic Conditions; Technology in the Greek and Roman World; Social Innovation; Religion, Ethics, and the Environment; Organizational Corruption in America; How Do You Know? Evidence, Mathematical Models, and Proofs; Separating Fact from Fiction in Mental Illness through Literature and Film; Reading the Brain: The Philosophical, Ethical, and Legal Implications of Brain Imaging; and, *Art, (Your) Money, and the Nation: The Arts and Cultural Production in the U.S.*

In the First-Year Signature Courses, particular emphasis is paid to improving the writing and communications skills of entering students. The program utilizes assessments conducted in these areas as means for measuring student learning and for determining that students possess the foundational intellectual skills that will enable their academic success. Faculty, therefore, can intervene to assist students who might be struggling academically during their first year at the university.

A second instructional initiative of even greater scope and likely impact involves the recent redesign of large, lower-division "gateway" courses at UT Austin as part of an effort to improve undergraduate student learning outcomes and increase student success at the university. Currently in its second year, the Course Transformation Program seeks to achieve deeper student learning and higher levels of student academic success than before, through the development of students' foundational knowledge and skills. In particular, the program has six primary goals, including improving student learning, improving student retention and graduation rates, influencing the instructional beliefs and behaviors of faculty, developing evidence-based models of effective teaching and learning, diffusing course redesign within academic departments, maintaining positive return on investment over time, and developing and disseminating "UT Approaches" within and outside the university. Corresponding to each of these goals is a series of objectives, strategies, actions, measures, and timelines.[103]

Over a five-year period, UT Austin's Center for Teaching and Learning will partner with faculty to redesign up to ten lower-division courses, whose enrollments often number several hundreds of students. These gateway courses, including ones such as Introductory Biology, Principles of Chemistry, Statistics, Economics, Literature, and Psychology, are crucial to students' academic success at subsequent stages in their studies. Yet, as traditionally delivered, the university has asserted, these courses, as others, often have not made systematic use of evidence-based, best practices around student learning.

Under the Course Transformation Program, a redesigned course involves the identification, development, and implementation of newer approaches to teaching and learning, which, research has shown, can improve student engagement, critical thinking, and knowledge retention. Such a course also entails the use of newer instructional technologies that make the learning process interactive, enable students to track their own learning progress, and provide

faculty with immediate feedback on how well students are learning. The university estimates that, in time, the redesigned courses will impact between 40,000 to 50,000 students a year.

Of key importance, the Course Transformation Program contains a research component designed to measure the effectiveness of the curricular initiative in meeting the overall program's espoused goals. The evaluation component for the initiative uses, among other assessments, pre- and post-course surveys by which to measure impacts on students' reasoning, critical thinking, and core conceptual knowledge, as well as student performance in subsequent courses.

Texas A&M University likewise has initiated a number of changes and reforms to its undergraduate curriculum that are intended to improve student learning. Many of the efforts also embody acknowledged best practices in liberal learning, such as the kind earlier described.

For instance, Texas A&M in 1999 adopted a 20-year guiding vision and strategic plan that emphasized the achievement of excellence in twelve specific areas of focus, consistent with the mission and the values of the university. The plan, named "Vision 2020: Creating a Culture of Excellence Serving the Public Good," contained 12 imperatives. Among those imperatives is one that calls for enhancing the academic experience of undergraduate students. This particular imperative includes the following concrete aims: improving writing, thinking, and self-expression skills of undergraduates; improving students' awareness, knowledge, and skills for living and working in a global society; providing more mentoring experiences for undergraduates; creating more opportunities for students to interact with and to learn alongside faculty; and, building a stronger infrastructure and stronger academic programs in the letters, arts and sciences.

The university more recently has elaborated on these aims by developing a series of undergraduate learning outcomes with specific operational goals. These entail the expectation that undergraduate students should be able to do the following:

- Demonstrate critical thinking, including the ability to:
    - Evaluate, analyze, and integrate information from a variety of sources;
    - Use appropriate strategies and tools to represent, analyze, and integrate information;
    - Develop critical, reasoned positions.
- Communicate effectively, including the ability to:
    - Demonstrate effective oral communication
    - Demonstrate effective writing skills;
    - Listen actively and critically;
    - Present work effectively to different audiences.
- Practice personal and social responsibility, including the ability to:
    - Practice ethical leadership;
    - Choose ethical courses of action in research and practice;

    - Acknowledge and address the consequences of one's own actions;
    - Engage in local and global civic activities.
- Demonstrate social, cultural, and global competence, including the ability to:
    - Live and work effectively in a diverse and global society;
    - Articulate the value of a diverse and global perspective;
    - Recognize diverse economic, political, cultural, and religious opinions and practices.
- Prepare to engage in lifelong learning, including the ability to:
    - Exhibit the skills necessary to acquire, organize, reorganize, and interpret new knowledge;
    - Demonstrate intellectual curiosity.
- Work collaboratively, including the ability to:
    - Participate effectively in teams;
    - Consider different points of view;
    - Work with others to support a shared purpose or goal.[104]

A recent strategic plan for the university for Fiscal Year 2011-2015, titled, "Action 2015: Education First," calls for a deepened institutional commitment to the design and implementation of high-impact educational experiences on the campus that will enable undergraduates to be able to evidence progress toward these outcomes. The theme of this initiative, *Aggies Commit to Learning for a Lifetime*, charges individual schools, colleges, and academic units of the institution with establishing learning environments and experiences that require students to demonstrate "curiosity, initiative, and independence, as well as the ability to reflect, transfer knowledge to new contexts, and integrate knowledge from more than one domain."

A number of curricular-redesign efforts currently are underway. These include, for example, an initiative in Texas A&M's College of Liberal Arts that entails the design of "Freshman Critical Thinking Seminars." Faculty leaders of the seminars will focus on critical thinking in small, topical seminars, as well as emphasize at least two other undergraduate learning outcomes. In the Look College of Engineering, faculty are developing a "Grand Challenge Scholars Program," whereby students will design learning portfolios centered around the components of research, interdisciplinary work, entrepreneurship, globalism, and service. The program also will involve student capstone projects in which students must demonstrate their use of the component areas. The university has committed substantial resources to these and other initiatives. The Grand Challenge Scholars recipients, for instance, will receive funds to build prototype learning portfolios, conduct experiments, and travel to conferences to present their portfolios. To date, these efforts remain in the planning and in the early-operations stages.

In summary, UT Austin and Texas A&M have recently launched a series of high-profile curricular initiatives that are designed to promote undergraduate student learning at the

universities. In a number of significant respects, these programs embody the "best practices" that advocates of undergraduate educational reform nationwide have identified as being paramount in efforts to deepen students' abilities to be able to think critically, to reason their way through complex problems and challenges, to communicate effectively, to make informed ethical determinations, and to understand better a world that is rapidly changing. These initiatives entail a more systematic and intense institutional focus than before on student learning outcomes and on the rigorous assessment of those outcomes; on the integration and application of student learning; on the use of certain high-impact educational experiences, such as student learning communities and capstones; on the increased frequency of faculty-student interactions; and, on student engagement in their own learning.

For many of the initiatives outlined, assessments are routinely being conducted as the programs proceed toward full implementation. Yet, because of the newness of these interventions, the universities are still unable to address fully whether and to what extent the desired improvements in student learning are in fact occurring. Through the introduction of these wide-scale initiatives, UT Austin and Texas A&M nevertheless have demonstrated a close attentiveness to both the quality and vibrancy of undergraduate education on their campuses, and a willingness to deploy substantial resources as part of systematic efforts to improve undergraduate educational outcomes and learning on the campuses.

VI.

Report Conclusion

The University of Texas at Austin and Texas A&M University are world-class research universities whose outstanding records of public service include incalculable societal and economic contributions to their regions and their state. The universities also provide their undergraduate students a high-quality educational experience at a great value. The two universities attract some of the most academically talented and well prepared students as any in the country who choose to attend public research universities. On many important dimensions, the two universities perform as well as – or better than – their benchmark peers, the nation's other leading public research universities. At the same time, tuition and fees at UT Austin and at Texas A&M remain lower than that of most of their peers, and the prices at the two Texas universities have risen less sharply in recent years than that seen at many peer institutions.

Not only do the undergraduate academic programs at UT Austin and at Texas A&M enjoy outstanding reputations nationally, but the students at the universities also perform very well on a variety of national and state certifying examinations and report high levels of engagement in educationally-purposeful activities and experiences. What is more, the universities recently have undertaken a variety of innovative curricular improvements that hold the potential to deepen undergraduate student learning in demonstrable ways.

For example, underway at UT Austin and Texas A&M are a number of large-scale, intensive efforts designed to encourage more and deeper interactions between the students and faculty (notably, tenure-line faculty); align course content with learning objectives and approaches that research has shown can deepen students' knowledge and skills; and, deploy learning technologies capable of enhancing students' engagement in their own learning. In fact, the evidence is abundant that UT Austin and Texas A&M have made a variety of high-level commitments in support of improved undergraduate student outcomes and of enhanced student learning on their campuses.

Clearly, there are needed areas of improvement in undergraduate education at UT Austin and at Texas A&M. The universities must work harder to improve the rates at which undergraduates complete college in four years. In particular, the universities must redouble their efforts around the enrollment and the timely completion of African American students. They must also remain diligent in their efforts to maintain peer-competitive prices for undergraduates during a period of fiscal and budget austerity throughout higher education.

Of enormous importance, too, is the universities' continued commitment to the curricular reforms and improvements that they recently have undertaken. In an era in which students, the public, and policymakers are paying closer attention than ever before to questions of educational value and outcomes in higher education, both the long-term quality and strategic competitiveness of UT Austin and of Texas A&M will depend on these universities' ability to demonstrate their

commitment to undergraduate student learning. By leveraging their own enormous intellectual and human resources, their high reputational regard and their proven willingness to blend the established traditions with newer, evidence-based approaches to student learning, the universities can better position their students – and themselves – for success.

Notes

[1] As noted here and elsewhere, this report makes use of the term "Public Research I" university in referring to those universities that the Carnegie Foundation classifies as having "very high research activity" on their campuses; these, being the most research-focused universities of any public ones in the nation. Although the Carnegie Foundation today uses a newer term in referring to these particular universities, the older designation, "Public Research I" university, means much the same as does the newer Carnegie phrasing, yet enjoys the added advantage of being more widely understood by much of the public. For this reason, the report uses the more familiar phrasing. The complete description of classifications of institutions of postsecondary education in the United States can be found on-line at http://classifications.carnegiefoundation.org/

[2] According to sociologist and former Columbia University provost, Jonathan Cole, Benjamin Franklin outlined a college curriculum in 1749 that challenged the reigning, Colonial-College model. In contraposition to his era's rigid adherence to a traditional, fixed curriculum, Franklin designed the University of Pennsylvania to help promote science and "practical affairs." Cole estimates that almost one-third of the college's curriculum in those days indeed was devoted to science and practical studies (J.R. Cole, [2009]. *The Great American University*. New York: Public Affairs/Perseus).

[3] See R.L. Geiger, (1986). *To Advance Knowledge: The Growth of American Research Universities, 1900-1940.* (p. XII). Oxford, England: Oxford University Press. J.R. Cole, (2009). *The Great American University*. New York: Public Affairs/Perseus. C.P. Loss, (2011). *Between Citizens and the State: The Politics of American Higher Education in the 20th Century*. Princeton, NJ: Princeton University Press. M.K. McLendon, (2003). State governance reform of higher education: Patterns, trends, and theories of the public policy process. In J.S. Smart's (ed). *Higher Education: Handbook of Theory and Research, Vol. XVIII* (pp. 57-144). London: Kluwer.

[4] U.S. National Archives and Records Administration. Available online at http://www.ourdocuments.gov/doc.php?doc=33&page=transcript

[5] R.M. Berdahl, (1998, October 5). "The Future of Flagship Universities." Texas A&M University Convocation. http://cio.chance.berkeley.edu/chancellor/sp/flagship.htm. H.D. Graham, (1989). Structure and governance in American higher education: Historical and comparative analysis in state policy. *Journal of Policy History 1*(1), 80-107.

[6] Heller, D. E., (2000). (Ed.). T*he States and Public Higher Education Policy: Affordability, Access, and Accountability* (2nd edition). Baltimore, MD: The Johns Hopkins University Press.

[7] K.J. Dougherty, (1994). *The Contradictory College: The Conflicting Origins, Impacts, and Futures of the Community College.* Albany, NY: State University of New York Press.

[8] F. Harcleroad, (1988). "Colleges and Universities for Change. A Pocket History of America's Comprehensive State Colleges and Universities." Washington DC: American Association of State Colleges and Universities.

[9] There are 73 Public Research I universities (i.e., VH/RU universities, according to the Carnegie classification system) but CUNY Graduate School does not serve undergraduates.

[10] National Science Foundation/National Center for Science and Engineering Statistics. (2010). "Higher Education Research and Development Survey, FY 2010." Washington, D.C.: NSF.

[11] See, for example, the 2004 report, "A Disciplined Culture of Excellence: Report of the Commission of 125."

[12] Data for this section are taken from two informational sources. The first is UT Austin's Office of Information Management and Analysis, in particular its publication, "2011-2012 Statistical Handbook." The handbook can be found online at https://sharepoint.ima.utexas.edu/sh/2011/2011 Viewer.aspx. The second source is http://www.utexas.edu/about-ut/campus-profile, which contains basic descriptive information about the campus, itself.

[13] M. Musick, (2011). "An Analysis of Faculty Instructional and Grant-Based Productivity at the University of Texas at Austin."

[14] Unless otherwise noted, data in this passage can be found at http://www.tamu.edu/about/facts

[15] http://www.tamu.edu/customers/oisp/student-reports/enrollment-profile-fall-2011-certified.pdf

[16] Counted among the AAU's membership are leading private universities, such as Harvard University, Stanford University, Yale University, Massachusetts Institute of Technology (MIT), Columbia University, Princeton University, University of Chicago, and University of Pennsylvania.

[17] R. Moll, (1985). *Public Ivies: A Guide to America's Best Public Undergraduate Colleges and Universities*.

[18] http://marcomm.tamu.edu/documents/tamuFacts.pdf

[19] Definitions of each category, the university rankings, and the measures used can be found at http://www.washingtonmonthly.com/college_guide/rankings_2011/national_university_rank.php

[20] See http://www.utexas.edu/opa/ic/economic_impact.pdf

[21] http://tamunews.tamu.edu/2011/01/25/texas-am-system-had-record-3-7-billion-2010-economic-impact-locally-study-shows/

[22] Information for these tables is drawn from a review of the websites of UT Austin and Texas A&M, dating from 2004-2012.

[23] Data on the universities' patenting and commercialization activities can be found at http://www.otc.utexas.edu/publications.jsp

[24] The source of information for the passages that follow is Texas Agrilife Research, (2010). Legislation Appropriations Request for Fiscal Years 2012 and 2013. http://www.tamus.edu/assets/files/budgets-acct/pdf/lars/556LAR12-13.pdf

[25] The source for the data contained in the passages is that of W.J. Hussar & T.M. Bailey, (2011). "Projections of Education Statistics to 2020 (NCES 2011-026)." U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office. Available online at http://nces.ed.gov.proxy.library.vanderbilt.edu/pubs2011/2011026.pdf

[26] See, for example, R. Ehrenberg, (2002). *Tuition Rising: Why College Costs So Much.* Cambridge, MA: Harvard University Press.

[27] American Association of University Professors, (2012). "2011-12 Report on the Economic Status of the Profession." Available online at http://www.aaup.org/AAUP/ comm/rep/Z/ecstatereport11-12/default.htm#1

[28] See E. Bettinger, & T.B. Long, (2006). The increasing use of adjunct instructors at public institutions: Are we hurting students? In R.G. Ehrenberg, (Ed.)., *What's Happening to Public Higher Education?* (pp. 51-69). Westport, CT: Praeger Publishers. R.G. Ehrenberg, & L. Zhang, (2005). Do tenured and tenure-track faculty matter? *Journal of Human Resources 40*(30), 647-659.

[29] J. Duderstadt, & F. Womack, (2003). *The Future of the Public University in America*. Baltimore, MD: The Johns Hopkins University Press.

[30] B. Johnstone, (2008). An international perspective on the fragility of higher education institutions and systems. In J. Martin, J.E. Samels, & Associates (eds.)., *Turnaround: Leading Stressed Colleges and Universities to Excellence.* Baltimore: Johns Hopkins Press.

[31] *Ibid*.

[32] To be sure, many successful research programs in science and engineering are funded externally and the cost of this labor is, theoretically, passed on to the granting organization. Yet, while each grant carries an overhead or, indirect charge, that is intended to support the costs of personnel and infrastructure, it is often the case that not all of these costs are fully recovered by grants.

[33] R. Ehrenberg, (2002). *Tuition Rising: Why College Costs So Much.* Cambridge, MA: Harvard University Press.

[34] In some states, these subsidies –direct and indirect – at one time were an important revenue source for private colleges and universities. Even today, many states subsidize the costs of a resident student's attendance at private colleges or universities located within the state.

[35] R.L. Geiger, (1986). *To Advance Knowledge: The Growth of American Research Universities, 1900-1940.* (p. XII). Oxford, England: Oxford University Press. C.P. Loss, (2011). *Between Citizens and the State: The Politics of American Higher Education in the 20th Century*.

[36] State Higher Education Executive Officers Association, (2012). "State Higher Education Finance: FY 2011." Publicly available at www.sheeo.org.

[37] H.A. Hovey, (1999). "State Spending for Higher Education in the Next Decade: The Battle to Sustain Current Support." Washington, DC: National Center for Public Policy and Higher Education. J. A., Delaney, & W. Doyle, (2011). "State spending on higher education: Testing the 'Balance Wheel' over time." *Journal of Education Finance, 36*(4), 343-368.

[38] Calculations are those of the authors using February 2012 data available through the Grapevine dataset, which is available online at http://grapevine.illinoisstate.edu. The calculations are adjusted for inflation according to Bureau of Labor Statistics standards.

[39] State Higher Education Executive Officers Association, (2012). "State Higher Education Finance: FY 2011." Publicly available at www.sheeo.org.

[40] The data was published in the State Higher Education Executive Officers Association's (SHEEO) annual report on state finance trends in higher education and can be found at http://www.sheeo.org/finance/shef-home.htm

[41] These figures are compiled from data found at http://utdirect.utexas.edu/budget/pdf/ UTAustin_ Budget_VolI_10-11.pdf

[42] Western Interstate Commission on Higher Education, (2009). "An Evaluation of Colorado's College Opportunity Fund and Other Related Policies." Boulder, CO: Author. Report available online at http://www.wiche.edu/pub/12271

[43] The College Board, (2011). "Trends in College Pricing." Report available online at http://trends. collegeboard.org/college_pricing

[44] The College Board, (2011). Trends in College Pricing.

[45] D.E. Heller, (2001). Trends in the affordability of public colleges and universities. In D.E. Heller (ed.). *The States and Public Higher Education Policy*. (2nd. Ed.). Baltimore, MD: The Johns Hopkins University Press.

[46] On average, students in this year also received approximately $1,009 in a combination of tax credits and deductions and Federal Work Study. Information for this section is taken from The College Board, (2011). Trends in Student Aid, 2011. Available online at http://trends.collegeboard.org/downloads/ Student_Aid_2011.pdf

[47] L. Perna, J. Finney, & P. Callan, (2012, April). "Hard Choices Ahead: Performance and Policy in Texas Higher Education." Report by the Institute for Research on Higher Education, University of Pennsylvania, and the National Center for Public Policy and Higher Education. Philadelphia, PA.

[48] National Association of State Student Grant and Aid Programs. (2011). "41st Annual Survey Report on State-Sponsored Student Financial Aid: 2009-2010 Academic Year." Washington, DC: Author.

[49] National Science Foundation/National Center for Science and Engineering Statistics. (2010). "Higher Education Research and Development Survey, FY 2010." Washington, D.C.: NSF.

[50] *Ibid*.

[51] R. Britt, (2012). "With help from ARRA, universities report $61 billion in FY 2010 total R&D; new details from redesigned survey." National Science Foundation/National Center for Science and Engineering Statistics. Washington, D.C.: NSF.

[52] National Academy of Science, (2007). *Rising Above the Gathering Storm*. Washington, D.C.

[53] J.C. Burke & Associates, (2005). *Achieving Accountability in Higher Education*. San Fransisco, CA: Jossey-Bass.

[54] The universities' performance relative to their designated peers is the basis for a variety of institutional reports periodically submitted to the governing boards of UT Austin and of Texas A&M, to the Texas Higher Education Coordinating Board, and to the state Legislature. Almost all other states likewise have defined for their own public universities (typically, in negotiation with the institutions), those universities nationally with which they will be compared.

[55] These are the federal student financial assistance programs initially established under Title IV of the Higher Education Act of 1965 (HEA), and subsequently reauthorized by Congress.

[56] The data used in the analyses and in the tables that follow are those data the universities themselves reported to the IPEDS system. The tables include only the data reported by an individual campus; the tables do not include data for other campuses within a multi-campus system, for example. These data can be found at the U.S. Department of Education's National Center for Education Statistics, available from http://nces.ed.gov/ipeds/datacenter/

[57] As noted, the peer groups of the two universities consist of those institutions which the universities and the Texas Higher Education Coordinating Board have formally designated as being peers for purposes of institutional reporting, benchmarking, and self-assessment.

[58] As noted earlier in the report, the original Carnegie Commission framework has recently been refined, such that, Research I institutions are now classified as having "very high research activity" on their campuses, while Research II universities are classified as having only "high research activity."

[59] Sometimes, five-year increments are not possible, because the definition of the measure may have changed over time. As is standard practice, all of the study's measures using FTE ratios are weighted by the full-time equivalent (FTE) fall enrollment reported by each institution. The indicator, "Average In-State Tuition and Fees," is a composite of the separate tuition and fee variables self-reported by the institutions.

[60] The ACT is accepted by almost all four-year postsecondary education institutions in the U.S. as a leading measure of applicants' college readiness, and thus is used here for purposes of institutional comparisons. Interpretations of test scores are publicly available on the company's web site, at http://www.actstudent org/scores/norms1.html.

[61] UT Austin's and Texas A&M's SAT scores in that year also positioned the universities quite well nationally, although their peer rankings on this metric are lower than those on the ACT. UT Austin's Combined Math and Reading SAT 75th percentile score ranked the university 8th among its peers and 13th out of all Public Research I universities. Texas A&M's SAT Combined Math and Reading 75th percentile score positioned the university as 12th among its peers and 18th best among all PRI universities.

[62] P. Gurin, E.L. Dey, S. Hurtado, & G. Gurin, (2002). Diversity and higher education: Theory and impact on educational outcomes. *Harvard Educational Review, 72*(3), 330. N.A. Bowman, (2010). College diversity experiences and cognitive development: A meta-analysis. *Review of Educational Research, 80*(1), 4-33.

[63] IPEDS uses the terms "Black, non-Hispanic" for African-American students and "Hispanic" for Latino students. This report uses the terms interchangeably.

[64] It is important to note that, in Texas, 15 percent of every tuition dollar an institution receives must be converted into financial aid.

[65] T. Dee (2004). Are there civic returns to education? *Journal of Public Economics*, 88, 1697-1720. S. Baum, J. Ma, & K. Payea. (2010). "Education Pays, 2010: The Benefits of Higher Education for Individuals and Society." Washington, DC: College Board.

[66] The "Student Right-to-Know" Act, which Congress passed in 1990, requires institutions eligible for federal student aid to calculate (and to publicly report) the proportion of students entering the institution who complete their degree within 150% of the normal time to completion, meaning that for four-year institutions, the rate is to be calculated as six years from the beginning of a student's full-time study at an institution.

[67] See, for example, http://www.completecollege.org/ and http://www.highereducation.org/reports/ losing_ground/ar2.shtml

[68] It is useful noting that the mission of the institution can also influence graduation rates. This mission indirectly establishes admission requirements, which, in turn, can have a significant influence on graduation rates. Institutions with open-admissions policies or, ones whose missions bring to their campuses large numbers of students who may not be well prepared for college, typically have lower graduation rates than those institutions whose students are academically well prepared. The graduation rates at UT Austin and Texas A&M would likely be even higher, were the admission standards raised.

[69] J.M. Braxton, A. Hirschy, & S. McClendon, (2004). *Understanding and Reducing College Student Departure.* ASHE-ERIC Higher Education Report, 30(3).

[70] For this same year, the average graduation rate for four-year colleges and universities stood at 44.5percent, an increase of nearly six percent since 2004. For two-year colleges in the U.S., the rate declined 7.7 percent over the previous six years, to stand at 31.5 percent. The average graduation rate for private, four-year colleges and universities stood virtually unchanged from six years earlier, at 54.3 percent.

[71] As noted, the mission of a particular institution can be a factor in determining the institution's graduation rates. Science and engineering majors are required to complete a large number of information-dense courses, a factor that could deflate the rates at which students in these fields complete their studies, within four years. Returning to the example cited in the body of the text, Table 21 shows that UT Austin graduates three times as many Science and Engineering (SE) majors as UNC; the ratio for Texas A&M is 4 to 1. One could speculate that the SE students at both Texas A&M and UT Austin and those at UNC graduate with similar four year rates, but that the larger enrollments of these students at the former institutions might be one factor contributing to the lower overall graduation rates found at the two Texas universities.

[72] The report is available at http://www.utexas.edu/ graduation-rates/documents/GRAD-REPORT.pdf

[73] "Education at a Glance: OECD Indicators, 2009." Table A-3.5. Paris: Organization for Economic and Cooperative Development.

[74] F. Rudolph, (1977). *Curriculum: A History of the American Course of Undergraduate Study since 1636.* San Francisco: Jossey-Bass. E.L. Boyer, (1987). *College: The Undergraduate Experience in America*. New York: Harper and Row. C.G. Schneider, & R. Shoenberg, (1998). "Contemporary Understandings of Liberal Education." Washington, DC: Association of American Colleges and Universities. Association of American Colleges, (1985). "Integrity in the College Curriculum: A Report to the Academic Community." Washington, DC: Author.

[75] True to the general pattern of development of the nation's system of higher education, these changes have tended to arise locally, as a result of campus-level decisions, or of voluntary efforts among institutions and professional associations, rather than by government fiat.

[76] R. Arum, & J. Roksa, (2010). *Academically Adrift: Limited Learning on College Campuses.* Chicago: University of Chicago Press. See also D. Bok, (2006). *Our Underachieving Colleges.* Princeton, NJ: Princeton University Press.

[77] National Center for Public Policy and Higher Education. (2008). "Measuring Up 2008: The National Report Care on Higher Education." Available online at http://measuringup2008.highereducation.org/

[78] M.K. McLendon, J.C. Hearn, & R. Deaton, (2006). Called to account: Analyzing the origins and spread of state performance-accountability policies for higher education. *Educational Evaluation and Policy Analysis, 28*(1), 1-24. J.C. Hearn, M.K. McLendon, & C. Mokher, (2008). Accounting for student success: An empirical analysis of the origins and spread of state student unit-record systems, *Research in Higher Education, 50*(1), 665-683.

[79] P. T. Ewell, (2009). "Assessing Student Learning Outcomes in College: The Role of the States." Boulder, CO: National Center for Higher Education Management Systems.

[80] As noted, there are a number of direct and indirect measures of student learning. One of these direct measures used at some institutions, for example, is the Collegiate Learning Assessment (CLA). Developed by the Council for Aid to Education, the CLA is a standardized examination that measures a college or university's contribution to the learning gains made by students (http://www.collegiatelearningassessment.org/). The CLA is recognized as one of the recommended survey instruments for measuring student outcomes by the Voluntary System of Accountability. The examination consists of open-ended questions, controls statistically for the incoming academic ability of students, and is administered to students online. The University of Texas at Austin, among the other institutions of the University of Texas System, has used the CLA. Few of UT-Austin's cohort peers deploy the CLA, nor does Texas A&M University use the CLA (http://issuu.com/chriscla/ docs/cla_10-1_report?mode=embed&layout= http://skin.issuu.com/ v/light/layout.xml&showFlipBtn=true). In some years, UT Austin's sample of graduating seniors who completed the survey performed at "expected levels;" in some years, they performed "slightly below" expected levels (see, for example, the University of Texas System's 2009-2010 "Accountability and Performance Report," http://www.utsystem.edu/osm/accountability/2009/homepage.htm).

Although to date, approximately 500 institutions have at one point in time used the CLA, there have also been criticisms of the assessment, including ones that relate to the validity and reliability of the instrument (e.g., R. Arum, & J. Roksa, [2010]. Academically Adrift: Limited Learning on College Campuses. Chicago: University of Chicago Press). In its 2010 "Accountability and Performance Report," the University of Texas System noted that, while the CLA "has gained wider use, a number of methodological issues have arisen which call into question the interpretation of the value added scores. The most significant issue relates to sampling seniors; even though the sample is a stratified random sample, the senior students may or may not put a total effort in solving the test items; simply the test is not a high-stakes test for them. Thus, the value-added nature of the test may be questionable" (http://www.utsystem.edu/osm/accountability/2009/homepage.htm, p. 19).

[81] For example, G.D. Kuh, J. Kinzie, J.H. Schuh, & E.J. Whitt, (2005). "Student Success in College: Creating Conditions That Matter." Washington, DC: American Association for Higher Education. Pascarella, E., & P.T. Terenzini, (1991). *How College Affects Students: Findings and Insights from Twenty Years of Research.* San Fransisco: Jossey-Bass. E.L. Pascarella, A. Bohr, A. Nora, & P.T. Terenzini, (1995). Cognitive effects of two-year and four-year colleges. *Educational Evaluation and Policy Analysis, 17*, 83-96.

[82] The Wabash National Study of Liberal Arts Education is a large-scale longitudinal study that examines the factors influencing six outcomes that have been defined as broad liberal arts competencies associated with a college education. These outcomes are: critical thinking, need for cognition, interest in and attitudes about diversity, leadership, moral reasoning, and well-being. Participating in this study are 49 institutions, including liberal arts colleges, regional universities, research universities, and community colleges. The AAC&U's LEAP (Liberal

Education and America's Promise) initiative, begun in 2005, is a ten-year effort that seeks to track the quality of student learning in the college years.

[83] T.F. Nelson-Laird, R. Shoup, G. Kuh, & M. Schwarz, [2008]. The effects of discipline on deep approaches to student learning and college outcomes. *Research in Higher Education, 49*, 469-494.

[84] Available on-line at http://engineers.texas.gov/

[85] The exam consists of 180 multiple-choice questions, which cover core knowledge of the engineering field, as well as different areas of specialization or, disciplines, for which the student has been preparing.

[86] The National Council of Examiners for Engineering and Surveying does not make pass-rate data publicly available in any systematic fashion. The data in table 21 are taken from documents made available by the Texas Higher Education Coordinating Board. The report's research team also reviewed the web sites of the benchmark peers of UT Austin and Texas A&M.

[87] See https://www.ncsbn.org/nclex.htm. There is a separate licensing exam for Practical Nurses (i.e., NCLEX-PN). The data on pass rates nationally and at the state level can be found at www.ncsbn. org/1232.htm and at https://www.ncsbn.org/12_REVISED 2010NCLEXExamStatsVol52.pdf

[88] These data can be found at http://texes.ets.org/texes/ and at https://secure.sbec.state.tx.us/ SBECONLINE /ASEP2/rpt_web_asep_menu.asp

[89] Indeed a number of studies and survey efforts underway are making inroads into understanding and improving college-level learning, including the Wabash National Study of Liberal Arts Education, the Cooperative Institutional Research Program (CIRP), and the Personal and Social Responsibility Inventory (PSRI), among others.

[90] The survey contains more items than these ones presented. The particular items reported here are broadly representative of the kind used to assess student engagement in learning on the surveyed campuses. The data for this table come from three sources. Data on the survey results for UT Austin can be found at http://www.utexas.edu/ academic/ ima/nsse. Data on survey results for Texas A&M were provided directly by the institution. Data for the various categories of public institutions that are found in the table come from the 2011 NSSE survey, and are available at the organization's website: http://bl-educ-cprtest.ads.iu.edu/ SAS/rb_nsse. html

[91] Definitions for each of the institutional categories can be found on the website of the Carnegie Foundation for the Advancement of Teaching (http://classifications.carnegiefoundation.org/ descriptions/basic.php and http://classifications. carnegiefoundation.org/methodology/basic.php).

[92] The category of Public RI universities includes, for example, the University of California at Berkeley, University of Wisconsin, and Ohio State University and the others mentioned elsewhere in the report as being the benchmark peers of UT Austin and Texas A&M. Among the Public R2 universities included in the sample are Auburn University, College of William and Mary, and George Mason University. Doctoral universities include ones such as Illinois State University and Indiana State University. Among the large Master's institutions are James Madison University, most of the constituent campuses of the California State University System, and likewise a number of institutions that comprise the State University System of New York. Finally, the Bachelor's-Arts and Sciences category includes the United States Service Academies (i.e., U.S. Air Force, Military, and Naval Academies), as well as a number of selective, public undergraduate "honors" colleges, for example New College of Florida and St. Mary's College of Maryland.

[93] A growing body of research suggests that educationally-effective learning environments are those characterized by the promotion of so-called, "deep approaches" to student learning. Students who possess and develop these skills to learning "retain, integrate, and transfer information at higher rates than students using surface approaches to learning" (T.F. Nelson-Laird, R. Shoup, G. Kuh, & M. Schwarz, [2008]. The effects of discipline on deep approaches to student learning and college outcomes. *Research in Higher Education, 49*, 469-494.)

[94] The variable, "Level of Academic Challenge," is a scale representing reported behaviors, such as the following: the extent to which a student had worked harder than he or she thought they would to meet an instructor's standards; the amount of reading and writing a student had done during the current school year; and, how many hours the student had spent studying, reading, writing, doing homework, and analyzing data.

[95] This variable, "Enriching educational experiences," represents a scale of reported behaviors and attitudes, including the following: the frequency with which a student had had serious conversations with students, whose race, religion, political opinion, or personal values are different than their own; whether a student had participated in a learning community; whether the student had taken foreign language coursework, study abroad, or independent study; whether the student had undertaken a culminating senior experience such as a capstone course or a senior thesis; and, the extent to which the student believed his or her institution had encouraged contact among students from different socio-economic and racial backgrounds.

[96] This variable is a scale that includes elements such as the frequency with which students had talked with a faculty member about career plans, grades, assignments, readings and classes, or had worked with a faculty member on a project outside of class.

[97] Another, very recent research effort focused on the experiences of undergraduates at large research universities, is the Student Experience in the Research University (SERU) survey, created and administered by the Center for Studies in Higher Education at the University of California, Berkeley. In spring 2011, the University of Texas at Austin joined eight other universities in administering the SERU to undergraduate students. These universities included the University of California at Berkeley, University of Florida, Rutgers University, University of Michigan at Ann Arbor, University of North Carolina Chapel Hill, University of Pittsburgh, University of Oregon, and University of Southern California. Responses to some of the questions on the SERU survey about student study habits are lower than those found in the NSSE survey, although over 70% of SERU-surveyed students at UT Austin agreed that the university has a strong commitment to undergraduate education; only 2.8% disagreed. The results of an analysis of this survey can be found at http://www.utexas.edu/news/2012/05/30/research_university/

[98] Duderstadt, & F. Womack, (2003). *The Future of the Public University in America*. Baltimore, MD: The Johns Hopkins University Press. J.R. Cole, (2009). *The Great American University*. New York: Public Affairs/Perseus.

[99] Established in 1915, the organization defines its mission as being that of making "the aims of liberal learning a vigorous and constant influence on institutional purpose and educational practice in higher education." http://www.aacu. org/about/mission.cfm

[100] See the following AAC&U reports and studies, for instance: Association of American Colleges and Universities, (2007). "College Learning for the New Global Century." Washington, DC: AAC&U. Association of American Colleges and Universities, (2005). "Liberal Education and America's Promise (LEAP)." Retrieved from http://www.aacu.org/leap/index.cfm. G.D. Kuh, (2008). "High-Impact Educational Practices: What They Are, Who Has Access to Them, and Why They Matter." Washington, DC: AAC&U.

Notably, many of these recommendations also find support in recent research showing the practices as capable of enhancing college success for low-income students at large public universities; e.g., J. Eagle, & C. O'Brien, (2007). "Demography is Not Destiny: Increasing the Graduation Rates of Low-Income College Students at Large Public Universities." Report available on line at http://www.diversityweb.org/diversity-innovations/student_development/recruitment_retention_ mentoring/documents/ DemographyisNotDestiny_001.pdf

[101] Commission of 125, (2004). "A Disciplined Culture of Excellence: Report of the Commission of 125." Author.

[102] Signature courses are not all small; some have enrollments of several hundred students.

[103] The source for this information is an internal university document, "Course Transformation Program Project Plan," dated August 15, 2011.

[104] "Undergraduate Learning Outcomes." Office of Institutional Assessment, Texas A&M University.