AMERICAN ACADEMY
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THE FUTURE OF UNDERGRADUATE EDUCATION

THE FUTURE OF AMERICA

Commission on the Future of Undergraduate Education

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(American Academy of Arts and Sciences, 2016)

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The Future of Undergraduate Education, The Future of America
(American Academy of Arts and Sciences, 2017)

FINAL REPORT AND RECOMMENDATIONS FROM
THE COMMISSION ON THE FUTURE OF UNDERGRADUATE EDUCATION

THE FUTURE OF UNDERGRADUATE EDUCATION

THE FUTURE OF AMERICA

AMERICAN ACADEMY OF ARTS & SCIENCES
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ACKNOWLEDGMENTS

The Future of Undergraduate Education, The Future of America is published at a critical moment in our nation's history, when so many long-standing assumptions about who we are as a people, and where we are headed, have been called into question.

For over a century, we have pursued grand ambitions—groundbreaking scientific discoveries, life-changing technological advances, hard-won social change—and emerged ever stronger, if still imperfect, from our struggles. In recent years, however, we appear to have lost some of that motivating enthusiasm, the optimism that has always lifted us as a people. As we grapple with persistent social inequalities, widening political divisions, prolonged international conflict, and intensifying environmental challenges, we often seem more concerned with the limits of our present capabilities than in the realization of our dreams.

If we are to regain our momentum, as we have after so many other challenging moments in our past, we will have to find new ways to channel our inexhaustible creativity, restore a measure of civility to the national discourse, and bridge our differences. In short, we will have to recommit to the promise of education—to study the lessons of the past, analyze the requirements of the present, and imagine the innovations that will brighten our future. Education is not the solution to every problem, but it is often the best tool we have at our disposal, and there is good reason to believe it has been the primary source of our greatest achievements over the past century.

This report offers practical and actionable recommendations to improve the undergraduate experience. But in its practicality, it is motivated by the highest ideals: faith that every person, from every background, can succeed in America when given the proper training and preparation; confidence that our existing institutions of higher education can and will evolve to meet the needs of today's and future students; and an unwavering commitment to the free exchange of ideas as the basis of a creative, productive, and democratic society. As stated in the conclusion of this report, "Progress is not guaranteed, and good things will happen only with sustained effort, but if we can sustain focus on the work, combining patience with urgency, we can, through undergraduate education, make great advances as individuals and as a nation."

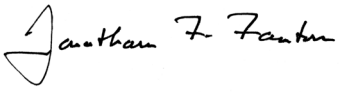
The Commission on the Future of Undergraduate Education, which authored this report, was created in 2015 by the American Academy of Arts and Sciences in response to a suggestion from Dr. Vartan Gregorian, president of Carnegie Corporation of New York. Dr. Gregorian observed that the context and expectations for American undergraduate education had changed dramatically over the past few decades, as our colleges and universities opened their doors to new populations of students (young and old, traditional and nontraditional, immigrant and international) and that it was time for a new study to examine the student educational journey. He therefore asked the American Academy to examine the current state of American undergraduate education, project the nation's short-term and long-term educational needs, and offer recommendations for strengthening all aspects of undergraduate education. We are grateful for his encouragement and for the support of Carnegie Corporation.

We are also very fortunate to have had the leadership of our distinguished cochairs, Michael McPherson, president emeritus of the Spencer Foundation, and Roger Ferguson, president and chief executive officer of TIAA. Their rigorous approach to the task, generosity of spirit, and deep knowledge of higher education have been invaluable to this effort. Thanks as well to all the Commission members (see Appendix A for a complete list), whose dedication and creativity enriched this effort and who modeled the kind of civil discourse and consensus-building that is, itself, one of the primary goals of undergraduate education. In preparation for this final report, they also published several occasional papers that elaborate many of the themes delineated in the pages that follow: *A Primer on the College Student Journey*, *The Complex Universe of Alternative Postsecondary Credentials and Pathways*, *Undergraduate Financial Aid in the United States*, *Policies and Practices to Support Undergraduate Teaching Improvement*, and *The Economic Impact of Increasing College Completion*. All of these publications are now available at www.amacad.org/cfue.

Over a two-year period, the Commission sought advice from a wide range of experts and organizations, all listed in Appendix B. We are grateful to all of them for their insights and suggestions. We also thank the following individuals for their time and counsel: David Autor, Larry Bacow, Cynthia Barnhart, Christopher Bishop, Derek Bok, Phil Bredesen, Louise Bryson, Mary Sue Coleman, Ron Daniel, Michael Dennin, Nicholas Dirks, Robert Haas, Dale Jorgenson, Jerry Kagan, Nan Keohane, Raynard Kington, Richard Light, Sara Lawrence-Lightfoot, Martin Lipton, Stan Litow, Tony Marx, David Oxtoby, Robert Pozen, David Pritchard, Virginia Sapiro, Alfred Spector, Jerry Speyer, and Mitchell Stevens.

Thanks as well to the members of the Academy's Board of Directors, Council, and Trust for their leadership, advice, and support for this project, and to the Academy staff who ably served this Commission and prepared this report: Francesca Purcell, Eliza Berg, John Tessitore, Phyllis Bendell, Alison Franklin, Heather Mawhiney, Scott Raymond, and Peter Walton; and consultants Lara Couturier and Richard Kazis.

This report is the culmination of a long process of research and deliberation, but it is only the beginning of the effort to strengthen undergraduate education in America. We will need many willing partners to help advance our recommendations. We look forward to working with you, and to hearing your thoughts about this report, in the months and years ahead.



Jonathan F. Fanton
President
American Academy of Arts and Sciences

INTRODUCTION

Our nation's effort over two centuries to provide education to everyone who lives and works within the United States is an expression of a core belief, one that has survived a long history of challenges: that all people, through learning, can achieve higher goals for themselves and for society as a whole.

Progress toward universal education in the United States has been slow and difficult, but the trend over time has been toward greater access and greater opportunity for more people of different regions and backgrounds. In the nineteenth century, the United States established local, public "common schools" for young children. In the first half of the twentieth century, high school became a universal experience for young adults. And in the second half of the twentieth century, colleges and universities expanded in size and number, as well as in academic offerings, to introduce more students of all ages and backgrounds to the kinds of opportunities once reserved only for a social and economic elite.

Our challenge today is to help the nation's extraordinary institutions of higher education work more effectively and efficiently for students in the twenty-first century. **What was once a challenge of *quantity* in American undergraduate education, of enrolling as many students as possible, is increasingly a challenge of educational *quality*—of making sure that all students receive the education they need to succeed, that they are able to complete the studies they begin, and that they can do all of this affordably, without mortgaging the very future they seek to improve.** The breadth and diversity of today's undergraduate population represent a great national achievement, but only if we can ensure that all students receive the rigorous knowledge and preparation they seek when they enroll—the education they need to succeed in their personal, professional, and civic lives. This is, in fact, a critical test for the American commitment to education, as the decades-long effort to welcome more students from different backgrounds, and to accommodate a more varied set of student expectations, has been so successful that colleges and universities, policy-makers, business and philanthropy leaders, and students and their families are now compelled to adjust to this next national challenge.

What was once a challenge of *quantity* in American undergraduate education, of enrolling as many students as possible, is increasingly a challenge of educational *quality*—of making sure that all students receive the education they need to succeed, that they are able to complete the studies they begin, and that they can do all of this affordably, without mortgaging the very future they seek to improve.

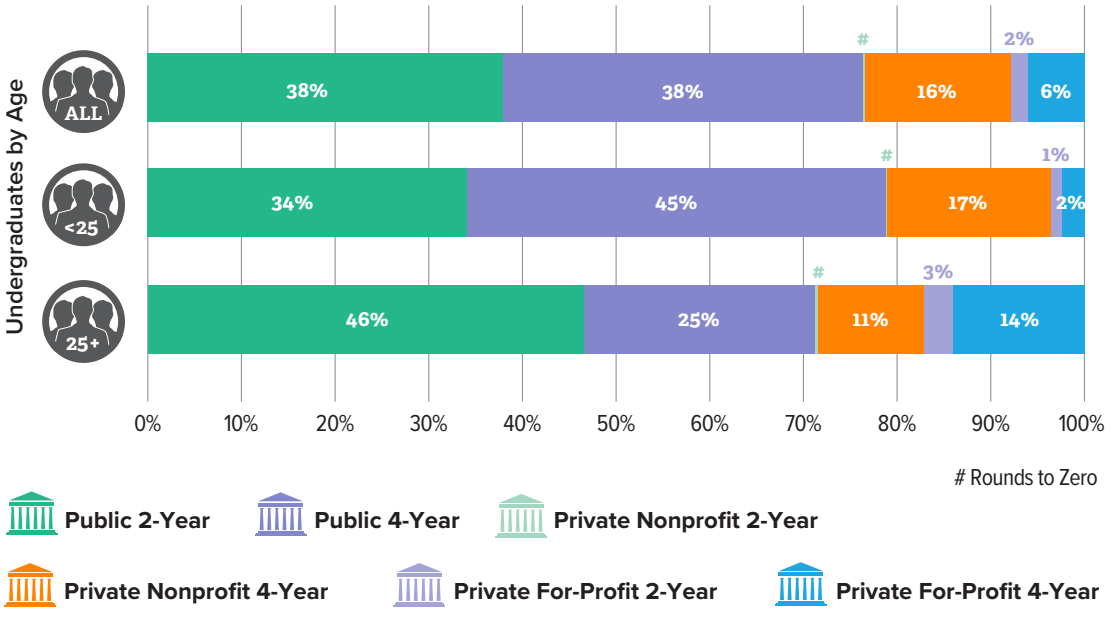
Almost 90 percent of high school graduates can expect to enroll in an undergraduate institution at some point during their young adulthood, and

smaller percentages continue their education through career and technical schools, apprenticeships, work-based training programs, and other alternatives.[1] Every fall, over 17 million students of all ages and backgrounds enroll at approximately 4,700 colleges and universities, attending either in-person or virtually, to earn an ever-widening array of certificates and associate's and baccalaureate degrees. Eighty percent enroll in the nation's public community colleges and state universities, while others attend a diversity of private nonprofit and for-profit institutions (see Figure A below). About one-third of enrolled students are over 25 years old, and almost 40 percent are enrolled on a part-time basis.[2]

Their motivations are varied, perhaps even unique to each individual, but in aggregate Americans are looking to undergraduate education to help them navigate a time of accelerated demographic, technological, and political change.

- They find themselves living in a nation that is increasingly heterogeneous. In today's public

FIGURE A: Enrollment Rates for Undergraduates by Age and Type of Institution



SOURCE: National Center for Education Statistics, Digest of Education Statistics, Table 303.50, "Total Fall Enrollment in Degree-Granting Postsecondary Institutions, by Level of Enrollment, Control and Level of Institution, Attendance Status, and Age of Student: 2013," https://nces.ed.gov/programs/digest/d14/tables/dt14_303.50.asp?current=yes; and National Center for Education Statistics, Digest of Education Statistics, Table 303.70, "Total Undergraduate Fall Enrollment in Degree-Granting Postsecondary Institutions, by Attendance Status, Sex of Student, and Control and Level of Institution: Selected Years, 1970 through 2025," https://nces.ed.gov/programs/digest/d15/tables/dt15_303.70.asp?current=yes.

discourse, diversity is often reduced to the prediction that, by 2040, there will be no racial or ethnic majority in the United States.[3] But the diversification of America can be described and documented in other ways, across aspects of religious belief, gender, language, political affiliation, and regional identification, to name a few. In every case, the public face of America has changed dramatically over the last few decades, and every American can now expect to come into contact with histories and worldviews quite different from their own, on a more regular basis. The development of an increasingly interconnected global economy will only reinforce this sense of profound ethnic, cultural, and linguistic change.

- Workers of the future can also expect to change occupations and careers several times and may even end up in jobs and industries that do not now exist. While it is impossible to predict future work trends with great accuracy, emerging technologies will continue to replace routine functions across many job categories at all levels, even as they create new opportunities for workers in hundreds of fields, including medicine and healthcare, manufacturing, and communications. These challenges will be amplified by the increasing competitiveness of other nations within the global economy, including the diversifying skill sets of foreign workers.

- And democratic governance will become much more complicated as a result of these demographic and technological changes. Engaged citizens already require real scientific and technological understanding—as well as a working knowledge of history, economics, civics, and the arts—in order to make informed policy decisions. They also need a set of sophisticated critical thinking skills in order to navigate a media landscape that includes the rapid exchange of information, often at the expense of careful analysis and reasoned debate, and in which fact and fiction are not easily distinguishable. Perhaps most important of all, they need institutions that welcome and protect a robust but respectful exchange of ideas as the basis of all innovation and the very essence of a democracy.

Our educational institutions can and must provide, at scale, the knowledge and skills that are required to help every American make sense of and thrive in a future society that will be even more diverse, technological, and complicated than the present. The pressures on our colleges and universities are particularly acute. A growing proportion of American occupations will require college credentials at the baccalaureate, associate's, and certificate levels because jobs will depend upon increasingly technical bodies of knowledge or because the more general skills and experiences that undergraduate education provides—scientific and civic understanding, critical thinking and "soft skills," clarity of thought and expression, and the ability to work in teams—will be considered more desirable in every field and profession. A college education also correlates to a host of other outcomes that most Americans find desirable. College graduates enjoy more time spent with their families and prove to be more active in their communities as volunteers. The voting rate among college graduates is nearly twice as high as the rate for high school graduates.[4] They tend to exercise more and report better health through the course of their lives. College graduates report having more interesting and rewarding work than nongraduates.[5] And

the economic benefits associated with a college degree are clear: on average, college graduates earn approximately $1 million more than high school graduates.[6] Part of this difference is due to college graduates' higher employment rates: for example, in 2016, the unemployment rate for high school graduates was 5.2 percent compared to only 2.7 percent for bachelor's degree holders and 3.6 percent for associate's degree holders.[7]

But to realize the full benefits of an undergraduate education, students must be able to complete their degrees. Our undergraduate institutions, as a whole, are more successful in enrolling students than they are in graduating them. By one measure, only about 60 percent of students who pursue a bachelor's degree actually complete one. Similarly, only about 30 percent who pursue a certificate or associate's degree ever earn the credentials they seek. In addition, completion rates, when analyzed by gender, race, ethnicity, and socioeconomic status, are troublingly unequal. Women complete at higher rates than men, White and Asian students complete at higher rates than Black and Hispanic students, and high-income students complete at higher rates than their low-income peers. Students who attend part-time, mostly working adults and parents, complete at much lower rates than those who attend full-time. And students from rural areas of the country lag behind their urban peers. These disparities mirror and reinforce other social inequities, and are an obstacle to social progress. They also represent a significant challenge to an education system that has long prioritized the expansion of access, especially when many who enroll but do not graduate are unable to repay student loan debt and are, therefore, worse off financially than when they started. True equity requires that students from all backgrounds have an opportunity to receive a quality, affordable education and that they can complete their degrees in a reasonable period of time.

To realize the full benefits of an undergraduate education, students must be able to complete their degrees.

The United States now ranks 11th among the 34 Organization for Economic Cooperation and Development countries in the percentage of its 25- to 34-year-olds who hold an associate's degree or higher. Less than half (46.5 percent) of all Americans in this age group hold a degree, compared with 69 percent in South Korea and 59 percent in Canada.[8] There are many reasons for these differences, including the social, economic, historical, and geographic challenges of serving a nation as large and diverse as the United States. There are also many reasons why an American student might postpone or cease their pursuit of a degree. Indeed, there is no single model for a successful undergraduate experience, and the diversity of educational pathways is a particular strength of the American approach. Nevertheless, now that most high school students have access to some college option, the nation's future success—in business and civic life, at home and abroad—depends on its ability to realize the untapped potential of the many students who begin but do not complete their undergraduate education. The completion of a few college courses is not a sufficient education in the twenty-first century.

Although the public discourse tends to focus on the most extreme examples of burdensome student debt, the larger issues reside with students who take out relatively smaller loan amounts but never earn a credential.

Among the primary obstacles to completion for many students is the sheer cost of an undergraduate degree. Close to 60 percent of all college graduates take out loans averaging a total debt of $20,000 per student—approximately the cost of a brand-new economy car. But the problem of student debt is far more serious for students who drop out than for students who graduate. While 9 percent of college graduates default on their loans, the default rate among students who do not complete their degrees is almost 25 percent. Although the public discourse tends to focus on the most extreme examples of burdensome student debt, the larger issues reside with students who take out relatively smaller loan amounts but never earn a credential.

Every sector bears some responsibility for addressing these challenges, and the entire nation needs to begin a new conversation about how to distribute the responsibility for undergraduate education. Institutions need to devote far more attention to and support for the quality of teaching and the teaching workforce and become more purposeful, effective, and efficient—reengineering their systems to focus on student completion. At the same time, government agencies need to focus their sights on students and communities in real need. And the private sector, including philanthropies, can help to advance these goals through a variety of partnerships and approaches to assist undergraduate institutions as they adjust to a growing and shifting student population.

The American Academy of Arts and Sciences organized its Commission on the Future of Undergraduate Education to take a broad view of undergraduate education in all of its manifestations and to recommend ways to ensure that students in every program and institution receive the education they need to succeed in the twenty-first century. In this final report, the Commission offers a comprehensive national strategy encompassing three broad recommendations to achieve this goal:

1. Ensure that all students have high-quality educational experiences.
2. Increase overall completion rates and reduce inequities among different student populations at every level of undergraduate education.
3. Manage college costs and improve the affordability of undergraduate education.

Action on these recommendations can and should begin soon, and many will take 10–20 years before they are realized. The fourth and final section of the report takes a more speculative approach, looking to a further future through the lenses of several factors—each plausible and pertinent to the Commission's principal goals of quality, completion, and

> Our nation's investment in education has always implied a compact among the generations, in which each generation has accepted some responsibility for the success of the next. That sustained effort, over 200 years, has resulted in the network of colleges and universities that is among the most significant contributors to America's intellectual and economic strength, the engines that drive the American Dream.

affordability—which could move in very different directions: our country's level of social cohesion; the characteristics of the workforce; the level of access to information and educational technologies; and unforeseen natural or human-generated global challenges. The report ends by offering priority research areas to advance the work toward a strengthened and more affordable undergraduate education for a greater share of Americans.

In developing this report, the Commission drew upon a vast array of innovative and important practices, policies, and studies underway across the country, as well as successful projects at every level of undergraduate education. Throughout the report, promising practices are highlighted either in green or included under a green "Promising Practice" banner. Additional promising practices may be found at www.amacad.org/cfue. It assembled evidence supporting the notion that undergraduate education institutions in every sector can achieve meaningful progress as long as they focus on quality and completion as primary goals, limit costs and obstacles in the pursuit of these goals, and partner with other entities to create new efficiencies, share best practices, and build economies of scale.

In time, as teaching methodologies evolve and delivery systems become less expensive and easier to manage, digital technologies will help expand educational opportunities for all students. Some advances, like the growing use of predictive analytics in student advising, are already changing the way institutions serve their students. But such innovations have been local and slow to spread across the higher education landscape. Taking up the challenges of improved performance cannot wait, however; they must be addressed now or risk failing the talented students of today and tomorrow.

A recent, comprehensive research project on social mobility tracked about 30 million college students, charting the percentage from lower-income families who then moved up the income distribution by their early 30s. Among its many findings, the study reveals that open access colleges and universities serve as major catalysts propelling low-income students into middle-class lives. But it also suggests that American institutions of higher education are not meeting their potential.[9]

Our nation's investment in education has always implied a compact among the generations, in

which each generation has accepted some responsibility for the success of the next. That sustained effort, over 200 years, has resulted in the network of colleges and universities that is among the most significant contributors to America's intellectual and economic strength, the engines that drive the American Dream. Some historians even suggest that America's rise as an economic power, beginning in the nineteenth century and continuing through the 1960s, can be traced to the rapid growth of educational opportunity in the United States, including the expansion of undergraduate education, in contrast to the more gradual broadening of educational opportunity in Europe.[10] We now have the potential to provide every American with an undergraduate degree, but over the past 30 years, the generational compact has weakened, investments have been reduced, and the rate of attainment lags behind our nation's needs.

To better understand the scope of the investments required to reverse this course, and to help measure the benefits of renewed investment, the Commission engaged a leading economic consulting firm, Moody's Analytics. Their analysis indicates that an ambitious yet achievable improvement in college completion rates would require substantial investments over a decade and more, but the longer-term effect on the economy would be a significant improvement in the productivity of the American economy and a resultant gain in the nation's standard of living.[11] One model, based on a 20-year projection, forecasts an annual growth in GDP that is nearly 10 percent higher than it would be without the program—an increase large enough to repay initial investments and continue to grow the economy. While the analysis focuses on the economic side of this development, there is every reason to believe that an investment in students would yield other, less easily quantified returns as well, including gains such as greater intercultural understanding, increased civic participation leading to a stronger democracy, and more rewarding lives for graduates. In the same way that the nation must reinvest in its physical infrastructure—roads, bridges, railways, and so on—as a stimulus for communication and commerce of all kinds, the United States should commit to a comparable reinvestment in our existing educational infrastructure, including undergraduate education, in order to realize the productive potential of all Americans.

Ultimately, the future success of the nation will depend on its citizens' level of commitment to a revised, inclusive ideal of an educated society in which every member is well-prepared to succeed and thrive. The national strategy the Commission recommends certainly requires some sacrifices, including sensible investments to assist students in need and to encourage a more concerted national effort to share, adopt, and bring to scale successful programs and best practices that enhance the student experience and spread the benefits of innovation more equitably across the nation. But the costs of such a strategy are far outweighed by the benefits to individual students, to local communities, to the nation, and to the world.

1 NATIONAL PRIORITY ONE

Strengthen the Student Educational Experience

INTRODUCTION

For the past two decades, institutions of higher education have been the subject of increased public scrutiny, and perhaps that is as it should be. As a society, we ask so much of our two-year and four-year institutions—that they provide foundational knowledge for future citizens, practical skills for future workers, technical innovations for future discoveries, and the understanding and habits of mind that can sustain all of us through the course of our lives. And we are now asking that they provide this kind of quality education to more students than ever before. Currently, 17 million students are enrolled in college and university programs across the country—representing, in every sense, the future of our country and of the world. It is only appropriate that we should continually evaluate the education they receive and adjust our methods and resources to ensure the most positive results for individual students, their families, and for our society as a whole.

Much of the current public discourse about higher education focuses on two systemic challenges: the affordability of a degree and the importance of program completion. Both are critical challenges that the Commission addresses in greater depth in later sections of this report, but before turning to those issues, we must first ask a fundamental question: What kind of education is worth students' commitment of time and their investment of scarce resources? Too little attention has been devoted to this question and to the rigors of the learning experience itself, despite all of the attention paid to undergraduate education. Specific answers will vary and may be particular to each individual who asks, but the Commission believes that some important general characteristics distinguish a quality college education in every case, including the quality of the teaching students encounter. Completion and affordability are critical challenges, but we must first ask, and answer, completion and affordability for what?

Given the accelerated rate of change in American society—technological change, demographic change, the evolution of a global economy—a quality education must encourage and develop intellectual resilience and flexibility. It must offer students a combination of scholarly knowledge, practical skills, and personal dispositions that empowers them to live productive and meaningful lives and to participate effectively in the American economy and democracy, regardless of their program of study or their age at enrollment. And it must build on the strengths of previous generations while creating a solid, practical foundation for future generations—since today's students are tomorrow's teachers, whether they find themselves in a classroom, in a factory or boardroom, or around a dinner table.

Students learn in many different settings: in classrooms, lecture halls, and laboratories; online; through peer interactions; through co- and extracurricular activities; and through self-motivated exploration. In almost every case, the richness and rigor of undergraduate learning depends upon the quality of instruction being offered, including the expertise of

the teaching workforce and the level of investment in successful teaching methods and resources. Currently, efforts to measure college learning and teaching quality are in their infancy. Researchers are making progress, such as recent advances in discipline-based education research in the STEM fields, but a great deal more needs to be done. In the meantime, colleges and universities need to be as strategic as possible about the kinds of instruction offered and how it is delivered.

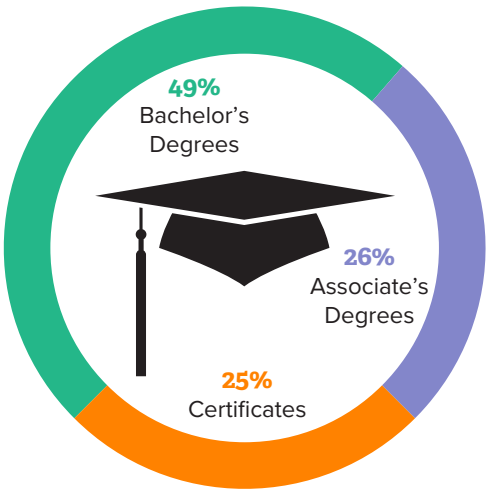
KNOWLEDGE AND SKILLS ALL GRADUATES NEED: ACADEMIC, PRACTICAL, AND CIVIC

All college students—whether enrolled in a short-term program, a two-year college, or a four-year institution—should be able to graduate with skills and credentials that help them to succeed personally and professionally, and to navigate the challenges they will face in their work, families, and communities. One college student may choose to earn a short-term certificate in medical assisting from a local community college. Another may work part-time toward an associate's degree in science in automotive technology from a for-profit university. A third may pursue a bachelor of arts degree in philosophy from a private, residential college. All should come away with a new facility in the knowledge and skills associated with their chosen program of study. But success in today's economy and effective participation in a democratic society require a broader ambition.

Students need to be equipped with the skills, flexibility, and attitudes required to navigate amid uncertainty, to see change as an opportunity rather than a threat. Such a goal is especially challenging given the diversity of students currently enrolled in undergraduate education, one-third of whom are over the age of 25, as well as their varied and changing motivations for pursuing a degree. Currently, about half of all college students earn bachelor's degrees (49 percent), while the other half pursue associate's degrees (26 percent) and certificates (25 percent).[12] Each pathway responds to a different set of motivations and offers a different set of outcomes. Yet all college graduates should also come away with an enhanced set of general skills that will serve them throughout their lives.

Career-focused college programs must provide students with a strong base from which to secure employment, but they should also help students learn skills and behaviors necessary for success in the short and long term. Students

FIGURE B: Credentials Earned



SOURCE: National Center for Education Statistics, https://nces.ed.gov/programs/digest/d16/tables/dt16_318.40.asp?current=yes.

earning a certificate in advanced manufacturing need to learn how to perform specific technical tasks. But they should also graduate with a broader understanding of how their work fits into the broader manufacturing sector and how to adapt quickly to industrial and technological changes so they can continue to succeed in their chosen fields, or even to change fields, if necessary. They should learn how to work collaboratively with peers (in person or through interactive technologies) to solve problems, to communicate their ideas, and to negotiate on their own behalf. Ultimately, they should have the capacity, when called upon, to lead. Similarly, students earning a bachelor of arts in political science or English literature should not simply be well versed in the discipline's theories and methods. Their academic knowledge must be augmented with specialized and technical skill sets such as computer programming, data analysis, or social media.[13]

In these pursuits, the traditional division between a liberal arts education and a practical, applied education is no longer a very useful distinction. College graduates in every field need to master a blend of so-called soft and hard skills, technical training as well as socio-emotional, problem-solving, and critical thinking skills, so they can perform effectively at work, participate meaningfully in community and civic affairs, and pursue learning throughout their lifetimes. Vocational training focused on narrow job-related skills helps students find jobs when they are young, research finds, but they are often not prepared to adapt to changes over time and thus are more likely to be unemployed or have lower salaries when older compared to those who received a more academic general education.[14] While short-term technical programs in particular are often underresourced and pressured to advance students quickly to completion, every program should strive to combine the skills of a liberal education with technical and practical skills for a firm foundation to promote greater social and economic mobility over a lifetime.

This approach is good for the individual student and increasingly it is good for business. A series of national surveys reveals that employers actively seek a workforce equipped with communication, problem-solving, and collaborative skills—and not simply the technical knowledge associated with particular tasks.[15] Some of these skills can be learned in the classroom, but some might be better mastered through cocurricular experiences such as internships, service learning, and co-op programs that reinforce the interaction of theory and practice, knowing and doing.[16] The intentional, mutual reinforcement between theoretical knowledge and direct experience is the foundation of any effective experiential learning program, and the collaboration between educational institutions and employers can be a powerful driver of innovation for business and academia alike. Further, ensuring that students receive a rigorous education engenders greater confidence among employers. Faculty and administrators at San Jacinto College in Pasadena, Texas, work closely with representatives from local industries to review curricula and data on student progress and to propose adjustments that help prepare students to graduate with the skills and attitudes employers seek. IBM and other large employers like Cisco and IDEO are working on initiatives to hire "T-shaped" professionals, who possess not only soft skills for collaboration

and the ability to interact with and understand specialists from diverse disciplines and functional areas (the T-top) but also the deep knowledge of a specific skill, process, or product (the T-stem). Several universities are now using the concept of the "T" to shape their curricula, with the goal of graduating students who are ready to tackle the challenges of an increasingly diverse, global, and technologically advanced workplace.[17]

Beyond preparing students for success in the workforce, preparing students for effective civic participation is a central obligation of undergraduate education writ large. Many of the country's founders—Thomas Jefferson, Benjamin Franklin, and John Adams, a charter member of the American Academy of Arts and Sciences—believed that the democratic experiment had to be safeguarded and maintained and that the enduring success of a democratic government depended upon an educated citizenry. And since the nineteenth century, expanding educational opportunity has been deeply embedded in American culture. This holds true today as well as into the future, obliging colleges and universities to actively educate students about fundamental knowledge about democracy, the practices and habits needed for lifelong active citizenship, and an understanding of and appreciation for the values that animate democratic practices. Every year, various reports raise concerns about the low level of civic literacy and participation in the United States.[18] Each institution must come to its own definitions and goals for student civic learning and engagement, considering how these can be brought about through academic coursework, cocurricular activities, and off-campus experiences, especially in a time when social media may be changing how students participate in various political processes.[19]

Many of the skills and capacities needed for effective citizenship—problem-solving, critical and creative thinking, working in groups—are fully aligned with those needed for success in the workplace. Thus, regardless of a student's program of study or eventual field of employment, a strong set of civic skills will complement, not compete with, their learning experience. Moreover, a well-educated citizenry has strong spillover effects—communities with strong civic health have higher employment rates, stronger schools, better physical health, and more responsive governments.[20]

As students engage in civic practices and discourse, this will inevitably give rise to competing ideas and positions on a variety of political and social issues. Vigorous debate must remain a bedrock value across undergraduate education. Rather than shielding students from points of view that some might find uncomfortable, educational institutions should actively promote discussion and debate. All members of the campus—faculty, staff, and administrators—have an important role to play by encouraging students to develop the confidence and skills to express themselves; to actively listen to all perspectives; to argue for, defend, and sometimes change their positions based on evidence and logic; and to fully appreciate the democratic principle of allowing citizens to speak their minds without fear of retaliation. Conflict and disagreement are inherent in debates that matter, but the environment within which debate occurs shapes the ability of all participants to engage productively. Colleges and universities need to foster the conditions for

the open and constructive exchange of ideas while maintaining a safe environment for all to pursue their education. This is no easy feat, but American campuses are the right places to demonstrate to the wider world how this can be done. Indeed, colleges and universities are one of the few places where diverse people with different views learn to work and reason together.

Many undergraduate institutions are already strengthening their commitment to the preparation of future citizens. The American Democracy Project, a network of more than 250 public colleges and universities, supports hundreds of campus initiatives such as curriculum revision projects, voter education and registration efforts, and a speaker series. An international group of universities collaborates through the Talloires Network to incorporate civic engagement and community service into their research and teaching missions. Massachusetts was the first in the country to adopt a statewide policy for the incorporation of civic learning in undergraduate curricula across all of its public colleges and universities.[21]

PRIORITIZING TEACHING AND LEARNING

The ideal education proposed here, supporting short-term and long-term personal and professional goals for each individual student, places a substantial burden on college teachers. Many other factors contribute to student success, including academic preparation; adequate financial support; curricular design and structure; effective tutoring, counseling, and other student support services; and student motivation. Longitudinal research on the effects of "high-impact" educational practices—including participation in undergraduate research and service learning opportunities—indicates an array of positive outcomes.[22] But the primary determinant of a quality education is the teaching and learning relationship between faculty and students. Effective student/faculty interactions are correlated with increased retention and completion rates, better grades and standardized test scores, and higher career and graduate school aspirations.[23] Quite simply, students learn more and fail less when faculty members consult and utilize a large and growing body of research about effective teaching methods and make connections with students. Yet, despite the high stakes now associated with undergraduate education, most institutions pay too little attention to these findings. Generalizations about undergraduate teaching and learning can be misleading given the remarkable variety of institutional missions, student populations, courses of study, and faculty compositions. Colleges that enroll a large proportion of underprepared students face different challenges than institutions admitting high-achieving young adults who live and learn on campus. Tenured and tenure-track faculty at small liberal arts colleges must juggle different expectations and requirements than their counterparts at large research universities. Part-time adjunct faculty, who teach an increasing percentage of undergraduate courses, often lack the institutional supports and professional development opportunities provided to full-time faculty. And teachers within and among institutions may harbor vastly different theories about how learning occurs.

While there are many exceptions, across the undergraduate landscape good teaching is generally undervalued. Faculty are rarely trained, selected, and assessed as teachers, and their effectiveness as instructors is rarely recognized

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or rewarded. Tenure-track faculty are typically hired and promoted for their research, while part-time adjunct faculty receive little, if any, coaching and resources on teaching methods. There are, of course, many faculty for whom quality teaching is the highest possible goal; they should be valued and rewarded. It is time for colleges and universities to elevate the importance of good teaching and to treat the practice of teaching as a central skill to be developed and supported. A new pilot is not asked to fly a plane without first practicing on simulators and flying smaller planes with an instructor for many, many hours. Nor should faculty be asked to learn to teach through the current trial-and-error method.

A crucial first step toward the rehabilitation of undergraduate teaching is the articulation of good teaching practices. Good teaching practice requires several forms of professional knowledge: fundamental subject-matter knowledge; teaching skills that transfer across disciplines and fields of study; discipline-specific instructional skills that combine a deep knowledge of subject matter (and the distinctive concepts, methods, and ways of thinking inherent to particular disciplines); and culturally relevant teaching practices and cultural modeling, which speak to the relevance of students' cultural knowledge and experience.[24] Many faculty members, for example, are experimenting with strategies to foster "active learning" in their classrooms, creating opportunities for students to cognitively interact with one another and the faculty member as opposed to exposing information to students in a passive manner.[25] Good college teachers help students

PROMISING PRACTICE
Program on Intergroup Relations, University of Michigan

The Program on Intergroup Relations (IGR) at the University of Michigan is a partnership between the College of Literature, Science and the Arts and the Division of Student Life with the goal of increasing active thinking, engagement in learning, and democratic participation. The Intergroup Dialogue process consists of structured social and intellectual interactions between members of different social identity groups over sustained periods of time. About 12–16 students from different groups participate in each section, which meets as a semester-long three-credit class. Research on IGR found that the experiences students have with diversity consistently and meaningfully affect important learning and democracy outcomes of a college education.

make explicit connections between theory and practice. Good teachers must be prepared to recognize and connect students who require support services to resources beyond the classroom. And as institutions fulfill their promise to prepare students for democratic citizenship as well as for the workforce, faculty must be ready to teach students how to listen actively to people who are different from themselves and hold competing ideological positions; to facilitate difficult conversations that may include issues related to race and ethnicity, sexual orientation, or other matters; and to ensure that students can think independently and creatively, expressing their opinions backed by evidence and reasoned judgment.

A growing body of research also indicates that significant student growth occurs when colleges provide structured opportunities for students from diverse backgrounds to learn and practice the skills and capacities needed to create real connection. This only happens when institutions leverage curricular and cocurricular activities that promote meaningful and sustained student dialogue and interaction.[26] To do this most effectively, faculty must be prepared to become facilitators as well as instructors.

To meet these new requirements—to pursue research-based teaching methodologies and to facilitate open dialogue in the classroom—college faculty may need to conceive of their roles in fundamentally new ways. The transformation of a teaching workforce rooted in disciplinary expertise to include pedagogical expertise will not be easy. Emerging research on the science of learning cannot simply be disseminated with the hope that doing so will improve outcomes. The research needs to be reinforced by new professional development opportunities at every level, including "preservice preparation"—in which pedagogy becomes a significant component of graduate training—and "in-service" professional development providing ongoing evaluation and support.

Doctoral and master's programs must integrate teacher training into their curricula. Graduate students who will be teaching assistants might be required to complete a teaching boot camp before they enter the classroom, as Clarkson University's School of Arts and Sciences now requires of its incoming doctoral candidates. And the sector as a whole must support and reward effective teaching by offering incentives and strong cultural support that can motivate faculty to adopt new methodologies. Purdue University recently took a hard look at how it valued teaching and learning in promotion and tenure decisions and decided to include expectations for mentoring or other personal time invested in students among the factors influencing decisions.

More experienced teachers might occasionally attend classes taught by novices and act as mentors. Assistant professors at research universities, for example, are accustomed to having their research evaluated, but their teaching (other than student evaluations) receives no such review. Of course, mentors would themselves need training as observers and guides to improvement. The ultimate goal should be the creation of a new culture within and across all undergraduate institutions—as well as disciplinary organizations, higher education associations, and key federal and state agencies—that supports and rewards good teaching informed by the insights of learning science. Boise State Uni-

versity, for example, offers faculty a range of opportunities, including a five-day summer design institute to upgrade and improve a course; a program called *Ten before Tenure*, which offers pre-tenure faculty ten teaching-related development experiences; and an extended opportunity for a small group of faculty members to meet regularly with a facilitator to discuss pedagogy and design and implement an individual teaching innovation. The university offers travel awards to conferences, small grants, and departmental teaching awards and also includes clear evidence of teaching quality as an important factor in promotion and tenure decisions.

The STEM fields are increasingly emphasizing the critical relation between teaching and learning with a range of initiatives across the country. The National Academies of Sciences, Engineering, and Medicine released several influential reports and tools on increasing STEM degree attainment that underscore the importance of instructional practices and understanding how students learn.[27] Transforming Post-Secondary Education in Mathematics, sponsored by Carnegie Corporation of New York, the Alfred P. Sloan Foundation, and the National Science Foundation, is working to strengthen math education by working closely with faculty, administrators, membership associations, and disciplinary societies. The Association of American Universities recently completed a five-year project supporting eight research universities in their institution-wide and departmental efforts to reform undergraduate STEM education and to recognize and reward effective teachers.

DIGITAL TECHNOLOGIES AND COMPETENCY-BASED EDUCATION

Digital technologies are already changing the ways in which education is delivered, and prospects are strong for their potential to strengthen teaching and learning. The conversation around educational technology, once framed as a conflict between human and machine, is now shifting to an examination of how technology can complement, enable, and improve upon teacher-student interactions.

PROMISING PRACTICE
The University of Colorado Boulder's STEM Education Initiative

Nobel Prize–winning physicist Carl Weiman and colleagues at the University of Colorado Boulder and at the University of British Columbia introduced the Science Education Initiative to stimulate large-scale adoption of active pedagogy by faculty, providing significant financial support for five years to redesign core undergraduate courses in several science departments. One key component was that departments were required to create and fill the position of a science teaching fellow whose primary responsibility was to support the course transformation process by helping faculty increase their knowledge of learning theory, practice, and assessment. About one-third of undergraduate courses in participating departments were redesigned, engaging over 50 percent of annual student enrollment. About half of faculty in the participating departments reported making changes to their teaching, though the extent of change varied with departmental leadership, teaching fellow skills, and faculty valuation of available incentives.

While undergraduate education has generally been slow to adopt new methodologies, a growing number of faculty are already experimenting with new techniques and innovations—incorporating video, digital textbooks, social media, mobile apps, and digital games in their teaching.[28] Despite the bullish predictions of the past decade, and with a few notable exceptions, the digital revolution has not, or at least not yet, led to a complete transformation in education.[29] High start-up costs and the need for teacher training have slowed the evolution of the classroom. Nevertheless, a new era is on the horizon.

The most apparent change so far has been the growth and expansion of online courses over the past 20 years. In fall 2014, 12 percent of all undergraduates were enrolled exclusively in online programs and another 16 percent took at least one online course.[30] The benefits for students are clear, eliminating geographic obstacles, scheduling challenges, and other factors that tend to limit access to higher education. Several studies indicate that well-structured and well-supported online learning experiences offer equal if not better outcomes than traditional face-to-face courses, at least in some subjects.[31] Unfortunately, not all online students realize the same results. Students, particularly those in high-risk populations such as academically underprepared students, learn less in online courses than from equivalent courses with at least some face-to-face experience.[32] And the impact of online education on decreasing costs is mixed as well, especially when institutions invest in teacher training and student supports for online classes. While a growing body of evidence suggests that computer-assisted education can be as effective if not more effective than traditional methods, its potential is still largely untapped.

Among the fastest-growing innovations are competency-based education (CBE) programs that award degree credit, primarily through online delivery, based on the demonstration of competencies rather than course hours. CBE programs maintain no time constraints; they are paced by the students themselves. A recent review suggests that as many as 200,000 students currently participate in approximately 150 CBE programs, with approximately 400 new programs in development.[33] The traditional faculty role is often disaggregated: a faculty member creates the curriculum, a coach guides the student through the coursework, and an evaluator assesses student work. These programs are so new that there has been little careful research into their outcomes for students, but as more institutions experiment with and measure the results of these programs, their effectiveness and potential will become clearer. To improve the quality of the education they provide, colleges and universities need to encourage and incentivize such experiments, adopt third-party assessment strategies to make sure innovations are effective and equitable across various student populations, and develop supports for quick adoption of proven or highly promising practices.

Since digital technologies are global in their reach, the United States is not alone in its pursuit of a new, twenty-first-century educational strategy. Colleges and universities around the world—from Finland to South Korea to Singapore to Israel—are also experimenting online, and all would benefit from a concerted effort to share knowledge and

test the scalability of new approaches. The Open University, the UK's largest university, which serves over 200,000 students, has a robust and long-standing research division that includes an internal focus on continual improvement of the university's own teaching and learning systems.

Although data needed to predict the outcomes of innovations are often lacking, researchers are beginning to accumulate sufficient domestic and international data to better inform decision-making. The improvement of learning analytics, which uses the data captured by traditional, online, and massively open online courses (MOOCs) to assess student progress, as well as the strengths and weaknesses of teaching techniques, will be a boon to the field—a resource for administrators and researchers alike.[34] Eventually, such data may be as valuable as the courses themselves, providing a statistical basis to help inform education policy, teaching strategy, and cognitive research.

ADDRESSING FACULTY WORKFORCE CHALLENGES

Concurrent with the boom in digital education technologies has been an acceleration of the decades-long shift from a faculty dominated by full-time tenured or tenure-track professors to a faculty of part- and full-time instructors with no prospect of tenure. "Contingent" faculty, nontenure-track teachers whose primary responsibility is instruction or instruction combined with research and/or public service, account for at least half of all instructional faculty across all types of undergraduate institutions, ranging from 50 percent at public research universities to more than 80 percent at community colleges.[35] Part-time positions with one-year terms or less make up the largest share of nontenure-track positions at all types of colleges and universities.[36] There are many causes for this trend, including the demand for more technical and career classes taught by practitioners, greater flexibility in course offerings, and the overproduction of PhDs in some fields, with the result that tenure-track employment is unlikely. However, there is little doubt that a primary motivation behind the shift to short-term, part-time instructors is a desire among colleges and universities to reduce labor costs. Tenure-eligible positions will continue to be most common at research universities and highly selective liberal arts colleges. But even in these places, openings for "off the tenure track" will become more common in the future.

These parallel shifts—away from tenure and toward digital delivery—place a particular burden on nontenure-track faculty, especially part-timers. There are many part-time faculty who contribute their specialized expertise but who do not necessarily want to pursue an academic track. They often provide new perspectives and deep experience, rounding out students' learning. However, they earn less and have fewer benefits than their tenured or tenure-track counterparts, and they often find themselves distanced from their institutions' administrative decision-making, less able to advocate for themselves, and less available to engage with students. At open access institutions, a heavy reliance on part-time faculty, who often lack the time or space for regular, high-quality interactions with students before and after class, may have adverse consequences on student outcomes. In this environment, ensuring that high-quality teaching remains

constant across all sectors for all students poses an urgent challenge.

The challenges associated with a contingent workforce are particularly troubling for minority students. At a time when about 32 percent of American college students identify as Black or Hispanic, only around 10 percent of full-time instructional faculty are either Black or Hispanic.[37] It is concerning that the greatest progress in diversification of the teaching faculty is among nontenure-track and part-time faculty,[38] many of whom lack the support and stability available to their full-time, tenured counterparts. Greater faculty diversity correlates with positive benefits for students of color, including higher persistence rates, better performance on tests, and increased classroom peer interaction.[39] Faculty diversity is also valuable for all students, not just those from underrepresented groups: In a survey primarily about undergraduate preparation for the workforce, 77 percent agreed that having a minority faculty member better prepared them for the diversity of today's corporate business environment.[40]

Given the importance of faculty in fostering and guiding student learning, it is critical to the quality of undergraduate education that effective teachers should be able to build successful professional lives, whether or not they have tenure.

Given the importance of faculty in fostering and guiding student learning, it is critical to the quality of undergraduate education that effective teachers should be able to build successful professional lives, whether or not they have tenure. Universities and colleges can support a well-prepared and motivated teaching force by creating stable professional working environments to support high-quality instruction and by providing meaningful career ladders with appropriate protections for academic freedom.[41] They should aim to create nontenure-track positions that are full-time with longer-term contracts and a clear voice in governance. Faculty in these positions should be evaluated and rewarded based on their teaching and on their efforts to master current trends in their fields. For example, the University of North Carolina at Chapel Hill complements its tenured and tenure-track faculty who have research responsibility with full-time, fixed-term (one to five years) lecturers, senior lecturers, and teaching professors who are engaged primarily in teaching. Allowances should be made for hiring short-term, specialized adjuncts who do not have and do not expect to have a long-term career in education, but colleges and universities should make a clear, ongoing commitment to improving how all faculty are selected, trained, evaluated, and supported.

MEASURING AND STRENGTHENING THE QUALITY OF STUDENT LEARNING

While countless faculty devote an enormous amount of effort to the evaluation of student learning at the course and departmental levels, valid and reliable measures of student

learning within and across colleges and universities are lacking. Despite the development of tools to measure and evaluate the quality of learning in college, higher education as a sector is poorly structured for a free flow of data about what students have learned, how well they have learned it, how their education relates to future success and civic participation, and whether some groups are learning more, and more consistently, than others. Without such cross-cutting metrics, it is difficult to put learning front and center amid calls for institutional reform and the creation of accountability measures.

Of course, accurate and reliable measurement of something as variable, and as private, as student learning is difficult and subject to any number of methodological disagreements.[42] Any realistic attempt to develop more systematic measures of student learning must take into account the full range of student characteristics (e.g., academic preparation, age, enrollment status, number of institutions attended) as well as the variety of institutional types and missions. Nevertheless, some colleges and universities have developed practices that help to define learning outcomes at the course, program, and institutional levels and to use authentic student work to measure learning. The enhancement of measurement and assessment at the actionable level of the department or the program, rather than at the level of the college or university as a whole, may offer the most immediate benefits for educators. In many cases, such data encourage faculty to define course and program objectives more precisely, work collaboratively to make curricula and program changes, and experiment with ways to demonstrate achievement. There is still

PROMISING PRACTICE
National Academy of Engineering's Grand Challenges

In 2008, prominent engineers, scientists, entrepreneurs, and visionaries assembled by the National Academy of Engineering (NAE) identified 14 of the most critical engineering systems challenges facing the planet in the twenty-first century. These "Grand Challenges" include making solar energy economical, engineering better medicines, securing cyberspace, improving access to clean water, and ten other huge challenges. A program to prepare engineering students organized around the Grand Challenges subsequently took shape, and now more than 40 engineering schools around the world participate in The Grand Challenges Scholars Program (GCSP) with more expected to join. The program aims to educate a new generation of engineers to tackle big real-world problems. GCSP is a combined curricular, cocurricular, and extracurricular program built around five competencies that cut across specific disciplinary knowledge and skills. These are: 1) mentored research or project experience to enhance technical competence; 2) multidisciplinary approaches to problem-solving and design; 3) business/entrepreneurship competencies to underscore the importance of viable business models for successful solution implementation; 4) multicultural understanding, which is critical to any viable Grand Challenge solution; and 5) social consciousness, often developed through service learning. The NAE and enthusiasts of the GCSP approach hope it will generate thousands of graduates a year who are uniquely prepared and motivated to approach the most challenging problems facing the world.

too little rigorous research to claim such efforts are contributing to student success, but early indications are promising.

A more effective system of assessment and evaluation may also help to supplement, or even to transform, college ranking systems, which currently rely on imperfect proxy measures such as admission selectivity rates and endowment sizes. While this application would be a mere by-product of enhanced data collection, it would be a great asset to students and families who seek more guidance as they choose among their educational options. Efforts such as the American Association of Colleges and Universities' VALUE Rubric Development Project, the Collegiate Learning Assessment, the University of Texas Skills Ledger, as well as surveys such as the National Survey of Student Engagement, the Community College Survey of Student Engagement, Student Experience in the Research University, and the Cooperative Institutional Research Program, provide helpful information about student experiences and the extent to which students spend time on meaningful learning activities. They also generate insights into how colleges and universities can help students achieve at higher levels. But a well-developed valid and reliable methodology, based on an aggregation of data about learning, would help all parties compare and contrast institutions as they pursue the mission they all share: to provide a quality education to every student.

Approaches to Determining the Knowledge and Skills Needed by College Graduates

Campuses across the country, higher education organizations, and educational thought leaders are engaged in efforts to clearly define the outcomes of an undergraduate education. There is growing consensus, even among employers, around the knowledge, skills, and dispositions needed by all college graduates. For example, the Association of American Colleges and Universities developed a list of essential learning outcomes in collaboration with campuses, researchers, and employers:

KNOWLEDGE OF HUMAN CULTURES & THE PHYSICAL & NATURAL WORLD

- Through study in the sciences and mathematics, social sciences, humanities, histories, languages, and the arts

Focused by engagement with big questions, both contemporary and enduring

INTELLECTUAL & PRACTICAL SKILLS

- Inquiry and analysis
- Critical and creative thinking
- Written and oral communication
- Quantitative literacy
- Information literacy
- Teamwork and problem-solving

Practiced extensively, across the curriculum, in the context of progressively more challenging problems, projects, and standards for performance

PERSONAL & SOCIAL RESPONSIBILITY

- Local and global civic knowledge and engagement
- Intercultural knowledge and competence
- Ethical reasoning and action
- Foundations and skills for lifelong learning

Anchored through active involvement with diverse communities and real-world challenges

INTEGRATIVE & APPLIED LEARNING

- Synthesis and advanced accomplishment across general and specialized studies

Demonstrated through the application of knowledge, skills, and responsibilities to new settings and complex problems

In his book *Our Underachieving Colleges*, Derek Bok argues that the goals of an undergraduate education should include the ability to communicate, critical thinking, moral reasoning, preparing citizens, living with diversity, living in a more global society, gaining a breadth of interests, and preparing for work.

These examples illustrate ways of articulating the objectives associated with an undergraduate education. In light of the very wide range of institution types, student interests, and student backgrounds across American undergraduate education, the Commission supports campus efforts to engage in the meaningful exercise of defining the purposes of an undergraduate education in line with their missions.

Priority One Recommendations 1

ENSURE THAT ALL STUDENTS—WHATEVER THEIR PROGRAM OF STUDY—HAVE HIGH-QUALITY EDUCATIONAL EXPERIENCES THAT PREPARE THEM FOR SUCCESS IN THE TWENTY-FIRST CENTURY.

Too little attention is paid in undergraduate education to the educational experience itself and, in particular, to the challenge of ensuring that the 17 million diverse college students in many types of programs are learning and mastering knowledge, skills, and dispositions that will help them succeed in the twenty-first-century United States. Moreover, these students face the growing challenges of a changing and more competitive global economy in which they are competing against highly motivated and trained students throughout the world. For this reason, the Commission's recommendations intentionally begin with the educational experience, with student learning. All college graduates—regardless of their major or the credential they will earn—need their programs of study to impart a forward-looking combination of academic knowledge and practical skills so they are prepared for both economic success and civic engagement. Today, the long-standing debate over the value of a liberal arts education versus a more applied postsecondary program presents a false choice. College educators need to adjust their program curricula and learning expectations accordingly. And students need to see the ability to work and learn with others, and to disagree and debate respectfully, as a skill essential for a high quality of life and a future of economic success and effective democratic citizenship.

The Commission recognizes that advancing the broad learning agenda advocated here—and advocating for more attention to the teaching enterprise itself—will remain difficult until more sophisticated and useful ways of measuring what students actually learn are developed. Redressing this lack of good data is a high priority. The Commission calls for far greater attention to and support for the quality of college teaching and the teaching workforce. Students learn in many different settings, including through peer interactions, co- and extracurricular activities, and self-motivated exploration. Ultimately, though, making undergraduate learning stronger and more rigorous will depend upon how undergraduate education invests in the teaching skills of its faculty and the kind of institutional and systemic commitment that is made.

1 Widespread inattention to teaching quality in the preparation, selection, and assessment of faculty is a major obstacle to improved undergraduate student learning. University systems and individual campuses, academic departments, and disciplinary associations all have roles to play:

a **Master's and doctoral programs that produce college teaching faculty should integrate meaningful and explicit teacher training opportunities.**

b **Institutions must make a systemic commitment to the improvement of college teaching,** a commitment that acknowledges and rewards good teaching practices that are grounded in the learning sciences and an understanding of the variety of experiences and learning styles students bring to campuses. This commitment will most likely require ongoing review of faculty teaching practices; analyzing the faculty incentive system; making mentoring and other structured resources available to faculty throughout their teaching careers; and including teaching quality as a key part of tenure evaluation and contract renewal decision-making processes. Much of this work must take place in collaboration with academic departments.

c Disciplinary associations should lead research and professional development efforts exploring the relationship between teaching practices and student learning.

2 **Colleges and universities have the opportunity and the responsibility to bring together students from different backgrounds to create intellectual and social connections in ways that sustain and enrich American democracy.** Relatedly, faculty and staff all need training and support to make possible campus cultures and classes that fully encourage active listening, discussion, and debate on controversial topics informed by the rigors of reason and evidence. Colleges and universities constitute one of the most important sites where people from various backgrounds and perspectives interact, learn with and from one another, and grapple with difference. Being prepared to teach in an increasingly contentious and fractured world, where diversity is crucial, is difficult.

3 Recognizing the challenges associated with greater numbers of short-term, nontenure instructors, any effort to improve undergraduate teaching and learning will require **providing nontenure-track faculty with stable professional working environments and careers.** The trend toward increased employment of short-term, nontenure-track faculty in undergraduate teaching will persist as long as colleges are under pressure to keep costs down and universities continue to produce more PhDs in some fields than are likely to find tenure-track employment. Good teaching need not require tenure-track faculty in every case, but it does require that faculty be supported and rewarded for doing their work well:

a **As they hire nontenure-track faculty who concentrate on teaching—a growing share at many institutions across the country—colleges and universities should aim to make these positions full-time with longer-term contracts and a clear voice in governance,** relying less on short-term, part-time instructors. These positions should respect profes-

sional norms of academic freedom and provide a voice in university governance and the opportunity to build successful professional lives with reasonable benefits and job security.

b **Support and integrate faculty who teach on a part-time basis,** and who are recruited for their specialized expertise but who do not necessarily want to pursue an academic track, in a way that suits their more flexible needs.

c **Ensure that faculty from a diversity of backgrounds are equitably represented** across all instructional categories.

4 **All college credentials—certificates and associate's and bachelor's degrees—should incorporate academic, career, and civic knowledge and skills as a foundation for rewarding and productive lives and careers.** In workplaces continually impacted by technological advances, employers value graduates who possess a broad technical, social, and entrepreneurial skillset, as well as the ongoing motivation to develop and apply new skills. Employers have a key role in helping graduates obtain these capacities. At the same time, the complexities of contemporary society demand citizens who understand the values and behaviors that lead to active civic engagement and contribute to a healthy democracy. Undergraduate learners need meaningful opportunities to develop and integrate knowledge and skills in the classroom and through cocurricular experiences such as co-op programs and internships, research, international study, or service that can help them improve their economic prospects, effectively navigate their personal and public worlds, and continue to learn throughout their lifetimes. Even in short-duration certificate programs, technical and academic knowledge should be augmented by curricular redesign that strengthens practical skills such as communication, problem-solving, and teamwork.

5 **Develop more reliable measures of student learning gains,** since knowing what students have learned and can do is a critically important measure of college value. The focus on student learning as a means to understand and evaluate the effectiveness of a college credential is a valuable addition to what have traditionally been imperfect proxy measures used in college rankings systems such as admission rates and endowment sizes. However, colleges and universities remain in the earliest stages of finding ways to measure and report on student learning within and across undergraduate institutions, as well as how to best convey aggregated levels of learning to the general public. Learning gains should be disaggregated by subgroups that include socioeconomic status, race/ethnicity, and gender. Greater attention should be paid to

how other countries and their institutions address this problem and seek to measure actual learning in their schools.

6 **Further experimentation with strategies for teaching and supporting students in online, "hybrid," and technology-supported environments, including new models where conventional teaching responsibilities are divided across multiple individuals, is needed to assess their effectiveness and to help instructors teach well in these formats.** Online courses and other technology-rich teaching innovations have the potential to offer much greater access, flexibility, and learning opportunities to students. Development of these innovations across undergraduate education, within existing institutions, and through new institutions is still at an early stage with promising potential. However, that potential has not yet been fully realized. Rigorous assessments are rare and high-quality evidence shows mixed results. In general, but particularly for lower-income and first-generation college-goers, existing technology simply cannot substitute for in-person instruction but requires a "high-tech/high-touch" approach.

7 **Federal and state government should invest in a research and development strategy that increases the knowledge base regarding new models for designing, delivering, and assessing learning.** Given the limited research base and mixed results to date, the Commission supports an evidence-based approach to the introduction of technology-based or technology-assisted education models. Outcomes should be disaggregated by key population groups, particularly those such as low-income, minority, and first-generation students. Results should be freely shared and disseminated across institutions and among researchers.

2 NATIONAL PRIORITY TWO

Increase Completion and Reduce Inequities

INTRODUCTION

After several decades of determined investment and coordination, a college education is now available to a substantial majority of Americans. Nearly 90 percent of all high school graduates enroll in college classes during their early adulthood. However, a much smaller percentage of Americans—an unacceptably small percentage—actually complete the education they start. By one measure, about 60 percent of students who pursue a bachelor's degree complete one. And about 30 percent who pursue a certificate or associate's degree earn the credentials they seek.

A wide variety of challenges conspire to prevent students from graduating. The path to completion is especially difficult for students who do not have a strong academic experience in high school; for older students returning to college after many years or enrolling for the first time while balancing family and work responsibilities; and for students who are the first in their families to attend college. These challenges are compounded for students who come from low-income families and struggle to meet day-to-day financial burdens. And completion rates, when analyzed by gender, race, ethnicity, and socioeconomic status, reveal substantial inequalities. Women complete at higher rates than men, White and Asian students complete at higher rates than Black and Hispanic students, and high-income students complete at a higher rate than their low-income peers. These disparities represent a significant challenge to an education system that has long prioritized the expansion of access over other considerations.

Evidence shows that the greatest benefits of an undergraduate education derive from earning a credential and not simply from attendance. Students who do not graduate are often wasting their scarce resources of money and time. Taxpayer-funded subsidies and scholarships are not being fully realized. Most important, the nation is squandering the enormous potential of its students if it does not ensure that they can graduate within a reasonable period of time.

This section of the report begins with a discussion of the most significant factors associated with low college completion rates. It then turns to promising ways in which colleges and universities themselves can reengineer their operations and processes to spur increased completion rates. The section concludes with an analysis of the interconnections among colleges and universities as well as with other entities and how such networks must be strengthened if completion rates are to be improved significantly.

WHERE THE PATHWAYS TO COMPLETION BREAK DOWN

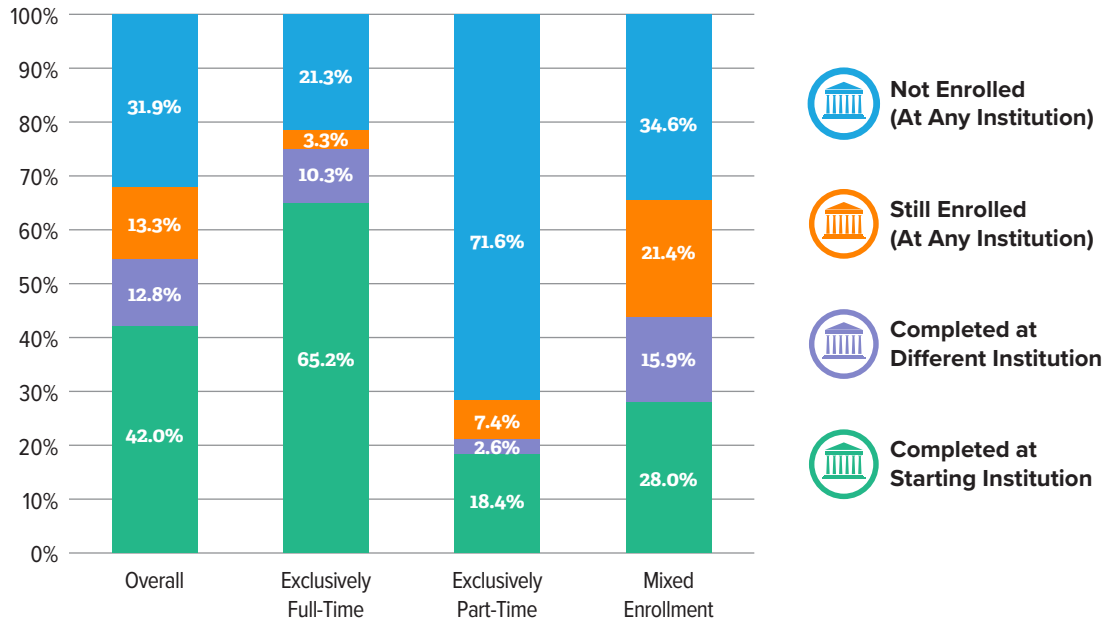
For too many college students, no clear path leads to the finish line of a timely graduation. Many take required developmental courses that do not count toward graduation; many take time off or switch between full-time and part-time study; and many must juggle families, jobs, and schoolwork. The cumulative effect of these interruptions and challenges is that more students take more time, and often earn more credits, than they need to graduate—and many do not graduate at all.

Academic Preparation: Many recent high school graduates as well as adults arrive at college academically underprepared. One-half of all college students are required to take developmental (remedial) courses that reteach high school–level reading, writing, and math. Many students do not complete these required courses and thus do not complete a college credential.

For example, only 28 percent of community college students who take a developmental course earn a degree within eight years, compared to 43 percent of students who did not require developmental education.[43] Another analysis found that students pursuing a bachelor's degree who take a developmental course are 74 percent more likely to drop out of college than their nondevelopmental course–taking peers.[44] Developmental education is discussed more fully later in this section, reporting that a growing body of research critiquing its practices points the way toward important reforms.

Enrollment Status: The difference in completion rates between students who enroll full-time versus part-time is striking. Figure C looks at the outcomes enrollment status in 2015 of almost 3 million students who started college in the fall of 2010. Less than one-quarter (21.3 percent) of full-time students dropped out in this six-year

FIGURE C: Six-Year Outcomes by Enrollment Intensity (N=2,911,634)



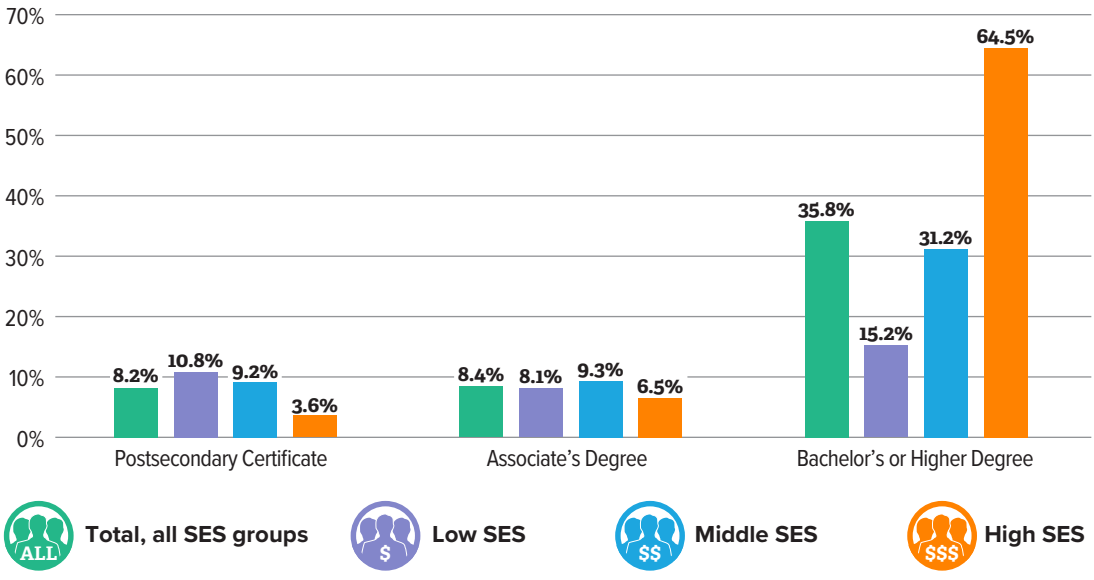
SOURCE: D. Shapiro, A. Dundar, P. K. Wakhungu, X. Yuan, A. Nathan, and Y. Hwang, *Completing College: A National View of Student Attainment Rates—Fall 2010 Cohort* (Signature Report No. 12) (Herndon, VA: National Student Clearinghouse Research Center, December 2016), 16, Figure 5.

time frame, compared to almost three-quarters (71.6 percent) of part-time students.

Institutional Choice: Some colleges and universities systematically and routinely outperform their peers when it comes to completion rates. A study that examined approximately 1,300 colleges and universities from 2003 to 2013, for example, found that although overall completion rates improved over this time period, they did not improve uniformly. Some institutions made huge gains, while others stayed flat or even lost ground. And in some cases, although an institution's graduation rates improved, they did not improve for all student groups.[45] Some colleges do better than others when it comes to completion, and within each institution some programs and majors do better than others.

Many underrepresented students, both recent high school students and adults, are often steered into colleges and/or academic programs with very low completion rates—and their future opportunities are limited as a result. This phenomenon, known as "undermatching," mainly occurs at the front end of the application process, not in college or university admissions offices, because students do not know where they have the best chance to earn a college credential and many believe they will not be able to afford tuition at more com-

FIGURE D: Percentage Distribution of Spring 2002 High School Sophomores, by Highest Level of Education Completed, and Socioeconomic Status: 2013



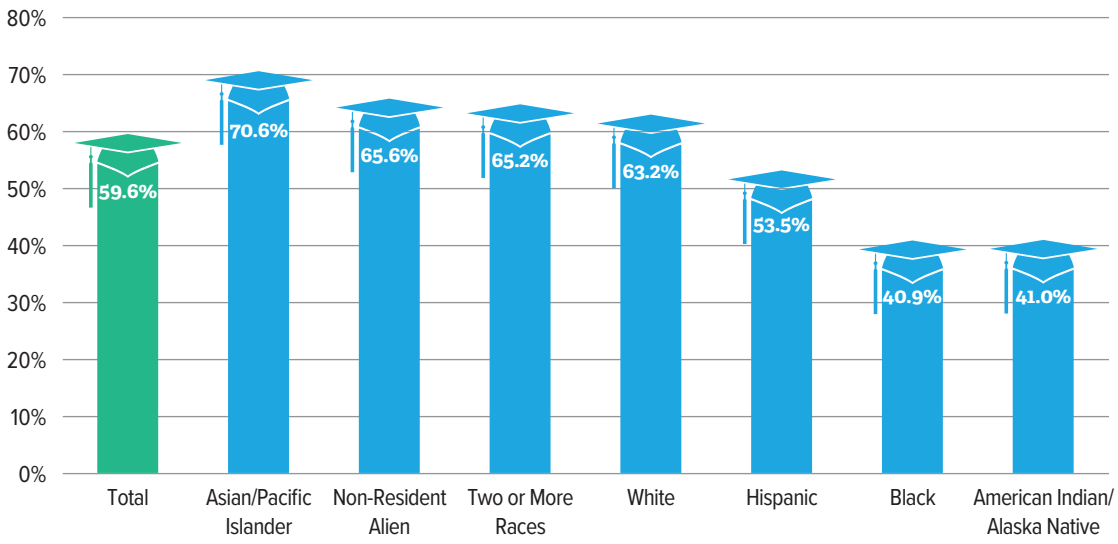
SOURCE: National Center for Education Statistics, 2016 Digest of Education Statistics, Table 104.91.

petitive four-year colleges. However, research shows that students who are identical on measures such as high school GPA and SAT/ACT scores do better when they go to schools with higher graduation rates.[46] Students from all backgrounds should attend the most challenging colleges they can.

Demographics—Socioeconomic Status: Figure D compares, by socioeconomic status, the highest level of education achieved as of 2013 by students who were high school sophomores in 2002. A higher percentage of students from the lowest socioeconomic status (SES) group earned certificates and associate's degrees compared to the highest SES group. This relationship is starkly reversed when it comes to bachelor's degrees: only 15.2 percent in the low SES group earned a bachelor's, compared to 64.5 percent of their high SES peers.

Demographics—Race/Ethnicity: As shown in Figures E and F, White and Asian students at four-year institutions graduate at higher rates than Black and Hispanic students. At two-year institutions, this trend is somewhat different, with Asian and Hispanic students completing at slightly higher rates than White and Black students.

FIGURE E: Graduation Rates at Four-Year Postsecondary Institutions, by Race/Ethnicity

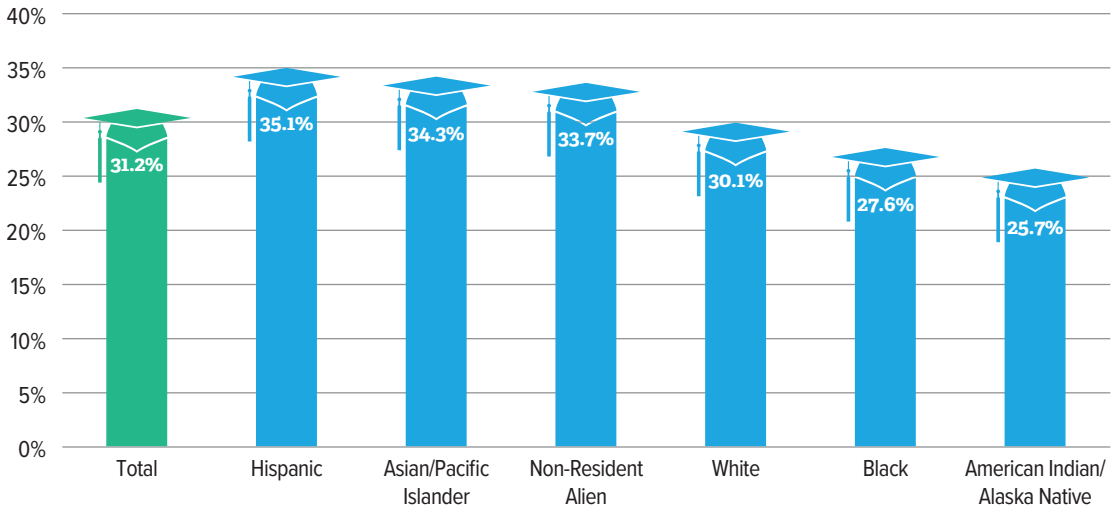


SOURCE: National Center for Education Statistics, 2016 Digest of Education Statistics, Table 326.10.
NOTE: Six-year graduation rate from first institution attended for first-time, full-time bachelor's degree–seeking students at four-year postsecondary institutions, by race/ethnicity: 2008 starting cohort. NCES defines "non-resident alien" as "a person who is not a citizen or national of the United States and who is in this country on a visa or temporary basis and does not have the right to remain indefinitely."

Demographics—Gender: Women are completing college at higher rates than men. Among first-time, full-time students who enrolled at a four-year institution in 2008, 62 percent of women and 57 percent of men graduated within six years.[47] Similar patterns held for first-time, full-time students who pursue an associate's degree or certificate at a two-year college. For those who first enrolled in 2008, 34 percent of women completed, compared to 27 percent of men.[48]

In addition to the factors discussed here, a host of other considerations serve to jeopardize students' college careers. Being a single parent, working more than 30 hours per week, and being a first-generation college student—all these are associated with lower completion rates. Educational aspirations, motivation, and family support also play crucial roles in determining college success. Taken together, these characteristics underscore the complex and challenging ways that precollege experiences, college choices, demographics, and individual circumstances influence college completion rates. There are no silver bullets or simple formulas to address these issues, but rather they must be approached with equally complex and deliberate responses.

FIGURE F: Graduation Rates from Two-Year Postsecondary Institutions, by Race/Ethnicity



SOURCE: National Center for Education Statistics, 2016 Digest of Education Statistics, Table 326.20
NOTE: Graduation rate from first institution attended within 150 percent of normal time for first-time, full-time degree/certificate-seeking students at two-year postsecondary institutions, by race/ethnicity: 2006 starting cohort. NCES defines "non-resident alien" as "a person who is not a citizen or national of the United States and who is in this country on a visa or temporary basis and does not have the right to remain indefinitely."

FULLY TAPPING RESERVOIRS OF HUMAN POTENTIAL

Over the next few decades, demographic changes will result in a declining number of Americans in their late teens and early twenties, the cohort of traditional college students. As a result, the number of high school graduates entering college over the next decade is expected to remain flat at about 3.3 million annually, implying level college enrollment rates nationally (the southern and southwestern regions of the country will see gains, while other regions may well experience enrollment declines). At the same time, the country will experience a decline in the working-age population of 18- to 65-year-olds. With fewer young people in the professional pipeline and fewer working-age adults overall, the only way to keep pace with or exceed current rates of economic growth will be to increase the productivity of the American workforce. In some industries in particular, automation may help fill the gaps. But, overall, the best strategy for addressing these demographic trends is to empower individuals to lead more productive lives, at home and at work. College completion

Limitations and Complexities in Measuring Completion Rates

The national Integrated Postsecondary Education Data System (IPEDS) is the primary data source on colleges and universities in the United States. IPEDS provides publicly available data on all institutions that participate in federal student financial aid programs and is managed by the National Center for Education Statistics (NCES). Due to their availability, many of the completion rates cited in this report refer to first-time, full-time students who complete their degrees within 150 percent of normal time (e.g., six years for a "four-year" bachelor's degree and three years for a "two-year" associate's degree). However, these measures exclude part-time and transfer students and thus undercount graduation rates. NCES recently implemented a new supplementary measurement to include part-time and "non-first-time" (transfer) students in their data collection efforts. These outcomes measures will track whether students received a credential within six years, within eight years, are still enrolled at their initial institution, are enrolled at another institution, or have an unknown enrollment status. This should provide a more holistic and realistic picture of how the full range of students are progressing toward completion over time. Several voluntary data collection initiatives also seek to provide a more comprehensive, nuanced understanding of college student completion rates, including the Voluntary Framework of Accountability, Complete College America, and Student Achievement Measure. Additionally, many states have the ability to track and analyze student progression through their statewide longitudinal data systems, and there are early efforts to coordinate the tracking of college student progress across state lines. It is critical that comprehensive measures that track student progression into, through, and beyond their college experiences serve to identify the weaknesses in college completion and focus on solutions where they are most needed. The further development and linking of the indicators that measure student progression must continue.

has proven to be a particularly effective way to achieve this goal.

One way of achieving the nation's growth objectives is to improve college access and completion rates—and of course the quality and relevance of education—of all student populations. Inevitably, institutions will continue to focus more and more on recruiting and serving larger numbers of students from populations that are currently underserved, especially the country's growing Hispanic population, the large pool of working adults, students from low-income families in rural areas, and those who are incarcerated:

- Hispanics are the fastest-growing minority group in the country—the number of Hispanic high school graduates is projected to increase by 50 percent by 2032—yet they have the lowest educational attainment levels. This implies a significant opportunity for increased college-going and completion in this population.
- About one-fifth of Americans 25 and older have some college experience but no degree.[49] These adult students range from veterans returning from service to displaced workers seeking to change careers to working parents wanting to improve their job prospects. Common barriers for adults seeking to complete a college credential include the associated costs and the challenge of balancing work, family, and community responsibilities. For these reasons and more, "reentry adults" often end up trying repeatedly without success to complete a degree or certificate. Among students who drop out for at least a year and then return to college, only about one-third complete a credential compared to over half of first-time students.[50]
- Despite the fact that high school students from rural areas have strong high school graduation rates (85 percent), only 29 percent of 18- to 24-year-olds in rural areas are enrolled in college, compared with 48 percent of their urban peers.[51] Moreover, the rural-urban gap in college attainment is growing. From 2000 to 2015, the share of urban adults with a bachelor's degree or higher grew from 26 percent to 33 percent; for rural areas, the share grew from 15 percent to 19 percent.[52]
- Incarceration rates in this country are alarming: between 1972 and 2010, the number of people in U.S. state and federal prisons rose 700 percent,[53] with young Hispanic and Black men with very low levels of education disproportionately represented. Although the number of adults in the U.S. correctional system has declined slightly in the past few years, Blacks and Hispanics are incarcerated at much higher rates than Whites. For example, in 2015, imprisonment rates for males ages 30 to 34 were 5,948 per 100,000 Black males, 2,365 per 100,000 Hispanic males, and 1,101 per 100,000 White males.[54] These trends have profound implications for the educational and economic opportunities for these individuals and their families and for the country as a whole.

These and other challenges should be met and turned into opportunities—the infusion of new ideas and energy for undergraduate education and for a nation that has always benefited from the interactions and innovations nurtured at its colleges and universities. We

discuss below what we see as promising opportunities to build more success as we consider our nation's future.

INSTITUTIONAL REENGINEERING

One potential hazard in the current push to improve college completion rates is the risk that colleges and universities might pursue strategies that improve completion rates at the expense of access or quality. The Commission strongly urges institutions to adopt the more challenging and ultimately rewarding path that addresses completion, access, and quality simultaneously.

The Commission recognizes a basic if implicit compact between student and college: At the moment of enrollment, students dedicate themselves and their energies to succeed in their studies, and institutions promise to provide the structure and supports necessary for the attainment of a meaningful degree. Educators and policy-makers often grapple with the question of how students can change and be better prepared to succeed in college. An equally important question that must be faced is, "How can colleges and universities be better prepared for their students?"

The Commission recognizes that many colleges and universities around the country are taking important steps to improve completion rates and reduce gaps across student populations, even as they maintain a strong commitment to access and high academic standards. A growing body of research and practice emphasizes the importance of structure and support for students, early entry into well-defined programs that have clear and transparent maps to completion, and the active use of student-level data to measure and improve student progression.[55] The most successful institutions employ a set of integrated strategies, increasingly known as "guided pathways,"

PROMISING PRACTICE
Florida State University

Florida State University (FSU), a 32,000-student public research institution, has been engaged in determined efforts to increase retention and graduation for years, and the work has paid off. For the student cohort that entered FSU in 2008, the six-year graduation rate was 79 percent, a 16-percentage-point improvement from 1988 outcomes and in the top third of large research universities. FSU committed to a university-wide effort to support students more effectively, particularly those from underperforming subgroups, by using data to identify the biggest problems and to create institution-wide structures for ongoing discussion, so that solutions would be grounded and would have faculty and staff support. FSU pioneered implementation of detailed program mapping so that students understand what they need to do to complete program requirements. Reinforcing the mapping is an investment in advising so that students get help before they fall off track. FSU's program mapping and proactive advising approach have become key components of promising initiatives across two- and four-year colleges and universities.[56] Its model is being adapted by the other ten members of the University Innovation Alliance, a consortium of large public research universities established to test, scale, and diffuse relatively low-cost completion initiatives developed by their peers.

beginning with the proactive use of student data to understand progression and attrition; incorporating better teaching and learning; utilizing sophisticated predictive analytics; and enhancing "intrusive" advising, career counseling, and financial aid support. Some institutions have also taken the step to significantly narrow students' choices. Rather than confront students with a bewildering array of courses, majors, and enrollment options in a typical college catalog, some schools offer a limited number of structured pathways, with curricula and course schedules designed to make these paths easier to negotiate.

This transparency and greater structure facilitates college planning and has proven to be especially helpful to first-generation students and others who lack familiarity with how colleges operate. It motivates students to complete their courses in a timely way and often provides greater clarity about how certain pathways may affect a student's future employment prospects. Greater clarity also serves to motivate students to complete their courses in a timely way. On a case-by-case basis, such approaches have proven to be very successful. They must now become widespread in practice at colleges and universities around the nation. It should no longer be acceptable to defend existing practices with the bromide, "that's the way we've always done it here."

While each campus must find its own way to understand and address student completion in an integrated and comprehensive manner, the following sections highlight some of the most important components in need of continued attention and experimentation: remedial education, program structure and pace, student support, and the potential of emerging technologies.

PROMISING PRACTICE
City University of New York's Accelerated Study in Associate Programs

The City University of New York's Accelerated Study in Associate Programs (ASAP), designed to help more associate's degree–seeking students graduate and complete more quickly, has demonstrated solid results in research studies and is poised to expand from 4,000 to 25,000 students by 2018. ASAP was created to overcome three common obstacles to completion: financial burdens; inadequate advising and support; and academic underpreparedness. Through a tightly structured program, ongoing and intrusive advising, meeting students' full financial needs, and other supports such as free transit passes, ASAP serves students who are predominantly low income (75 percent receive Pell grants) and are either college-ready or require one or two developmental courses. Students are expected to attend full-time and graduate within three years. A random assignment evaluation found that ASAP students outperformed control group students on persistence, credit accumulation, full-time enrollment, three-year graduation, and transfer to four-year colleges. The three-year graduation rate was nearly double that of the control group (40 percent versus 18 percent). After three years, 25 percent of ASAP students were enrolled in a four-year school (versus 17 percent of the control group).[57] Although the costs associated with ASAP students are greater compared to students in traditional programs because of the extra services, the overall cost for each graduate is less for students in ASAP because of the considerably higher graduation rates.[58]

Developmental (Remedial) Education

"College readiness" is a complex concept measured in multiple and controversial ways, including standardized test scores and transcript analysis. All too often, the determination that someone is "ready for college" is predicated on a superficial set of characteristics: "acting and looking like the students who have always succeeded at this college." Such determination can be shortsighted. Standards of college readiness should be based on real evidence of factors that connect to college learning. Failure to abide by the evidence in such cases can be costly, for individual students and for the nation as a whole. In practice, students who do not meet the readiness standard, however defined, are typically required to enroll in developmental courses, which do not count toward a college credential, before they can take college-level courses. They require additional time and tuition, further delaying completion. As noted earlier in this section, one half of all college students take developmental courses, and degree completion rates are low for these students; indeed, many do not even complete their developmental courses.

Placement into developmental education is often determined by a brief high-stakes standardized exam, but recent research suggests such exams on their own do not reliably place students into the appropriate level of course-taking. As a result, some institutions and states are adopting different approaches to making this important determination. Long Beach Community College changed its placement policy for recent high school graduates to include students' high school GPA, a policy shift that enabled the school to increase placement into college-level English from 14 to 60 percent and college-level math from 9 to 30 percent—without any statistically significant difference in pass rates in those courses between those who were placed under the new policy and those placed under the test-only policy. Connecticut passed legislation in 2012 requiring its public colleges and universities to revamp how students were placed into developmental education and to limit the time in developmental courses to one semester.

Once students are placed properly in standard and/or developmental courses, efforts to reform developmental education are key

PROMISING PRACTICE
The California State University System

The California State University System (CSU), made up of 23 campuses serving almost 500,000 students annually, is working to increase its six-year graduation rates from its current 57 percent rate to 70 percent by 2025. If the system succeeds, it will have come a long way from its 46 percent completion rate in 2009. CSU is also focusing on increasing the four-year graduation rates for transfer students from 73 percent to 85 percent. Through a combination of campus efforts and system-wide coordinated actions such as hiring more tenure-track faculty and academic advisors, improving curricular alignment with K-12, supporting faculty innovation and course redesign efforts, and strengthening relationships with community and business partners, the system hopes to produce 100,000 additional graduates by 2025 as a result of this initiative.[59]

to improving college completion rates. The Commission supports the recent institutional, research, and policy initiatives that are restructuring the content and delivery of developmental education, aligning content to the skills needed for success in a student's chosen program of study, and adopting accelerated methods like "corequisite" developmental instruction linked to first college-level math and English courses. The Community College of Baltimore County's Accelerated Learning Program placed developmental English students into college-level English classes while enrolling them at the same time in a supplemental course in which the same faculty member provided additional instruction. Students in this corequisite model were more likely to pass their first two college-level English courses than students who took a traditional developmental course. In addition to corequisite models, some colleges have compressed their developmental sequence into fewer semesters, moving through the same material at a faster pace. New Mathways, developed by the Dana Center at the University of Texas-Austin, and the Statway and Quantway courses developed by the Carnegie Foundation for the Advancement of Teaching integrate developmental and first-year college math into seamless year-long courses that show great promise.

Program Structure and Time-to-Degree

Despite the fact that credentials are typically described in terms of "two-year" and "four-year" degrees, most students take longer to complete associate's and bachelor's degrees than those terms imply. For example, students across the country who started at a "four-year" college took an average of five years and ten months to earn a bachelor's degree.[61] In Cali-

PROMISING PRACTICE
The University of Maryland University College

The University of Maryland University College (UMUC) was created specifically to serve the adult learner population. As such, the university's strategies—including a strong focus on online course delivery, emphasis on workforce development, and use of data for student support, program design, and institutional decision-making—take into consideration the unique circumstances and barriers that adult learners face. Of the approximately 84,000 students who are enrolled at UMUC, 87 percent took at least one online course in 2015. The institution's approach to online education is not only notable for its scale: A part of UMUC's online model involves a centralized and accessible support system and online community spaces where students and faculty engage with one another and share resources. Reflecting the institution's commitment to giving students the opportunity to learn from professionals in their field, 90 percent of UMUC's faculty are part-time and work on a contract basis. This "scholar-practitioner" faculty model plays a large role in the institution's focus on workforce development, and students report high levels of satisfaction as a result. A survey of 2013 bachelor's degree recipients found that 63 percent of students were satisfied with job preparation. That number rose to 85 percent when asked about preparation for continuing graduate or professional studies. Using data to drive decision-making at all levels is another aspect of UMUC's success in serving adult students. Conducting analyses on why some students drop out, for example, has informed policy changes that directly affect outcomes for students.[60]

A growing body of evidence on predictors of completion suggests that most students—especially students who attend less-selective institutions or come from low-income families—would benefit from a shorter time-to-degree and that reducing the time will likely increase graduation rates.

fornia, half the state's community college students take four years or longer to complete a "two-year" degree.[62] For some students, slow progress may be necessary, but a growing body of evidence on predictors of completion suggests that most students—especially students who attend less-selective institutions or come from low-income families—would benefit from a shorter time-to-degree and that reducing the time will likely increase graduation rates.[63] Early research indicates that by limiting the vast array of program and course choices students have before them, and by providing more guidance and mentoring, institutions are able to help students conserve precious time and accelerate progress to a degree.

Efforts to reduce time-to-degree tend to focus on several related challenges. One is the tendency of many "full-time" students in two- and four-year programs to take only 12 credit hours a semester, even though on-time completion requires 15 credits each semester. Some states, such as Hawaii, Colorado, and Utah, utilize marketing campaigns and incentives encouraging students to take a 15-credit load. In Indiana, state financial aid is tied to a requirement that students take 30 credits a year. This policy has led to a 5.2 percent average increase in the likelihood of students earning 30 credits or more a year—without a significant decline in completion or fall-to-fall retention rates.[64] States, systems, and institutions are testing other incentives to speed up time-to-completion. Indiana University–Purdue University Indianapolis discounts the cost of summer credits 25 percent for in-state students. Temple University's Fly in 4 Campaign pays students up to $2,000 if they agree to work no more than 15 hours a week and commit to following the university's directions on how they can complete in four years.

Perhaps the most promising strategies to reduce time-to-degree are those that streamline requirements and course sequences. In the late 1990s, Florida State University tried to reduce the large number of students who graduated with more than 120 credits by creating program maps that made it more transparent to students which courses and in what sequences they needed to pursue to graduate in a timely way. Initially, this change had no impact on time-to-degree, though it did result in slightly improved graduation rates. When the university turned the program maps into the default pathway for students and required undecided students to enter an exploratory major in their first semester, the four-year graduation rate increased by 17 percentage points. From 2000 to 2009, the share of students who had more than 120 credits when they graduated dropped precipitously from 30 to 5 percent.[65]

Student Engagement and Support

Whether they attend two- or four-year institutions, and whether they enroll full- or part-time, college students' educational experiences are far broader than their academic courses and experiential learning activities. One of the primary benefits of the college experience, for example, is participating in the range of activities and services available to students in the hours they are not in class or studying. Research over several decades concludes that the more actively students engage with their peers, with faculty and staff, and with their academic program, the more likely they are to progress, persist, and complete. Both the National Survey of Student Engagement at four-year institutions and the Community College Survey of Student Engagement have found a similar correlation between engagement and success, even for community college students, who do live away from campus, work more hours than their four-year counterparts, and often attend on a part-time basis.[66] A recent review of research studies indicates that faculty participation in professional development activities and use of evidence-based teaching practices have a positive relationship with student persistence and degree completion.[67] It is important to continue to understand more fully the connection between teaching strategies and student completion rates.

However, many students, particularly those from low-income and first-generation college families, are unable to participate in campus life in a meaningful way, and many face significant nonacademic obstacles to success. Financial reversals, housing challenges, car breakdowns, bus route changes, an illness or death in the family, childcare difficulties—each can be sufficiently disruptive for students with complicated schedules and little flexibility in their lives. One helpful strategy is for college administrators to have discretionary funds at their disposal to help students immediately address these difficult temporary financial circumstances.[68] Another approach is to more purposefully use federal work-study experiences to better prepare students for postcollege employment.[69]

In addition to these obvious obstacles, many students face subtler barriers to academic success rooted not in their academic ability but in a lack of the knowledge, support networks, and confidence that can be so helpful to anyone trying to navigate the college experience. To help address all of these challenges, many colleges and universities make available a range of nonacademic student supports outside the classroom to help improve academic performance. The Community College Research Center identified four mechanisms by which nonacademic support services appear to promote student success:[70]

- *Creating social relationships* with peers and instructors;
- *Clarifying aspirations and enhancing commitment* to specific career goals and path;
- *Developing college know-how* in order to manage the logistical, behavioral, and cultural demands of college; and
- *Making college life feasible* by minimizing financial and other daily life obstacles.

Enhanced advising, student success courses, and learning communities have demonstrated modest results in improving academic performance and persistence in college. Yet short-term and modest interventions tend to have short-lived

results, so reformers have begun to design and implement interventions that are more intensive and systematic and provide long-term access to academic, financial, and social supports.

Technologies Supporting Student Completion

New technologies to support the student experience are evolving in different directions. Many have significant potential to help more students complete degrees. Advances in adaptive learning technologies are beginning to become available, creating on-demand, automated tutoring that can support students in customized, efficient ways. Learning analytics are being incorporated into more comprehensive systems that combine education program planning, progress tracking, advising and counseling, and early alert systems that initiate proactive interventions. The growing use of free Open Educational Resources is reshaping the textbook market and allowing students greater access to high-quality educational materials at much lower costs. The combined use of data systems and close monitoring have already proven their worth in improving completion rates.

New technologies to support the student experience are evolving in different directions. Many have significant potential to help more students complete degrees.

However, it is still early in the evolution of educational technology—for advising as for instruction. Even as the pace of technology innovation accelerates, there is still insufficient evidence to determine the extent to which new classroom technologies can address the most fundamental challenges undergraduate education will face over the next decades, and strong results for at-risk students have proved elusive. Thorough research on promising practices will be critical as the country seeks to address a host of challenges.

SYSTEMS APPROACHES

Student Transfer

Each college and university has the responsibility to critically evaluate its internal approaches and make the changes needed to ensure that the students who arrive are able to complete their studies in a timely way. Ideally—because it's the least complicated option—a student would start and finish at the same college. However, the more complicated reality is that a significant proportion of undergraduate students—approximately one-third—transfer from one institution to another or enroll in two institutions at the same time during their college careers. And among all students who completed a degree at a four-year college in 2015–2016, almost half (49 percent) had enrolled at a two-year college in the previous ten years.[71] Beyond the "vertical" movement from a community college to a four-year college or university, transfer is also "lateral" (e.g., community college to community college or four-year to four-year); "reverse" (e.g., state college to community college); and "swirling" (multiple institutions). Further complicating student transfer is the growing array of ways students earn college credit: through high school dual enrollment, early college, and vocational programs; competency-based programs;

prior learning assessments; nationally recognized exams (e.g., CLEP, DANTES, UEXCEL, Advanced Placement Examinations); and prior military education.

The transfer of academic credit from one institution to another is often a messy, perplexing, and frustrating part of the college experience for faculty, staff, and, most important, for the students themselves. This reality demands that an institution look not only inwardly but externally to improve relationships with other colleges and universities in order to increase student success. There is much work to be done in this regard. Confusing and contradictory policies and agreements, the rejection of course credits for unclear reasons, the inability to apply some completed courses to some credentials, and inconsistent student access to information and appeals processes have complicated student transfer for decades. Students who transfer frequently lose credits, repeat courses, extend their time-to-degree, and, in many cases, fail to complete their degrees. Only 14 percent of students starting in community colleges transfer to four-year schools and earn a bachelor's degree.[72]

The failure to address transfer obstacles ultimately wastes the precious time, money, and energies of students and disproportionately affects those most at risk: students who are first-generation, working adults, low-income, and/or from underrepresented racial and ethnic groups. It is critical for institutions to work collaboratively, informed by trust and transparency to systematically align courses and academic programs; to make transfer credit decisions based on data rather than impressions; and to provide systematic and coherent advising and support to students.[73] A strong cultural shift in the undergraduate education landscape toward openness and willingness to evaluate, recognize, and apply the college-level learning that takes place at multiple institutions through various mechanisms will do more to advance the educational opportunities for underrepresented students than any other national policy, including affirmative action.

The University of Central Florida (UCF) offers guaranteed admission to graduates of Valencia College and three other community colleges through its DirectConnect program. Students from those schools have access to reliable information, UCF advisors, and can take third- and fourth-year UCF classes on Valencia's campus, saving students a two-and-a-half-hour bus ride. DirectConnect graduates from the community colleges are guaranteed UCF admission and they have been graduating at a slightly higher rate than native UCF students.[74] The Mandel Continuing Scholars Program is a partnership with Cleveland State University (CSU), Cuyahoga Community College (Tri-C), and the Jack, Joseph and Morton Mandel Foundation in Ohio to increase the number of Tri-C students who transfer into the Mandel Honors College at CSU. The program identifies community college students through receptions, individual or group meetings, and recommendations to engage with faculty and students in the bachelor's degree program they aspire to enter. Through a coordinated combination of scholarship support, stipends for books and transportation, and academic and career advising and mentoring, the program goes beyond just ensuring that academic credits transfer to helping create a welcoming environment and sense of belonging for community college students by building social net-

works and providing ongoing support through bachelor's degree completion.

Many states are working toward coordinated processes to help students transfer more efficiently to the baccalaureate programs of their choice. In Massachusetts, faculty from across two-year and four-year public colleges and universities identified the foundational courses for 20 majors, created pathway maps of courses that make up the first 60 credits, and engaged in dialogue to identify competencies and skills that students need to master in the first two years.[75] In the western part of the country, seven states are participating in the Interstate Passport, a new program that focuses on the transfer of lower-division general education courses.[76]

Collaborations with Alternative Educational Providers

Growing numbers and types of providers that are not colleges or universities offer pieces of educational experiences comparable to college-level learning. Career and technical schools, corporate training programs, MOOCs, coding boot camps, and industry groups, to name a few, may play an increasingly important role working with colleges and universities. If indeed these kinds of opportunities multiply (they are a growing sector but remain a small segment of the undergraduate land-

PROMISING PRACTICE

The Partnership between Northrop Grumman and the University of Maryland, Baltimore County

Northrop Grumman (NGC), a leading global security company, and the University of Maryland, Baltimore County (UMBC) have had a robust partnership for more than 20 years that strengthens both organizations and also strengthens the region.

- Early in this partnership, the two organizations codeveloped a master's program in system engineering. To date, more than 500 NGC employees have earned this advanced degree.
- With support from the Northrop Grumman Foundation, UMBC established its successful Cyber Scholars program, focused on attracting more women and minorities to the cybersecurity field. UMBC, NGC, and the Northrop Grumman Foundation are making an impact in local communities through an innovative multiyear partnership in Baltimore City Schools designed to boost STEM resources and student outcomes.
- Together UMBC and NGC launched a novel cybersecurity business incubator program (CYNC) run by bwtech@UMBC, UMBC's research and technology park.
- NGC executives serve on advisory boards at all levels of the university, and the company's scientists and engineers are on campus regularly to speak with and mentor students inside and outside the classroom.
- Finally, NGC is a top recruiter of UMBC talent at the undergraduate and graduate levels, with large numbers of UMBC students securing internship opportunities every year.

scape), this diversification of options has the potential to expand college-level learning but could also become a daunting maze that students must navigate in deciding on their best path forward.

New efforts to help build educational crosswalks and consider innovative ways to represent learning are taking hold. These include the emergence of microcredentials, digital badges, and certifications. The Commission supports efforts to improve pathways across educational routes and to measure and afford recognition to college-level learning that takes place outside the bounds of traditional and familiar college offerings. Regardless of the provider, students pursuing a college-level certificate, associate's degree, or baccalaureate program should expect to gain the knowledge, skills, and experiences to improve their near-term economic prospects as well as the ability to more skillfully navigate their personal and public worlds and participate fully in a democratic society.

Collaborations with Business and Industry

New substantive and mutually beneficial partnerships between businesses and colleges help students gain the knowledge and skills needed for the workforce and help employers secure well-prepared employees. These relationships vary with the type of college, region, and industry, but in an increasingly interconnected world the walls between colleges and employers need to be broken down, and bridges must be built that help meet the needs of students and future employees. Given the differences in mission and culture often found between colleges and companies, organizations seeking to work together effectively should adopt mindsets that seek to understand each other's needs and be open to constructive criticism. Creating trust and transparency is vital for building an ecosystem that comprises different institutional types. Affiliations range from simple agreements such as employers offering internship placements and mentoring for students to multilevel partnerships sustained and enhanced over years and involving input from

PROMISING PRACTICE
P-TECH

The P-TECH model, launched by IBM, is a Grades 9–14 school whose graduates earn an industry-recognized associate's degree, have benefited from business mentors and work experience, and are prepared to enter a high-demand industry. Begun in 2011 in a single school in Brooklyn, the model is now being implemented in 70 schools across the United States, Australia, and Morocco. The State University of New York system, for example, embedded this program throughout all of its 30 community colleges. Variants on this model can be found in Texas and other states that have encouraged career-focused early college high schools and close partnerships between local industry, high schools, and community colleges, resulting in momentum for both college (through dual enrollment) and career (through work experience and mentors). These partnerships also serve to incentivize students to learn and to stay in school by giving them added confidence that the academic work they are doing will prepare them for actual jobs when they graduate as many students see no clear link between what they learn and productive employment afterward.

industry on curriculum development and evaluation, research and experiential opportunities for faculty, and placement support for students.

The most comprehensive partnerships are regional, involving colleges and universities, K-12 institutions, employers, workforce/economic development agencies, labor groups, and social service providers, and connect the supply and demand sides of the local labor market through new credential programs, information-sharing venues, and opportunities for learning and sharing across business and higher education. In many communities, these "career pathways" efforts begin in the high schools, particularly in areas with strong career and technical education programs. Taking their inspiration from European apprenticeship programs that serve a majority of youth in countries like Switzerland and Germany, these efforts are creating new and promising ways for educators and employers to understand each other better and for alternative routes to high-demand employment to develop that expand young people's postsecondary college and career choices.

State and Federal Roles in Accelerating Completion Goals

State governments have a special role in ensuring that their public agenda for higher education includes a focus on improving college completion rates. While state investment in public higher education has declined over time, states still remain a major funder and oversee a range of academic and fiscal policies that influence and directly regulate institutional behaviors. Government leadership can and should enact comprehensive and coordinated strategies to make college completion a top state priority. State leaders should determine their state's educational attainment goals, communicate and promote these goals to their citizenry, and collaborate with campuses, government agencies, business and industry, and community-based organizations. States can help set campus goals for increasing college completion rates, support campuses through targeted institutional allocations and student financial aid, and track improvement by population subgroup, utilizing state longitudinal data systems. States can use discretionary funds to create competitive grants that encourage evidence-based approaches to improving completion, including promoting informed program choices, limiting excess credits, reducing developmental coursework, and redesigning curricula.

The following section of the report will focus on changes that can and should be made at the federal level to promote college affordability, a key element in increasing college completion rates. In addition to these actions, the federal government should revisit the 2008 amendment to the Higher Education Act that banned a federal student unit record data system and resume efforts to build a system that can track institutional, state, and national trends related to student progress and outcomes. A great deal of student level data is currently collected by the U.S. Department of Education's National Student Loan Data System, the Internal Revenue Service, the Department of Defense, and the Department of Veterans Affairs. Removing student-identifying information and connecting this data would provide invaluable information in helping identify and address a range of concerns.

Tennessee has made undergraduate education access and success a top priority over the past 15 years, under two governors from different political parties. During Democratic Governor

Philip Bredesen's two terms, which ended in 2011, Tennessee's legislature passed the Complete College Tennessee Act, which took steps to increase and simplify transfer from two- to four-year institutions, reduce remediation at four-year schools, create a statewide community college system, and introduce a new performance-based funding formula. The initiative also included a focus on K-12 improvement. When Republican Bill Haslam assumed the governorship in 2012, he continued the state's emphasis on education, committing Tennessee to a goal that 55 percent of the state's adults would have a postsecondary degree or credential by 2025 (up from 33 percent). The state introduced, among other initiatives, the Tennessee Promise, a last dollar scholarship for high school graduates that guarantees full-time freshmen who are recent high school graduates two years of free tuition along with a mentoring program that helps recipients make better decisions among higher education options; a program to support regional partnerships that bring together employers and K-12 districts; and a program that expanded the state's last dollar scholarship strategy to adults.

Strengthening Pre-K-12

The main focus of this report is the work that must be done at colleges and universities to ensure the future of American undergraduate education. These institutions bear the heaviest burden for improving students' educational experiences along the pathway to success. But undergraduate education is built on a foundation of primary and secondary school education that is itself in need of strengthening. It is difficult to think of anything that could do more to increase opportunities for more equal and more effective education at the postsecondary level than making improvements to early and K-12 education. The Commission urges that the nation take the long view that an individual's path toward college completion begins at birth and that the life circumstances into which one is born still substantially affect one's chances of

PROMISING PRACTICE
Hawai'i P-20 Partnerships for Education

This statewide partnership led by the Executive Office on Early Learning, the Hawai'i State Department of Education, and the University of Hawai'i System works to strengthen the education pipeline from early childhood through higher education in order to increase the share of working-age adults (25 to 64) with a two- or four-year college degree from 46 to 55 percent by the year 2025. One of many integrated strategies to meet this goal is to improve college graduation rates, particularly for Native Hawaiians, low-income students, and those from underserved regions and populations. To do so, the University of Hawai'i System responded by creating a data-driven program to help students track their progress toward completion, review degree requirements and milestone courses along their academic pathway, and explore the impact of scheduling decisions and changes in major on the time it will take them to graduate. The university also created 15 to Finish, a campaign that encourages students to take 15 credits per semester. The four-year graduation rate at the University of Hawai'i at Mānoa (the system's largest campus) for first-time, full-time students who started college in fall 2012 was 32 percent, compared with 17.5 percent six years earlier.

earning a college degree and one's later life experiences, even with strong efforts at later stages. The goal of increasing college attainment rates is inextricably linked to the education and care children receive from their families and communities beginning at a young age—including the willingness or ability of parents to read regularly to their toddlers, access to high-quality prekindergarten programs, and the availability of good healthcare and nutrition in a safe and supportive environment. Similarly, if they are to meet their full potential, students from all backgrounds need to encounter high-quality coursework and skillful classroom instruction and will benefit from academic and social supports throughout their elementary and secondary school experiences. Community-based afterschool programs often serve a critical role in helping young people build the skills and attributes necessary for academic success—especially for students from low-income, historically underrepresented backgrounds. The Commission is encouraged by the continual increase in overall national high school graduation rates and college entry rates but remains concerned that these rates are unequal across student populations and that too many high school students are unprepared for college-level academic work.

In acknowledging these realities, the Commission does not mean to imply that nothing can be done to improve college success until the precollege experience is transformed. It is the responsibility of all the powerful institutions in American society to bend their efforts toward improving prospects for the next generation.

In that spirit, the Commission affirms that colleges and universities have the responsibility to advance the cause of better precollege education. What a particular college can do depends on its circumstances. Many open access universities and community colleges can work directly with teachers and administrations in their local communities to clarify expectations and smooth pathways. High school students should have opportunities and supports to engage in college learning, since dual enrollment and early college initiatives have been shown to improve college readiness, reduce the need for remediation, and increase persistence and completion. Some universities have large schools of education whose students are a big part of the region's teaching force. These institutions need to ensure that their students are well equipped for the work they will take up. The wealthiest and most-selective schools can invest in actively recruiting students from disadvantaged backgrounds throughout the nation but can also help neighboring communities to advance opportunities for all college-going youth. Lastly, the most fundamental and important way every college and university can help create stronger educational experiences at the P-12 levels is to ensure that their own students are receiving a high-quality, broad-based education: the vast majority of credits that college students take to become teachers are in the arts and sciences, not education courses, and aspiring teachers must have a strong and deep understanding of their subject-matter knowledge as a starting point to be effective.

Texas community colleges aggressively pursue dual-credit partnerships with area high schools. In 2015–2016, more than 133,000 Texas high school students enrolled in dual-credit courses, up from 17,800 in 2000. South Texas College, a predominantly Hispanic-serving community college, has one of the largest dual-credit efforts in the state, partnering with 24 districts

and about 80 high schools, including 30 autonomous Early College High Schools, which enable participating students to earn up to 60 hours of college credit during their high school years. Minneapolis Public Schools' My Life Plan initiative started in 2006 and works with students starting in middle school to explore and develop academic plans and career paths.

College Access: Still a Concern

Although less directly related to the issue of college completion, access to college, and to which colleges, is still a concern. Although undergraduate student enrollment grew dramatically over the past several decades and is increasingly diverse in terms of race and ethnicity, including students of all ages and backgrounds, many continue to face significant barriers to the pursuit of a college credential. Of increasing concern is access for students from low-income families, students from rural areas, adult students, Black and Hispanic students, and men.[77]

The barriers that preclude students from going to college fall into four broad categories: precollege academic struggles; financial hurdles; low college awareness and/or aspirations; and an inability to complete administrative requirements such as applying for financial aid. Students often lack the support and structure they need to be able to navigate burdensome processes of applying to college and managing institutional bureaucracies. Inadequate information and advising present important obstacles to success, especially for members of disadvantaged groups. As a result, the transition from high school or the workplace to college can be complex, if not opaque, to potential applicants, resulting in too many costly financial decisions and poor choices about which institutions to attend and which programs to select. For adults, often without even the limited assistance high school guidance counselors can provide, finding and receiving effective guidance and support may be even more difficult.

Wherever possible, institutions and government agencies should make available clear information about program completion rates and simplify the application process, as well as the procedures for receiving financial aid, so that qualified students from low-income or disadvantaged backgrounds can apply to the programs in which they will likely succeed. To use the language of behavioral economics, there are many advantages to finding ways to "push" information and advice to potential students, rather than making them try to find it for themselves. More generally, all college-going students (and their families) should have easy access to information about their chances of graduating from the college program they intend to enroll in, as well as an understanding of their postgraduation employment or graduate study prospects. A lack of knowledge about their postgraduation prospects is a source of deep frustration for many graduates. Much work is required to help students understand the link between the courses they take and their ability to obtain a good job or an opportunity to continue their education.

But beyond access to clear and useful information, high-quality and sufficient advising and mentoring are key.[78] Information needs to be coupled with active advising and guidance along the way. Therefore, institutional practices and state and federal policy responses should focus on solutions that are comprehensive in nature and address multiple, rather than individual, barriers.

Priority Two Recommendations 2

INCREASE COMPLETION RATES AND REDUCE INEQUITIES AMONG DIFFERENT STUDENT POPULATIONS.

The Commission envisions a future that depends on most Americans obtaining and benefiting from high-quality undergraduate education. Too few students who start at an American college or university complete their programs, and systematic variations in completion are linked to family income level, race and ethnicity, and gender. Many students who leave college without a degree are worse off than when they entered, unable to repay student loan debt. Low completion rates have been stubbornly resistant to improvement and require a serious redesign of institutional processes informed by data, deep partnerships with other entities, and a supportive state and federal environment. If a quality undergraduate education is the key to opportunity in the twenty-first century—an open door to a wider world—it should not be subject to a means test. The stakes, for individual citizens and for the country as a whole, are much too high. Students who will be entering colleges and universities over the next 20–30 years will come from all cultural, ethnic, and socioeconomic backgrounds; they will earn their education through an expanding variety of modes and institutions, according to schedules of their own making; and they will, like past cohorts, face multiple barriers to success. These students will need to complete their degrees. Colleges and universities, businesses, community-based organizations, and state and federal governments all have a role to play in this massive endeavor. The Commission makes the following recommendations for improvement in areas related to completion.

1 **College and university leadership, with the full engagement of faculty and staff, must make completion a top institutional priority, with a clear focus on understanding the diverse needs of students. Institutional resource allocation decisions must be viewed through the lens of whether investments are likely to increase student completion without compromising quality.** More large-scale experimentation and research are needed, as is a commitment to continuous improvement by experimenting institutions. Multiple interventions should be integrated in coherent, scalable efforts:

a **Data collection should enable institution-specific insights through nuanced analyses and should support rigorous evaluation and careful assessment of completion-related student interventions.** Institutions must be able to analyze, compare, and report student-level data on persistence and progression, disaggregated by student characteristics that include family income, first-generation college-going status, enrollment status, race and ethnicity, and gender.

b **Students should have opportunities to make meaningful, personalized connections with faculty and staff.** There is strong evidence that active guidance and interventions grounded in good data are valuable in promoting student success.

c **More attention must be paid to understanding and assisting students from groups with the lowest completion rates.** Summer bridge programs, accelerated remediation, and the provision of emergency funds are examples of proven strategies that benefit students who struggle to graduate.

2 **Expand experimentation with and research on guided pathways designs, which already help many institutions increase completion and reduce time-to-degree and excess credits.** Design elements include clear guidelines for students to earn credentials and to further their education or career employment, mapped so course sequences and postcompletion choices are transparent; faster and better on-ramps to college-level learning for underprepared students; strong, ongoing guidance and mentoring on academic and career decision-making; and technology-assisted advising that keeps students on track to completion. Many of these reforms also have implications for greater efficiency in college and university operations, particularly when measured in terms of cost per graduate.

3 **Work toward a new national understanding of and approach to student transfer undergirded by an openness to evaluating, recognizing, and applying college-level learning that takes place at multiple institutions through various models.** One-third of college students change institutions at least once, and about half of public university graduates began their studies in community colleges. But many lose credits, do not have their credits accepted, or even drop out along the way, especially students from underrepresented populations. This obligates both public and private colleges and universities as well as state policy-makers to work collaboratively to align learning programs and expectations across institutions and sectors, including implementing a transferable general education core, defined transfer pathway maps within popular disciplines, and transfer-focused advising systems that help students anticipate what it will take for them to transfer without losing momentum in their chosen field. Beyond this, a growing number of providers that are not colleges or universities offer pieces of educational experiences that are comparable to college-level learning. New efforts and strategies are thus required to measure and afford recognition to college-level learning that takes place outside the bounds of traditional and familiar college offerings.

4 **Employer partnerships with colleges and universities play an important part in improving college completion rates and helping students understand the relevance of their education to future employment, develop important workplace skills, and explore potential career pathways.** Such partnerships—which include internships and co-op programs, mentoring, and research opportunities—also often include curricular consultations to help ensure students are prepared with the knowledge and skills needed for the workforce. New models in which colleges collaborate with businesses and high schools to create curricular pathways and provide professional mentoring and workplace internships to students especially show great promise.

5 **Federal and state government leadership should enact comprehensive and coordinated strategies to make college completion a top national and state priority.** Both state and federal governments should use discretionary funds to make competitive grants that encourage evidence-based approaches to improving completion, including promoting informed program choices, limiting excess credits, reducing developmental coursework, and redesigning curricula to postcompletion success:

a **State leaders should determine their state's numerical educational attainment goals, communicate and promote these objectives to their residents, and coordinate with colleges and universities and other public and private entities to achieve these goals.** More specifically, states can help set meaningful stretch goals for increasing college completion rates; track improvement by population subgroup by utilizing state longitudinal data systems; and support campuses through targeted institutional allocations and student financial aid.

b **The federal government should build a student unit record data system—removing identifying information—to understand institutional, state, and national trends on college outcomes.**

6 **Colleges and universities should provide all college-going students and their families with easy access to accurate and relevant information to inform their college choices, including the actual costs of the academic program to student and family, the likelihood of completing the program, and the prospects for employment or further education after graduation.** Given the high sticker cost of college and the difficulty of choosing among myriad possible institutions, programs, and credentials, better information must be coupled with active guidance and support that is personalized and technology-assisted in order to facilitate decision-making and keep students on track, particularly for first-generation students and others with little experience of both college and careers.

7 Colleges and universities have the responsibility to advance the cause of better precollege education. The most fundamental way every college and university can help improve P-12 education is to ensure that its own students receive a high-quality education so that graduates who seek a teaching career will have a strong understanding of the subject matter they wish to teach. What a particular college can do depends on its circumstances. Many work directly with teachers and administrations in their local communities to clarify expectations and smooth pathways, create pipeline programs that prepare elementary and high school students for college, and engage in dual-enrollment programs and early college initiatives—all of which can improve college readiness, reduce the need for remediation, and increase college persistence and completion. Some universities have schools of education whose students are a big part of the region's teaching force, and these institutions need to ensure that their students are well equipped for the work they will take up. The wealthiest and most-selective schools can invest in actively recruiting students from disadvantaged backgrounds throughout the nation and can help neighboring communities to advance opportunities for all college-going youth.

3 NATIONAL PRIORITY THREE

Control Costs and Increase Affordability

INTRODUCTION

As the first two sections of this report make clear, the Commission believes the future prosperity and well-being of American society depend upon a substantial majority of citizens completing a postsecondary education of quality in the decades ahead. Pursuing this goal implies that, no matter how high the quality of an undergraduate education in the United States, it cannot serve its purpose if it is not financially accessible to all who can benefit.

No matter how high the quality of an undergraduate education in the United States, it cannot serve its purpose if it is not financially accessible to all who can benefit.

In the United States, the responsibility for providing the resources through which colleges and universities pay the costs of providing undergraduate education is shared among four principal groups of actors:

1. Students themselves and their families, who pay tuition, room and board, and other college expenses partly out of pocket from current income, partly out of savings, and partly out of future income, through borrowing;
2. State and local governments, which draw on appropriated funds to provide public institutions with some of the money they need to pay their bills and which in some states provide money directly to students in the form of student aid to help pay tuition and other expenses;
3. The federal government, which provides Pell Grants, GI Bill funds, and other grant aid to students to help pay their college expenses, as well as making tax credits and deductions available to qualifying families to help defray the costs of college. The federal government also relies on its unique access to capital to provide the bulk of the lending that helps families spread college payments over time; and
4. Businesses, philanthropic organizations, and individual donors, who help defray college costs through a combination of funding student scholarships and making direct gifts and grants to colleges and universities to help defray college expenses.

The affordability of college for students and families thus depends on successful coordination of the efforts of all of these sets of actors, so that students and their families do not have to carry unreasonable burdens to attend college, and also so that in an environment of scarcity students and families are not provided with public or philanthropic resources beyond what is needed to make college possible for them. The share of resources supplied by these various actors and its variation over time is shown in Tables 1A, 1B, 1C, and 1D. The tables show

that the share of resources supplied by students and their families has grown significantly, while the share provided by state and local governments has declined. (The one exception to this is for those students who attend community colleges.) This familiar story of growing reliance on families to pay for their own education, with less assistance from state governments, is a major source of concern. The tables also show that students and families make part of their contribution in cash, drawn from a combination of savings and current income, with the rest of their contribution financed by borrowing, principally from the federal government. The existence of federal lending has assisted students and families in coming up with the money to pay college bills, but it has also resulted in rising student indebtedness and thus contributed to worries about affordability.

Tables 1A, 1B, 1C, and 1D present data on how "the average student" attending different types of colleges (public, private, for-profit; two-year and four-year) pay for college (often with help from their family). Although the "average" is a statistical construct that masks a great deal of important variation, these calculations can help explain what the financial flows involved in college enrollment are like. The student's actual tuition price is determined by deducting from the average "sticker price" (tuition and fees) at a particular college type their grants from various sources, as well as tax benefits. Typical room and board charges for a full-time student at that type of institution are then added to get an approximate view of how much money the family has to come up (Net Tuition Fees and Room and Board or Net TFRB). This is the student's "bottom line." The tables then show how students and families, on average, split that charge between cash and education loans, which the student—or for parent loans, the parent—is obliged to repay.

This more complete picture of student finance offers many insights and a few surprises. Private four-year colleges, for example, offer a large discount to the average student—greater than $13,000 in 2015–2016—and the discount has gone up fast enough that the average student there pays less in tuition now than did their counterpart in 2007–2008. But room and board charges have risen fast enough to leave the family's bottom line essentially unchanged. The growth in discounting at public four-year and two-year colleges is also striking, although in this case it is led by the very large expansion in the Pell Grant program during the recession, more than doubling at two-year and nearly doubling at four-year institutions. These increases have been largely sustained but not further increased as the recession has receded. Despite the increase since 2007–2008 in federal grants, growth in the sticker price and in room and board charges has been rapid enough to result in an increase of more than $2,000 in the amount students must pay on average. It is noteworthy that students and parents have met this increased charge not by higher borrowing (the average amount borrowed has actually fallen at four-year publics) but by greater payments in cash, perhaps explained in part by the postrecession recovery of housing and financial asset values.

This brief review of the numbers is a reminder that the problems involved in financing such a complex, multidimensional operation as modern undergraduate education are unlikely to yield to simple solutions. For richer, more

TABLE 1A: How "Average" Students Pay for College at Public Four-Year Institutions

PUBLIC FOUR-YEAR	2007–2008	2011–2012	2015–2016
Tuition and Fees	$7,090	$8,740	$9,420
Grants and Tax Benefits			
Pell Grants	$970	$1,690	$1,430
State Grants	$930	$970	$1,080
Employer and Private Grants	$460	$580	$690
Institutional Grants	$1,330	$1,330	$1,610
Tax Benefits	$370	$1,100	$1,010
Total Grants and Tax Benefits	$4,060	$5,670	$5,830
NET TUITION AND FEES	**$3,030**	**$3,070**	**$3,590**
Room and Board	$8,440	$9,380	$10,150
NET TUITION, FEES, ROOM AND BOARD	**$11,470**	**$12,450**	**$13,730**
How Average Students Pay			
In Cash	$7,590	$8,200	$9,800
Educational Borrowing	$3,880	$4,250	$3,940

TABLE 1B: How "Average" Students Pay for College at Private Four-Year Institutions

PRIVATE FOUR-YEAR	2007–2008	2011–2012	2015–2016
Tuition and Fees	$26,830	$29,460	$32,330
Grants and Tax Benefits			
Pell Grants	$1,010	$1,610	$1,370
State Grants	$1,050	$920	$950
Employer and Private Grants	$940	$1,690	$1,940
Institutional Grants	$8,300	$11,250	$13,650
Tax Benefits	$570	$1,320	$1,210
Total Grants and Tax Benefits	$11,880	$16,790	$19,130
NET TUITION AND FEES	**$14,960**	**$12,660**	**$13,200**
Room and Board	$9,820	$10,660	$11,540
NET TUITION, FEES, ROOM AND BOARD	**$24,780**	**$23,320**	**$24,740**
How Average Students Pay			
In Cash	$17,410	$16,410	$18,210
Educational Borrowing	$7,370	$6,910	$6,530

TABLE 1C: How "Average" Students Pay for College at Public Two-Year Institutions

PUBLIC TWO-YEAR	2007–2008	2011–2012	2015–2016
Tuition and Fees	$2,630	$3,140	$3,440
Grants and Tax Benefits			
Federal Grants	$1,200	$2,520	$2,290
State Grants	$370	$370	$430
Employer and Private Grants	$190	$310	$420
Institutional Grants	$200	$280	$420
Tax Benefits	$290	$430	$430
Total Grants and Tax Benefits	$2,260	$3,910	$3,990
NET TUITION AND FEES	**$370**	**-$770**	**-$550**
Room and Board	$7,920	$7,750	$7,930
NET TUITION, FEES, ROOM AND BOARD	**$8,290**	**$6,970**	**$7,380**
How Average Students Pay			
In Cash	$7,640	$6,120	$6,860
Educational Borrowing	$650	$850	$520

TABLE 1D: How "Average" Students Pay for College at For-Profit Institutions

FOR-PROFIT	2007–2008	2011–2012	2015–2016
Tuition and Fees	–	$16,900	$15,130
Grants and Tax Benefits			
Federal Grants	$3,060	$4,600	$4,840
State Grants	$800	$550	$830
Employer and Private Grants	$860	$1,770	$2,160
Institutional Grants	$300	$160	$270
Tax Benefits	$980	$1,860	$2,160
Total Grants and Tax Benefits	$6,390	$7,800	$8,500
NET TUITION AND FEES	**–**	**$9,090**	**$6,630**
Room and Board	$7,920	$7,750	$7,930
NET TUITION, FEES, ROOM AND BOARD	**–**	**$16,840**	**$14,560**
How Average Students Pay			
In Cash	–	$9,840	$9,420
Educational Borrowing	$8,240	$7,000	$5,140

detailed information on much of this, see *A Primer on the College Student Journey,* published earlier by the Commission.[79] The information provided below limits the data to full-time students and masks the huge variation among students and institutions by reporting on averages.

These are the major actors providing the resources that cover the cost of providing undergraduate education. Note, however, that it is the colleges themselves that combine these resources to actually produce education (in concert with students). Thus, the effectiveness and efficiency of higher education institutions in managing these resources helps determine both the size of the total bill the nation pays in providing undergraduate education and the numbers of students successfully completing college. Colleges and universities are key actors in determining how affordable colleges and universities will be not only for students and families but for the society as a whole. While the political forces that shape governmental finance are never easy to predict, few observers anticipate that either the federal, state, or local governments will move sharply in the direction of more generous funding for undergraduate education in the foreseeable future, so the Commission anticipates that the demands on postsecondary institutions to deliver high-quality education for less money will continue to be strong.[80]

The next section begins a discussion of the role of the federal government in providing grant and loan aid to students and ways these systems can be made to work better for families; the challenges state governments face in fulfilling their financing and operating roles as the principal suppliers of higher education to our students; the role of colleges and universities themselves, both in managing their costs and in communicating transparently with students and families about the share of the costs they will be expected to cover; and, briefly, federal, state, and accreditor regulatory matters.

THE FEDERAL ROLE

The federal government funds undergraduate students primarily through the federal financial aid system. Rather than providing subsidies directly to institutions, the government operates grant, loan, and work-study programs that allocate funds to students. It also offers tax credits and deductions to parents and students who pay tuition. Nonloan federal student aid for undergraduate students rose from $12 billion (in 2016 dollars) in 1996–1997 to $28 billion in 2006–2007 and to $56 billion in 2016–2017. Over the same period, annual federal loans to undergraduate students and their parents rose from $31 billion to $47 billion to $58 billion.

This investment in undergraduate students could be more effective if federal aid programs were simpler, better targeted, and more flexible. There are strong arguments in support of proposals for expanding the federal role to directly fund institutions that successfully graduate low-income students and/or that ensure that students do not face unmanageable tuition prices. But absent a detailed, practical plan

SOURCES (TABLES 1A, 1B, 1C, AND 1D): Sandy Baum, Jennifer Ma, Matea Pender, and Meredith Welch, *Trends in Student Aid 2016,* The College Board, 2016; Jennifer Ma, Sandy Baum, Matea Pender, and Meredith Welch, *Trends in College Pricing 2016,* The College Board, 2016.

for moving in this direction, the Commission focused on needed improvements to the federal student aid system.

Continue to Reform the Pell Grant System

The Pell Grant program is the foundation of federal student aid, providing grants to low- and moderate-income students that they can use at the accredited postsecondary institutions of their choice. In 2016–2017, 7.1 million students received $27 billion in Pell Grants.[81] But the application process and eligibility formula for Pell are complicated, and too many students do not access the aid they need. Moreover, requirements for institutional participation are weak, and many students, particularly those from disadvantaged backgrounds, do not receive adequate guidance about where to use these federal funds.

The federal government has made progress in recent years in making it easier to apply for Pell Grants and other federal financial aid. The Data Retrieval Tool that allows applicants to automatically transfer data from their past tax returns to the Free Application for Federal Student Aid (FAFSA) form eases the process for many students.[82] As of 2017–2018, aid eligibility is based on earlier income data than was previously required, making it easier to complete the application in a timely manner. The Commission looks forward to further simplification and very possibly the elimination of the FAFSA, with the award of Pell Grants based on information the government already has from past tax returns. In the meantime, programs that assist lower-income students and their families with the financial aid application can have a significant impact on the likelihood that these students will apply to and attend college.[83]

The Pell Grant program was designed to increase college access by putting money in students' pockets, but it should also support completion. Under current policy, full-time enrollment is defined as 12 credits per semester, and students enrolling for 15 credit hours—the average needed each semester to complete a bachelor's degree in four years or an associate's degree in two years—do not receive additional Pell Grant funds. Students who enroll for 12 credits each semester for five years receive five full Pell Grants—25 percent more federal funding than those who enroll for 15 credits each semester for four years, completing the same 120 credit hours.

The recent reinstatement of "summer Pell," which allows students who exhaust their annual Pell allocation in the fall and spring to receive additional funding if they enroll for additional credits over the summer, is a step in the right direction. An even better solution would be to allocate the same funding to all students who enroll for 30 credit hours, no matter how those hours are distributed over a 12-month period.

Simplifying the federal student aid system and making it more flexible is important, but it is not enough in itself to promote good choices for students aiming to attend college. The federal government should take an active interest in promoting better college counseling in high schools (as should the states) and also in providing easy guidance and information channels for adults returning to college. This is more than a matter of detail. A great deal of resource waste results from people making poor choices about where (or sometimes whether) to go to college. Purposeful and proactive measures to provide better guidance are essential. All part-

ners in the process should incorporate insights about how people actually make decisions into their efforts to support constructive choices and behaviors among students.

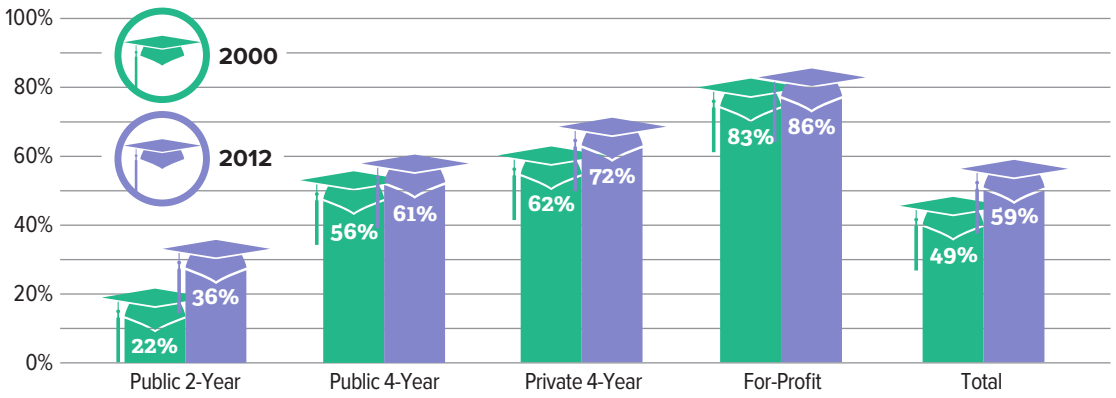
Make Student Loan Debt Manageable

Any discussion of financing college must address the rising levels of student debt. The country faces significant challenges in ensuring that all those who want to and are ready to attend college can afford to do so. More undergraduates borrow money to finance their education, so that today almost 60 percent of all two- and four-year college graduates have taken out loans, with an average cumulative loan amount of $20,000 (see Figures G and H).

Among students with larger-than-average debt totals, the share of bachelor's degree recipients graduating with $40,000 or more (in 2012 dollars) in debt rose from 2 percent in 2003–2004 to 18 percent in 2011–2012.[84] The share of associate's degree recipients borrowing $30,000 or more rose from 1 percent to 8 percent over these years.[85] This debt is concentrated in the for-profit sector, where the increase was from 1 percent to 28 percent. Almost half of bachelor's degree recipients in this sector borrowed $40,000 or more, compared with 20 percent in private nonprofit and 12 percent in public institutions. Over this period the share of students attending for-profit colleges grew, implying that rising debt levels are at least partially attributable to changing enrollment patterns.

It may be counterintuitive, but the students who struggle most with student debt are not those who borrow the most but those who do not complete their programs. The central issue is whether students complete credentials of value. Default rates are much higher for students who do not graduate than for those

FIGURE G: Share of College Graduates Borrowing for College: 2000 and 2012



SOURCE: *A Primer on the College Student Journey* (American Academy of Arts and Sciences, 2016)

who complete credentials, and default rates are inversely related to amounts owed (see Figure I). Students who graduate from private nonprofit, four-year colleges—the highest-priced institutions—have the lowest default rates.[86] Thus, increasing the rates at which students succeed in completing their undergraduate programs—and doing so in a timely way—is likely the best antidote to unmanageable student debt.

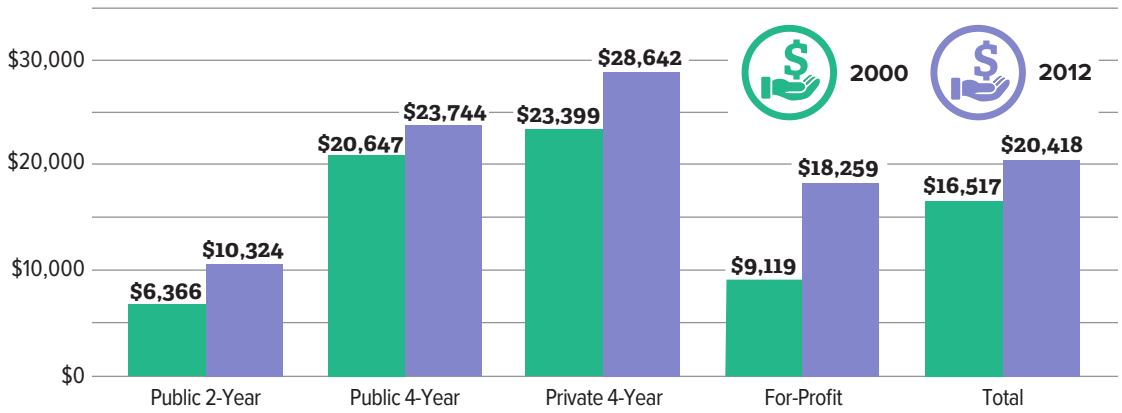
There are very real problems facing a subset of students who have borrowed and will borrow for college. But these problems will best be solved by focusing on the particular difficulties facing students in specific circumstances, not by devising broad-brush plans for eliminating or minimizing student debt. Specific recommendations for reforming the student loan system include the following.

Design a Single Income-Driven Repayment System

A college credential is a solid investment that pays off very well for most students in financial terms, as well as through increased opportunities for personal development and civic participation. It is reasonable for most students to finance part of the cost of their education by borrowing and repaying their loans out of future incomes. However, the returns to education vary dramatically, and a strong income-driven repayment program that allows students to pay back their loans based on income levels is a critical component of encouraging people to enroll and persist in college.

The federal government should improve its valuable yet confusing income-driven repayment (IDR) plans for student loans. IDR programs link an individual's monthly college loan payments to the person's income level and

FIGURE H: Median Cumulative Loan Amount Borrowed in 2015 Dollars for Graduates: 2000 and 2012

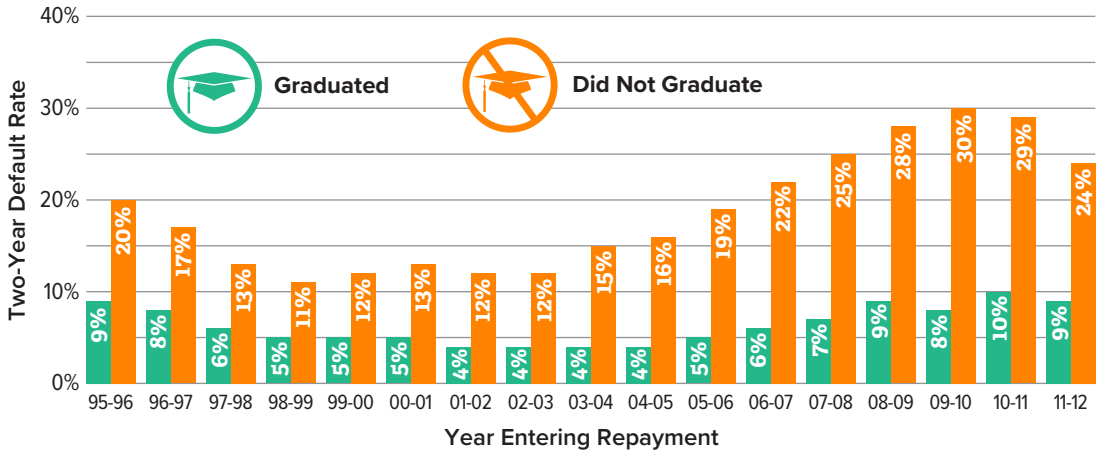


SOURCE: *A Primer on the College Student Journey* (American Academy of Arts and Sciences, 2016)

family size—making the payments an affordable percentage of income. If the debt is not completely paid off by a set time (10, 15, or 20 years, depending on which of several programs a student is enrolled in), the remaining debt will be forgiven. The risks to borrowers from holding federal student debt have been significantly reduced by growing access to these systems, which now enroll more than a quarter of borrowers and account for almost half of outstanding debt. But these options are much more complicated than they need to be—one problem, for example, is the recertification process, which requires participants to provide income information annually. And there is a real risk that repayment and forgiveness rules have become so generous that they will impose large burdens on the federal budget as more students reach the stage where loans are forgiven.

Both Australia and England successfully implemented income-based loan programs about

FIGURE I: Two-Year Student Loan Default Rates by Degree Completion Status: 1995–1996 to 2011–2012



Two-Year Cohort Default Rates, Borrowers Entering Repayment in 2011–2012

	Public 2-Year	Public 4-Year	Private Nonprofit 4-Year	For-Profit	All
All Borrowers	23%	9%	7%	18%	14%
Borrowers Who Graduated	17%	6%	5%	14%	9%
Borrowers Who Did Not Graduate	29%	18%	15%	28%	24%

SOURCE: *A Primer on the College Student Journey* (American Academy of Arts and Sciences, 2016)

two decades ago, relying on their tax systems to determine and collect payments. Congress should design a single income-driven repayment plan that will become the standard way students repay their college loans. Eliminating bureaucratic hurdles will go a long way toward reducing default rates and diminishing the hardships borrowers face. The use of payroll withholding for collecting payments will ease the process for borrowers and ensure that borrowers will assign student loans higher priority on their list of personal financial responsibilities. (Borrowers tend to prioritize car loans over student loans to avoid having their cars repossessed. Because other forms of unsecured debt generally charge higher interest rates than federal student loans, borrowers may pay off other debts first, electing to defer or even default on their student loan payments.) The plan should be designed to subsidize the borrowers who need and deserve subsidies, but it should also require, and provide incentives for, most borrowers to eventually repay their debts. It should not encourage excessive borrowing or transfer a disproportionate amount of risk to taxpayers. The latter will undermine public support for the whole program and in time drain it of resources. It is critical to find the correct balance here.

Introduce a Risk-Sharing Program into the Federal Loan System

In addition to strengthening the student loan repayment system, the federal government should ensure that institutions have a stake in their students repaying their loans. This idea is taking hold both among members of Congress and among policy analysts, but designing the details of such a system is challenging. One recent proposal, for example, recommends that institutions whose students have poor repayment records be required to repay the federal government a fraction of the unpaid debt of their students.[87] For most institutions, this fraction would be modest, but for schools with very low repayment rates, the penalties could be substantial. The Commission does not wish to endorse this particular effort, in comparison to the many other related proposals, but a plan along these lines could be a valuable tool for reducing student borrowing and for moving students to institutions where they are likely to succeed.

Track Satisfactory Academic Progress across Institutions

The low payoff for enrolling in college and leaving without a credential and the associated problems with student debt make it imperative that the student aid system promote completion, in addition to access. The Commission's recommendation to allocate Pell awards to students who enroll for 30 credit hours over a 12-month period, no matter how those hours are distributed, is an important piece of this effort. Another constructive step would be ensuring that students are making satisfactory academic progress—passing their classes with at least a C average—as they move from one institution to another. The current federal financial aid system requires students to make academic progress at a single institution to maintain eligibility for financial aid. If students fail to meet these academic requirements, they lose eligibility for federal financial aid. But when students transfer to new undergraduate institutions, their academic history is not relevant. A significant fraction—one-third of first-time undergraduate students—transfer from one institution to another or enroll

at the same time at two institutions at least once over six years. Some of these students move from one college to another because they have not been able to succeed academically. This allows students a second chance, but also supports a potentially long string of unsuccessful college experiences, with debt building up along the way. The federal student financial aid system should track students as they move across undergraduate institutions to ensure they are making academic progress. If not, then as with students who stay at one institution, students who "swirl" unsuccessfully would not be able to accrue more federal debt at a new institution.

Encourage Students to Attend Institutions and Programs with Strong Outcomes

Rising tuition prices combined with increases in living expenses and stagnant or declining household incomes have made paying for college more difficult for students and families. But whether college is affordable in a meaningful sense depends on how well it pays off in terms of future earnings. If students do not complete their programs or if they earn credentials with little value in the labor market, they have not made a good investment—whether or not they borrowed to finance the investment.

Even across institutions that serve similar students, there is tremendous variation in how successful students are in completing their programs. The use of public money to send students to institutions where their chances of graduating may be as low as 10 percent is difficult to rationalize—as is, for that matter, encouraging students to invest their own time and resources in such institutions. The federal government should encourage students to attend high-performing programs and institutions by strengthening the requirements for institutional participation in federal financial aid programs. The Commission urges the federal government to take more responsibility for limiting the colleges at which students can use their federal student aid to those that meet reasonable minimum performance standards and to provide stronger guidance to students about where and what to study.

Provide Incentives to States to Support Low-Income Students

The Commission supports the development of strong federal incentives for states to more generously fund public undergraduate education institutions. The goal is not to reduce the tuition prices students pay to zero but to reverse the trend of states backing away from providing significant subsidies to the colleges and universities that educate most students. The general subsidies to institutions should be complemented with need-based aid to make it possible for students who cannot afford even subsidized tuition to enroll.

A straightforward approach could be modeled after the Leveraging Educational Assistance Program, which was established in 1972 but eliminated in 2011. Under this program, the federal government provided matching funds for state need-based aid programs. This approach is consistent with the federal role in awarding grant aid to students with financial need and would use federal dollars to leverage well-targeted state funds.

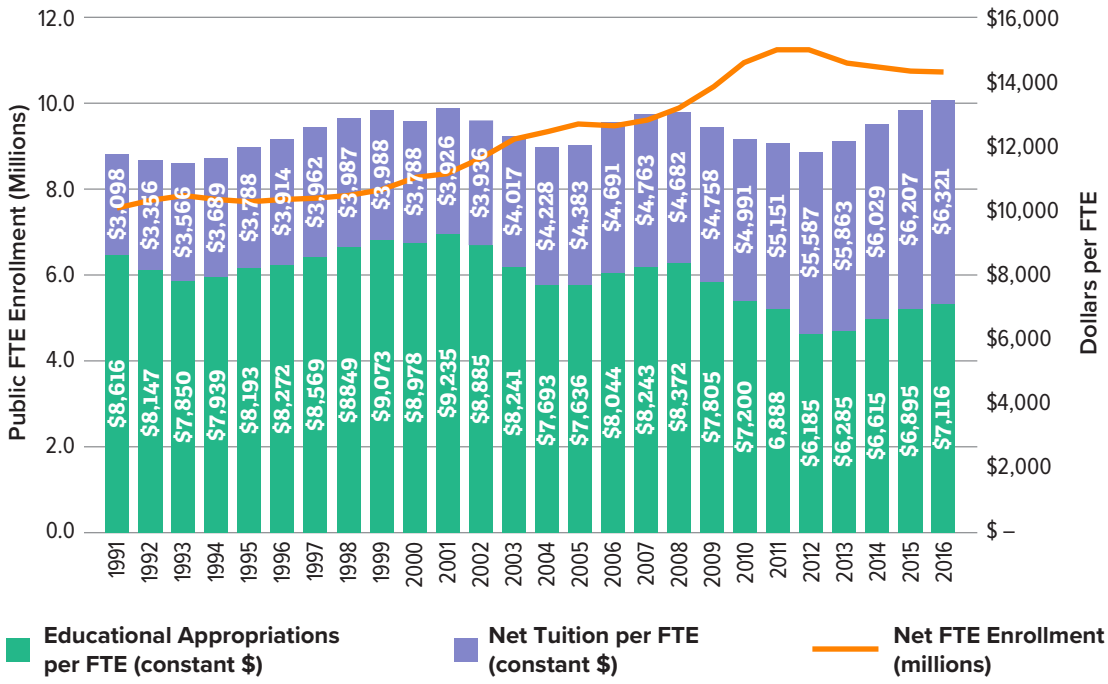
The federal government plays an important role in diminishing financial barriers to post-

secondary education. The billions of dollars devoted to this effort would be more effective if federal student aid programs were better designed. Nonetheless, state governments will continue to bear much of the responsibility for ensuring the availability of high-quality, affordable education.

THE ROLE OF STATE GOVERNMENTS

The historical role of public colleges and universities is to provide quality educational opportunities to the states' residents. Recognition of the importance of an educated citizenry and labor force for the society motivates public subsidies of colleges and universities while leaving students and their families responsible for a fraction of the full cost of their education. This commitment to access to and affordability of a public undergraduate education helps explain why public two-year and four-year institutions account for almost 80 percent of undergraduate enrollments every fall. And this is a good investment for individuals and for the American public. Individuals benefit from higher

FIGURE J: Public FTE Enrollment and Educational Appropriations per FTE, U.S., FY 1991–2016



SOURCE: State Higher Education Executive Officers. State Higher Education Finance FY 2016.
NOTES: Net Tuition revenue used for capital debt service included in the above figures. Constant 2016 dollars adjusted by SHEEO Higher Education Cost Adjustment (HECA).

earnings and the important nonmonetary benefits of college. States benefit from higher taxes paid by a more educated workforce, as well as from the civic and broader economic benefits of a more educated population.

There has been a long-term downward trend in the extent to which states provide undergraduate education subsidies to their residents. Total state and local funding at the national level has increased 10 percent over the last 25 years, but large increases in the number of enrolled students have meant that *per student* funding has declined sharply. The national average state appropriation per student in 2016 was $7,116 compared with $8,616 (in 2016 dollars) in 1991, a 17 percent drop (see Figure J).[88] State and local funding has not kept up with enrollment growth.

Higher education is the third-largest priority in state general fund budgets (the portion financed primarily by taxes) after elementary and secondary education and Medicaid. But states are dedicating a declining percentage of their resources to higher education. Other obligations of state governments, especially Medicaid, prisons, and infrastructure, demand an increasing share of the pie, and political pressures to cut taxes reduce the total amount available to cover these needs. The result has been a squeeze on funding for undergraduate education. For example, in fiscal year (FY) 1995, higher education constituted 12.9 percent of general fund spending, while in FY 2015 it was only 9.9 percent. During that same period, Medicaid went from 14.4 percent to 19.7 percent of state spending.[89]

The decline in the role of state appropriations in covering the cost of educating students helps to explain rising public college tuition levels.[90] While the Commission regards it as extremely unlikely that state governments will fully recover their former financing role, continued decline threatens access to public institutions for students who cannot afford to pay or who are more expensive to educate because of lack of preparation. It also threatens the economic vitality of the states themselves, because many large and small companies, domestic and international, place new plants and research centers near campuses to tap the talent pool they create. If the talent pool shrinks because of financial constraints, so, too, do the incentives to invest in the areas around colleges and universities, diminishing future job opportunities and the future tax base of the region.

Fiscal pressures on states and on state-run colleges and universities are likely to be unrelenting, and it is essential that both government decision-makers and leaders on campus focus on directing resources to the highest priorities. Nothing will do more to encourage a state's residents and leaders to support the cause of public higher education than clear evidence that available dollars are being used well. The Commission believes some of the general points offered below apply broadly to states' higher education policies and practices, but it also recognizes that every state is different both in the needs of its students and in the economic and civic role higher education plays in the state.

Direct Scarce State Resources to the Students for Whom They Will Have the Greatest Impact

It is not just overall state funding levels that shape the affordability and effectiveness of a public college education. States also face the

dual challenge of allocating their operating subsidies across different types of institutions with different missions serving students with differing levels of financial need, while also helping to ensure that the needy students within institutions get the financial help they require for successful attendance. A substantial number of states operate their own financial aid operations, with helping needy students as one of their goals.

The Commission urges state governments to weigh carefully the balance of their funding across types of public institutions, recognizing the distinctive contributions made by research universities, regional comprehensives, and community colleges. Because the roles of these different types of institutions differ greatly, as do the backgrounds and aspirations of their students, no simple formula can determine how much support each institution should receive from the state. The Commission believes it is important to recognize that community colleges and regional comprehensive universities disproportionately educate first-generation college students and those from disadvantaged backgrounds, populations that have historically been neglected in American higher education. Few of these students can contribute much in dollars to their own education, and they have good reason to avoid excessive debt. Yet despite these challenges, these institutions can and often serve, in a memorable phrase invoked by Raj Chetty and John Friedman, as American "engines of opportunity."[91] These colleges and universities, serving students who often have had to overcome deficient preparation for college in underresourced elementary and secondary schools, require sufficient resources to provide the academic and social supports their students need.[92] That said, like all colleges, these places should be able to demonstrate success in educating the populations they serve.

In calling attention to these broad access institutions, the Commission does not intend to signal that the remarkable accomplishments of many of the nation's leading public universities can be discounted. The American Academy's extensive Lincoln Project found that public research universities are responsible for conducting much of the nation's core research; serve as anchors of economic stability and growth in their regions; and function as centers of cultural learning with their museums, theaters, and athletic centers open to the public.[93] Moreover, many flagships make special efforts to recruit and provide financial support to qualified disadvantaged students: 31 percent of undergraduate students who attend public research universities receive Pell Grants.[94] Each state has a different mix of populations, institutions, and needs, and each must weigh its own priorities thoughtfully and with attention to evidence.

Many states complement their general state subsidies to institutions with state-run student aid programs. These aid programs often serve multiple purposes, including encouraging students to stay in the state for college, rewarding good performance in high school, and directing a portion of state funding toward private colleges, in addition to increasing educational access and attainment. Without questioning the legitimacy of these aims, the Commission believes that prominent among the goals of state student aid policies should be meeting the financial need of highly disadvantaged students. Depending on family resources, many qualified students may

be unable to attend the public flagship or even a nearby community college without additional funding to supplement federal grant assistance. Not only tuition and fees but living expenses can make college unaffordable.

Most states with grant programs award funds on the basis of both need and merit.[95] While multiple goals for these programs make sense and are probably necessary for political sustainability, in the Commission's view directing funds toward students with substantial financial need should be a high priority—and should be supported with federal incentives.

Align Funding with Completion

Traditionally, state higher education systems have tied the operating subsidy going to an institution to the number of students enrolled. In such systems, schools are paid for filling their classrooms, regardless of how much progress the enrolled students make toward completion. As the nation puts greater focus on program completion, paying schools simply for enrolling students is misaligned with the goals state leaders want institutions to pursue. It can also interfere with the goal of reducing time-to-degree. To their credit, many institutions have pursued completion goals even in the absence of clear budgetary rewards for doing so, and many states have instituted performance-based funding policies.

Policy-makers at both the state and federal levels should work with colleges and universities toward improved alignment between funding and program completion. This is a difficult challenge to manage adroitly, for at least two reasons. First, a college can sometimes raise its completion rate by recruiting students who have better graduation prospects, but the true goal is to have colleges do better with the students they have. Second, the aim of such a program should be not to reward programs for the graduation rates they already have but to reward improvement. Developing sound ways to respond to these dual challenges requires serious work on policy design and measurement tools, tasks that the research community and federal and state policy analysts need to focus on. So far these matters have been addressed at the state level through fully elaborated performance-based funding systems. The track record of such systems has not been entirely encouraging, at least in part because of excessive complexity and because they have involved only a small share of overall state funding. However, continually evaluating these systems and modifying them based on evidence of effectiveness and of unintended consequences holds real promise. Much simpler practices, like allocating some dollars from enrollment-based funding to a stream of funding per graduate, can also help improve alignment, especially if the added funding is focused on graduating high-risk students.

Coordinate State Agencies in Developing Comprehensive Student Support Strategies

Many students, whether coming straight out of high school or adults returning later to college, face multiple social and personal challenges that can range from homelessness and food insecurity to childcare, psychological challenges, and even imprisonment. Colleges are in many cases not the institutions best equipped to meet these multiple needs and challenges. Some of these challenges can be attended to within the campus environment (childcare in some cases) or even by bringing the campus

to the student, as in college programs at prisons. Yet often the best solutions can emerge from building cooperation between a college and relevant social support agencies. These are innovations that states can do a good deal to support and even subsidize.

Recognizing the interaction between college affordability, academic preparation, college success, and career outcomes is key to developing sound and comprehensive strategies. The focus should not be entirely on lower prices and more grant aid but include ways of linking other social support mechanisms, such as subsidized housing benefits, childcare, transportation subsidies, and earned income tax credits in recognition of the fact that, for many low-income students, tuition is but one of many challenges. Federal and state governments should coordinate their dollars on comprehensive supports and incentives to institutions to improve the chances of students from low- and moderate-income backgrounds to earn college credentials of value.

THE ROLE OF COLLEGES AND UNIVERSITIES

The introduction to this section of the report notes that the role of higher education institutions in the education system is to draw on resources provided by others (students, parents, state and federal governments, and philanthropy) to produce the educational services students and the nation value.[96] Colleges and universities have choices to make about how to deploy the resources they have, and these choices affect both how much students pay and the return on their investment in undergraduate education. Many colleges and universities have considerable discretion over the tuition prices they set, the amount and distribution of discounting they do from that price through institutional grant aid, and the way the resources of the institution are deployed in producing education. Decisions about all these matters are constrained by market conditions and by economic and (especially for public institutions) political trade-offs.

Making good decisions about all these matters in the constrained economic environment that faces colleges now and for the foreseeable future is no easy task, and it is all too easy to stand on the sidelines and demand that colleges simply produce better education for less money. Nevertheless, without presuming to wave a magic wand, the Commission believes that evidence is accumulating about ways colleges can significantly improve some of their practices. Increasing numbers of institutions of all types are taking serious steps to manage costs through eliminating lower-priority academic and nonacademic programs, cutting faculty positions, and reducing library services, among other steps. More colleges have developed comprehensive financial models establishing annual cost targets accompanied by well-considered strategies to meet them.[97] Cost-saving partnerships with other educational institutions, as well as with business and industry, have become more common. These are all laudatory measures that require significant effort and persistence, for which these institutions should be recognized.

The practices identified below are ones for which there is significant evidence of effectiveness and which the Commission believes are especially worthwhile for institutions to pursue in service to quality, completion, equity, and affordability.

Invest in Providing Students with Consistently Good Teaching

Our first priority in this report is to give more widespread and sustained attention to the quality of teaching and learning in undergraduate education. It is important not simply for students to have the occasional outstanding teacher but for them to have consistent, purposeful instruction throughout their college experience. Evidence supports the view that consistent good teaching raises student learning and satisfaction and, importantly, raises persistence in challenging majors, as well as degree completion.[98] Changing the culture and expectations around teaching in a department or an institution requires upfront investment. But once in place, strong and effective instructional systems can better meet institutional and social goals without being more expensive than the less-reliable teaching practices they replace.

Build Governance Practices That Support Cost-Saving Innovation

It is hard to picture any high-quality college or university operating successfully as a top-down "command and control" organization. Education is a fundamentally cooperative enterprise animated by shared values and goals. Yet it is clear that in order to make their greatest contribution to the future of the economy and society, colleges and universities are going to have to become better at making tough decisions and opening themselves to experimenting with new and potentially better ways of accomplishing their missions.

The Commission believes colleges and universities of all types need to develop a more robust conception of "shared governance" than has historically been the case.[99] In practice, shared governance has often meant "divided authority," with faculty controlling the curriculum, administrators controlling the budget, and regents or trustees attending to the institution's long-run financial viability. The Commission foresees a future in which these interdependent elements of curriculum, budget, and long-run finances will need to be managed through deep collaboration among all parties.

Even though faculty, administrators, and trustees will naturally view the institution through different lenses, they share an interest in the institution's financial success and, even more, its vitality in achieving its mission. Achieving shared goals will require greater openness and more candid discussion among all parties than currently prevail. Concretely, faculty should not insist that their traditional authority over curriculum should serve to preclude experimentation with new modes of instruction, including innovative uses of technology and elements of distance learning. Administrators in turn need to cultivate practices of keeping the community fully informed about fiscal and budgetary matters and follow a rule of "no surprises" in instituting major budgetary and program changes. And trustees should learn about the history, values, and traditions of the institution they serve and be open to honest dialogue about how best to advance the institution's long-run vision and mission.

Moving in these directions entails risks for all concerned—risks to faculty autonomy, to administrators' discretion over program and budget, and to trustees' ability to stay above the fray of campus debate. But there is, the Commission believes, no pathway to long-run success for higher education that avoids these risks.

Reduce Costs per Graduate through Timely Progression to Degree Completion

The Commission argues that improving program completion rates is a major priority for American undergraduate education. Timely completion of degrees and certificates has major benefits for students in terms of economics, personal satisfaction, and civic involvement.

Timely completion for students is also valuable in making colleges more efficient and cost-effective. Students who are enrolled for seven years to earn a bachelor's degree or five years for an associate's degree are consuming institutional resources even as they are wasting their own precious time. Moreover, completions are much more valuable to students and society than attendance without a credential. Higher completion rates can generate lower costs per degree, even when more resources are devoted to each student. In other words, raising the completion rate can be a cost-reducing strategy.

As highlighted in the previous section, a growing number of universities and community colleges are successfully raising completion rates through a carefully designed process that helps keep students on track to graduate. An important common element in this emerging work is that it begins with a significant investment in data and measurement tools, including "big data" that can help an institution identify the factors that predict a student with certain characteristics is showing early stages of academic or personal difficulty. Coupling this knowledge with rapid assembly of data about the current progress of students on campus supports timely interventions and counseling to keep students on track. By making progress to a degree more likely, these efforts at once bring the college closer to a major goal and reduce the costs per graduate—a more meaningful measure than costs per enrollee. A cost-benefit analysis of CUNY's ASAP program found that although the program requires more resources per student than traditional associate's degree programs, the cost per graduate is lower because of its much higher effectiveness in producing graduates. The study also found that for each dollar of investment in ASAP by taxpayers, the return was between three and four dollars—arising from higher tax revenues and lower costs of spending on public health, criminal justice, and public assistance.[100]

Readers with a business background will recognize the close parallel between this kind of work and efforts toward "continuous improvement" and "process reengineering." The common element is a deliberate and ongoing effort to understand what the processes at work in an enterprise are intending to do and then focus on how to make them work more reliably and with less waste.

It is important to recognize that these are quality improvement and cost-saving strategies that can be undertaken *now*, without waiting for big technological improvements in teaching. New educational technologies indeed hold great promise for the future but are not yet ready for widespread adoption without undue risk, especially to disadvantaged students. Depending upon how they are developed and deployed, these technologies have the potential to increase inequality by providing experiences of lesser quality for some students while enriching the experiences of other students. Active experimenta-

tion with varieties of technology-enhanced instruction is needed, and institutions need to learn much more before widespread adoption of these technologies is warranted. There is real potential for expanding opportunity and better managing costs, but institutions should approach this effort with a commitment to quality and equity.

Governance and financing practices at the state level should align with these process-improving strategies, a point noted above, in the context of the role of the states. Such reform practices take time to evolve and sometimes require upfront investment before they pay off.

Direct Financial Assistance to Students Who Need It

Colleges and universities have many reasons for offering some students admission at a reduced price. Student ability to pay is a big factor, with institutions offering "need-based" awards to students who could not otherwise afford to attend. But awards for academic or athletic achievement are also common, and colleges may also offer discounts for musical talent, prowess in debate, or any number of other characteristics. Colleges may see such "merit" awards as useful tools in shaping their entering class in desired ways. But when different institutions have similar definitions of merit, such as scores on SAT or ACT exams, they may find themselves in a "bidding war" for the same students, with the result that scarce institutional resources go to students and families who could well afford to attend without the aid. Because colleges have limits on how much tuition revenue they can afford to forgo, merit awards frequently wind up competing with need-based awards for scarce aid dollars.

Institutions should carefully assess their student aid strategies to meet institutional missions, prioritizing aid to students who are most financially needy. Access and equity are fundamental to the role of undergraduate education—and to the nonprofit status of most colleges and universities.

A relatively small subset of colleges and universities that have more resources than most other institutions compete for well-prepared, affluent students at the national and international levels. They provide costly amenities such as well-appointed dormitories, expansive fitness centers, and elaborate dining facilities to attract students who can choose among prestigious colleges. While these amenities may respond to student demand, many add to institutional expenses with little or no educational impact. The Commission urges institutions, whenever possible, to direct their competitive efforts to raising the educational quality of their offerings and increasing opportunities for social mobility to a greater fraction of aspiring students.

Provide Students with Clear Information about Price

Many students and their families, and lower-income families in particular, rule out schools that they can afford because the so-called sticker price—the information about tuition, fees, room, and board published on college websites and in admissions brochures—appears to be too high. The sticker price shows how much students must pay to attend a school before subsidies such as grants and scholarships are awarded. In reality, the "net" price is consistently lower than the sticker price, and about two-thirds of students pay the lower net prices compared to the higher sticker prices.[101]

Unfortunately, many students and their families turn away from applying to colleges based upon the sticker price, and some decide not to attend college at all. Colleges and universities that genuinely want to elicit applications from qualified students of all academic backgrounds should work hard on communication strategies that help with this problem.

Another area in which greater transparency is needed is in communication with students after they are admitted and awarded financial aid. A student who is offered aid at several institutions is likely to receive "award letters" that look very different from one another, even if the bottom line of each turns out to be the same. A national effort to standardize these communications would be worthwhile. Failing that, it is essential that each institution make clear what the student and their family will be required to pay, and what options, including loans, summer employment, and Federal Work-Study, will be available for helping to finance those expenses. Colleges also need to work very hard to make sure students understand the obligations they enter into in agreeing to a loan.

REGULATORY MATTERS

In recent years, state, federal, and accreditor regulations have been criticized for obstructing progress and innovation and adding unnecessary and wasteful costs to colleges and university budgets. The Task Force on Federal Regulation of Higher Education, a group of college and university presidents and chancellors created by a bipartisan group of U.S. Senators, recently released an analysis recommending that regulation not related directly to institutional quality and improvement be identified and, where possible, eliminated.[102] The Commission supports such an exercise.

And while the most vigorous critique of regulation has focused on federal rules, state agencies and accrediting bodies should also engage in a thoughtful review to identify regulations and other policy barriers that may impede the spread of innovation across colleges and universities. Regulations that do not contribute to protecting students by insisting that providers meet rigorous quality standards should be reviewed and, where possible, rolled back. Conversely, greater regulatory attention and compliance should be directed at institutions that are chronically poor performers. A better relationship between important regulatory protections and the promotion of innovation can be achieved through thoughtful action at the state, federal, accreditation, and institutional levels.

Priority Three Recommendations 3

CONTROL COSTS AND INCREASE AFFORDABILITY TO MAKE UNDERGRADUATE EDUCATION FINANCIALLY ACCESSIBLE TO ALL WHO CAN BENEFIT.

The Commission believes that, no matter how high the quality of an undergraduate education, it cannot serve its purpose if it is not financially accessible to all who can benefit. In an environment of continuing financial constraint, colleges and governments must put their limited resources where they will do the most good in realizing this commitment. In the Commission's view, this means targeting institutional operating funds toward programs that promote efficiency and effectiveness in getting students to completion and targeting state and federal support to students who need it most in the programs in which they are most likely to succeed. Increasing the rates at which students succeed in completing their undergraduate programs in a timely way is likely the best antidote to unmanageable student debt. Across-the-board spending cuts are good at avoiding tough choices, but deliberate decisions about where to invest and where to cut back have much greater promise for controlling costs while promoting quality and completion. More broadly, while addressing the challenge of low success rates for a significant portion of the population will require significant investments in the near term, in the long run it will return significant and measurable long-term economic and civic dividends. Strengthening college completion should be seen as an investment in human infrastructure that is critical to the nation's long-term economic vitality and social cohesion.

The Commission makes the following recommendations for improvement related to controlling costs and increasing affordability.

1 The federal student grant and loan programs play a valuable—in fact, irreplaceable—role in the American system of financing higher education, but the nation's aid system is far more complex and confusing than it needs to be, and too much public money is being wasted. The recommendations below should be complemented by more comprehensive interventions that help students understand the potential earnings and debt levels associated with various college credentials and career paths, prevent students from excessive borrowing, and encourage students to complete their credentials in a timely way. The federal government should:

a Take further steps to **simplify or even eliminate the FAFSA-based student aid application process,** relying more on financial information already available from the Internal Revenue Service to determine eligibility.

b **The Pell system should provide grants that support students completing 30 credits anytime throughout the course of a calendar year**, allowing students to take classes when they can and to complete their credentials in a timely fashion.

c **Design a single income-driven repayment plan** in which students are automatically enrolled and loan payments are collected through the income tax system. The plan should include fiscally responsible repayment rates to limit the need for future debt forgiveness.

d **Develop guidelines for colleges and universities whose students are systematically unable to repay their federal loans to reimburse the government a fraction of the unpaid balance.** Institutional risk-sharing that gives a college or university a financial stake in their students' success at school and afterward appears to be a promising innovation and should be tested, provided that institutions continue to honor their access-related missions and stand behind their commitments to high-risk students.

e **Track student progress across institutions and provide access to continued aid based upon satisfactory academic progress across multiple institutions.** Under the current system, too many "swirling" students move from institution to institution piling up debt without earning a degree, resulting in significant debt and high risk of loan default.

f **Revise eligibility rules so as not to allow federal financial aid to follow students to low-performing institutions that have extremely low graduation rates.**

g **Develop incentives for states to sustain funding for public higher education institutions and, where possible, to increase it.** Federal and state governments should focus their dollars on comprehensive supports and incentives to improve the chances of students from low- and moderate-income backgrounds earning college credentials of value.

h **Experiment with and carefully assess alternatives for students to manage the financing of their college education.** For example, income-share agreements allow college students to borrow from colleges or investors, which then receive a percentage of the student's after-graduation income.

2 The states historically have exercised primary responsibility for funding and oversight of public colleges and universities, and this core state responsibility should continue—it is a duty states owe to their residents, as the majority of those who go to college attend their local public higher education institutions. States must ensure that their public institutions are provided with adequate funding to fulfill their missions, in particular those that serve the most disadvantaged students. However, an overall decline in state support represents a central challenge to the core missions of public institutions. Fiscal pressures on states and on state-run colleges and universities are likely to be unrelenting, and it is essential that both government decision-makers and leaders on campus focus on directing resources to the highest priorities:

a **Direct scarce resources to the students for whom they will have the greatest impact.** State governments must weigh carefully the balance of their funding across types of public institutions, recognizing the distinctive contributions made by research universities, regional comprehensives, and community colleges. Because the roles of these different types of institution vary greatly, as do the backgrounds and aspirations of their students, no simple formula can determine how much support each institution should receive from the state. While the balance of priorities will and should vary among states according to a state's needs and opportunities, the Commission believes that every state should attend effectively to the needs of its most disadvantaged students, wherever they enroll.

b **State-run student aid programs should prioritize meeting the financial need of highly disadvantaged students.** Without additional funding to supplement federal grant assistance, many qualified students may be unable to attend the public flagship or even a nearby community college.

c **Policy-makers should work with colleges and universities toward improved alignment between funding and program completion.** Performance-based funding systems are showing mixed results; continually evaluating these systems and modifying them based on evidence of effectiveness and unintended consequences holds real promise.

d **Coordinate state agencies in developing comprehensive student support strategies.** Many students, whether coming straight out of high school or adults returning later to college, face multiple social and personal challenges that can range from homelessness and food insecurity to childcare, psychological challenges, and even imprisonment. The best

solutions can often emerge from building cooperation between a college and relevant social support agencies. These are innovations that states can do a good deal to support and even subsidize.

3 In the constrained financial environment that exists now and that the Commission believes lies ahead, colleges and universities must continue to be more effective at managing their costs and directing scarce resources smartly if they are to meet the goals of more equitable access and increased completion. Building on the difficult and serious steps many institutions have already taken, the following areas deserve particular emphasis:

a **Invest in providing students with consistently good teaching.** Good teaching raises student learning and satisfaction and raises persistence in challenging majors, as well as degree completion. Once in place, strong and effective instructional systems can better meet institutional and social goals without being more expensive than the less-reliable teaching practices they replace.

b **Build governance practices that support cost-saving innovation.** Colleges and universities of all types need to develop a more robust conception of "shared governance" than has historically been the case. Even though faculty, administrators, and trustees view the institution through different lenses, they share an interest in the institution's financial success and, even more, its vitality in achieving its mission. Achieving shared goals will require greater openness and more candid discussion among all parties than currently prevail.

c **Reduce costs per graduate through timely progression to degree completion.** Institutional reengineering that results in more students completing degrees in a timelier fashion lowers costs per graduate because of the greater effectiveness in producing graduates. Success requires the full effort of the entire campus, including the faculty, in making efficiency-improving adjustments; for example, through timely tracking of student progress.

d **Direct financial assistance to students who need it.** Colleges and universities should assess their student aid strategies to meet institutional missions and lean toward providing aid to students who are most financially vulnerable.

e **Make information about prices, aid, and outcomes more accessible and transparent** to students. Institutions should think carefully about clarity and equity for students as they design their pricing policies.

4 Federal and state regulatory agencies, as well as regional and disciplinary accrediting bodies that also hold regulatory sway, should assess institutional effectiveness and guide behavior based on desired practices and outcomes for students rather than focusing primarily on educational inputs:

a To promote an increase in responsible innovation, government and accrediting agencies should **track institutional and program performance on priority outcomes** such as graduation rates, student debt default and loan repayment rates, and job placement/job success or further education outcomes.

b To reduce compliance costs and target resources where they can have the greatest impact, **apply more thorough institutional review to chronically poor performers and reward strong performers by reducing the frequency and scope of regulatory review processes.** Reporting requirements should be simplified where possible and better targeted to control bad actors and to assess the quality of new entrants into higher education.

c Increasing numbers of colleges and universities struggle to meet costly federal and state regulatory requirements. The federal and state governments should take steps to **consolidate and streamline confusing regulations, review and reduce unfunded mandates where appropriate, and eliminate extraneous and tangential rules while retaining and where possible improving worthwhile consumer protections.** Regulations, put forth in a clear and comprehensible manner, should be related to education, student safety, and stewardship of federal and state funds. The costs and burdens of regulations should be estimated accurately and regularly.

SECTION FOUR

The Further Future Considered

At its most fundamental level, education (from preschool through graduate school) is a preparation for the days, years, and decades ahead. The preceding three sections of this report analyze present-day realities, propose a set of priorities for future investment and innovation, and offer recommendations for achieving a more effective and equitable approach to undergraduate education. Action on these recommendations can and should begin soon, and many will take 10–20 years before they are realized. This fourth and final section takes a deliberately more speculative approach, considering an even more distant future through four lenses: the country's level of social cohesion; the needs and characteristics of the workforce; the level of access to information and advanced educational technologies; and unforeseen natural or human-generated global challenges. As any reader of science fiction can attest, the number of possible futures is infinite, and even minute differences between imagined scenarios can result in wildly varying outcomes. The Commission focuses on four factors that seem most plausible and pertinent to its principal concerns (quality, completion, and affordability) and tries to imagine what the nation's needs will be and how colleges and universities might respond. In each case—whether contemplating a future characterized by social division or unity, widespread automation, a greater dependency on data, sudden cataclysmic change, or anything in between—it is clear that undergraduate education will continue to play a vital role in securing and strengthening the nation's future.

The section concludes by offering a set of research questions to continue to advance the work toward a strengthened and more affordable undergraduate education for a greater share of Americans.

FACTOR #1: A MORE DIVIDED OR A MORE UNITED NATION

By 2040, there will be no racial or ethnic majority in the United States, a clear turning point in the history of the nation. If current trends persist, income and wealth inequality will continue to expand, and political divisiveness may intensify even further. The nation's inclusivity, a foundational principle of the American experiment, is a great virtue by any reasonable standard. But it also serves, paradoxically, to complicate democratic governance and to make the achievement of consensus ever more difficult. These shifts, some more predictable than others, will be happening as the global economy continues to alter sectors of the American economy and as the ongoing proliferation of news media will make it even easier for consumers to select information sources that confirm their biases and, in some instances, their worst impulses. The potential for heightened discord is already evident in the deterioration of political deliberation at all levels and in the coarseness of the public discourse.

To check these negative influences, undergraduate education should play a large and constructive role. As cultural crossroads and sites of reasoned debate—as institutions that should and often do welcome students from all communities: urban and rural, conservative

and liberal, young and old, high- and low-income, LGBTQI, and so on—they could set new standards for civility and mutual understanding in a society sorely in need of new models. By welcoming international students, they can encourage interactions among peoples of different cultures, often for the first time, and thereby perform a critical function in a shrinking world. And they should continue to fulfill their customary function, to provide the knowledge and understanding—of science and technology, history, economics, and the arts—as well as the critical thinking skills and the civic instruction necessary to support informed decision-making in a fast-paced, interconnected, technological future.

Most projections about the future of undergraduate education (including this report) assume that distance learning will continue to expand as a way to ensure access for the widest possible population of students. Some experts even predict the end of the college campus as we know it, to be replaced by hybrid and online delivery models. In this context, the power of Skype and its progeny is undeniable, eliminating any physical distance, no matter how great, between a student and a teacher. Even if MOOCs have not transformed undergraduate education, as was predicted earlier in this decade, they have pointed to a future much less tied to physical presence, in which higher education is more accessible and less expensive for more people. This is especially good news for people who live far from the institutions of their choosing, who are unable to enroll full time because they are juggling jobs and/or family, or who cannot afford room and board. But something vital would be lost if undergraduate education adopts online delivery systems without recreating, in a digital space, the sense of community that could serve to bind together those who attend and work in the nation's colleges and universities. The loss of public spaces, without a suitable replacement in the digital world, would serve to limit even further the number of opportunities students would have to encounter viewpoints other than their own. An increasingly diverse nation requires more common spaces and more opportunities for meaningful interaction, not fewer, whether they exist physically or virtually.

> In each case—whether contemplating a future characterized by social division or unity, widespread automation, a greater dependency on data, sudden cataclysmic change, or anything in between—it is clear that undergraduate education will continue to play a vital role in securing and strengthening the nation's future.

Online technology may well be evolving rapidly enough to help fill the void, although that is by no means certain. For example, the American Academy's recent report on language learning, *America's Languages: Investing in Language*

Education for the 21st Century, applauds the expansion of new online exchanges that enable American students to communicate directly with students from other countries and regions to enhance their language and cultural skills.[103] And many universities are now experimenting with new platforms that resemble, recreate, and even improve upon the traditional common spaces of campus life. But the provision of public space, as crucial as it can be, is not enough to foster the kinds of interactions most needed to overcome the potential divisions that threaten the nation. Colleges and universities will also require faculty and administrators who are trained and prepared to mediate as well as educate, who can bring together students of diverse viewpoints and structure productive dialogue among them, and who can ensure that all ideas are evaluated with respect and civility.

Previously, when new voices have been added to the national chorus—for example, during the Civil Rights and anti-war movements of the 1960s or the women's movement in the 1970s—the nation has turned to its colleges and universities to help define and model a more civil form of public discourse, a process that can be as disruptive as it is constructive. Sometimes this process has led to immediate and positive results, such as the forging of a new collaboration among former adversaries. Other times, it has led to more turbulent and vivid activity, such as the staging of protests, the occupation of buildings, and highly visible conflicts stoked by social media. But both aspects of this public role have proven crucial to the nation as it evolves over time. And the nation will continue to turn to its educational institutions in future moments of transition, as long as they are able to maintain an open environment for the free exchange of ideas, the creation of strong and diverse communities, and the possibility of both chance and deliberate encounters among people of different backgrounds, whether online or on the ground. Few other American institutions have played this role as effectively in the past, and there does not appear to be a clear alternative on the horizon. Higher education—on campus or online—should continue to provide students, and the nation as a whole, with the time, space, and resources necessary for the thoughtful, collaborative, and occasionally contentious process of defining the kind of society Americans would like to foster today and tomorrow.

FACTOR #2: AN AUTOMATED, ROVING WORKFORCE

Advanced robotics, artificial intelligence, and enhanced and virtual reality technologies are all evolving so rapidly that experts in a wide variety of fields—from manufacturing to transportation to the military—are considering the consequences of an automated future in which many of the tasks now performed every day at work and at home will be performed by machines. Their projections range from a utopian notion of an abundant society in which people are freed from common drudgery in order to solve persistent problems like disease and hunger, engage in volunteer efforts more fully, and pursue leisure activities at length, to a dystopian vision of mass unemployment, wide-ranging worker dislocation, ever-greater inequality, and existential disaffection.

Along with the range of possibilities brought about by greater automation, there may also evolve a decidedly larger "gig economy" in which increasing numbers of workers are hired on a task-by-task basis, often through a digital

marketplace, to work on-demand rather than as full-time employees, and without many of the protections federal law provides for traditional workers.[104] The recent rise of online services such as TaskRabbit, which connects freelance workers of all kinds to local demand, is evidence that Americans are already beginning to develop strategies to accommodate an economic future of high turnover and volatility. Moreover, according to most measures, Americans change jobs more frequently than they have in the past, and they are less likely to view their jobs as part of a long-term career path.[105] Most of this flux is precipitated by a changing global economy, by the rapid upheaval of industrial practices in the digital age, and by circumstances like the slow recovery from the Great Recession.

The combination of these trends may suggest a future that fundamentally demands people learn an assortment of new and increasingly complex skills over their lifetimes; in which the relationships between employers and employees are even further attenuated; and in which a "gig" may be a more common economic arrangement than a job and independence is valued more highly than stability.

Although the gig economy is still a small fraction of the workforce, colleges and universities are already implementing new strategies for teaching students the technical skills they need to succeed amid technological upheaval and the changing nature of the workforce. But there may be deeper and more fundamental structural changes needed in a world in which practical and technical knowledge is quickly outdated, with parts of jobs or even entire jobs replaced by advanced robotics, artificial intelligence, and virtual reality. Such a workforce—adaptable but itinerant—would place a premium on educational approaches that provide "just-in-time" technical and intellectual skills and foster professional resiliency and flexibility. And employers would perhaps play a greater role in providing employees with short-term, ongoing training opportunities. An educational system based on disciplinary divisions and credit hours would be increasingly forced to adjust to meet the requirements of an evolving workplace and a growing number of education and training providers. At the same time, if the economy develops in ways that further strip workers of existing protections and opportunities for collective action, it may become even more important that education should equip people to be more self-reliant and assertive and more capable of problem-solving and critical thinking.

Current responses to an increased demand for shorter-term, flexible options include competency-based programs and innovations like coding boot camps and MOOCs. The recent closure of several prominent coding academies is a reminder of the fragility of forecasts of the future, but many efforts are proceeding apace. AT&T's multiyear effort to develop a comprehensive strategy to reskill its existing workforce of almost 300,000 employees relies, in part, upon partnerships with Georgia Tech and Udacity to offer employees flexible opportunities to engage in lifelong learning and skills development through short-term "nano-degrees" and online master's programs. These sorts of programs increasingly will address the needs of new student populations, particularly working adults.

So, too, does a wide range of new badging programs, which certify a student's attainment of specific marketable skills for a range of profes-

sional fields. Badges are currently distributed by a variety of independent organizations and can be displayed by recipients on emerging e-credential sites like Credly. Like other social media innovations, their value is crowd-sourced: badge recipients and the employers who hire them rate particular badges just as Amazon customers rate products and Facebook users "like" their friends' posts. Cumulative ratings within the marketplace ultimately determine their value. Similarly, "microdegrees"—which typically focus on a specific professional skill set and are delivered online in an accelerated format—may prove to be harbingers of adaptable models for future educators who will be expected to provide students with practical and marketable skills quickly enough to keep pace with innovation.

Colleges and universities will need to make careful and informed choices about how they design and structure future educational opportunities.[106] A fully automated future would require a highly skilled, technical, and adaptable human workforce. But the best, most efficient, and most natural strategy for succeeding in a world enhanced by robots and artificial intelligence and by careers punctuated by change and itinerancy may be to develop the qualities that make us most human and most resilient, to double down on the skills that are most difficult for machines to replicate, such as solving unstructured problems, working flexibly with new information, carrying out nonroutine manual tasks, and accruing the knowledge, sense of history, appreciation for cultural context, and "human skills" that are indispensable not just for the marketplace but for civic life and rich personal lives as well. Since a foundation in the liberal arts will be part of the answer for salaried and gig workers alike, then a quality liberal arts education must be available and accessible to everyone, regardless of social or economic background.

Finally, the possible future intensification of automation and a larger itinerant workforce could require colleges to think about their students much differently. Currently, their relationship to their students undergoes a dramatic shift at the moment of graduation, when learners become alumni. But in a future in which every college graduate would someday need to add to existing skills or learn entirely new ones, alumni could begin to look like students again—lifelong learners who begin as undergraduates and then return periodically throughout their lives for new knowledge and retraining. In such a scenario, many colleges and universities would need to develop whole new models and even cultures to provide learning opportunities over a lifetime, thus helping students not only launch their careers but advance in and pivot to new careers over time, adopting a philosophy whereby a student today is a student always.

FACTOR #3: A FREE FLOW OF INFORMATION AND DATA

Digital giants like Google, Facebook, and Amazon already gather enough data on their users to be able to identify, with increasing precision, habits and preferences of all kinds and therefore predict a person's commercial and perhaps even political choices. The commercial and research potential of such data collection is seemingly limitless (as is the potential for misuse). Computer scientists are now empowered to pursue new methods in predictive analytics and cognitive computing that will have broad applications in health and climate science, his-

torical research, polling and opinion research, economics, and dozens of other fields. In many respects, corporations are leading the way, collecting consumer data of all kinds in order to refine their products, customer service, and marketing strategies.

At the same time, the ubiquity of the smartphone and the ongoing digitization of the world's libraries have made a substantial portion of human factual knowledge available—at least in theory—to just about everyone on the planet, no matter where they live or travel. Both trends appear to be irreversible. In the not-so-distant future, universal access to scholarly knowledge may be considered a realistic human goal, perhaps even a right (although the universal capability to understand this knowledge is by no means guaranteed), and, far more problematically, the information accumulated on individuals may be considered a public resource rather than a private trove to be protected.

Many fields and institutions will be affected by these technologies, including government and healthcare, but few could be affected as profoundly as education, in which transformative innovations like massive virtual data warehouses and new teaching platforms could be used to improve and accelerate educational delivery, and personalize and verify certain types of student learning, in ways that cannot yet be imagined.

Although the higher education sector has voiced strong concerns over the collection of too much student data for fear of invading student privacy and breaking trust with parents, it may be only a matter of time before the benefits of massive data collection outweigh the risks, and the teaching establishment could harness the power of Big Data to improve educational delivery. (The recent experiences of Facebook and Google, who found their algorithmic data management exploited in the 2016 presidential campaign, provide a striking illustration of the risks that also accompany Big Data.) Colleges and universities will need to examine the issue rigorously and define their own parameters for the use of student data, balancing privacy concerns with the potential of Big Data to help refine and personalize teaching and advising. Colleges and universities may even take the lead in the public debate about the proper use of personal data more generally. On a comparatively small scale, some institutions, as noted earlier in this report, have adopted predictive analytics as a way to monitor student performance and boost graduation rates, with positive results. And several for-profit institutions like the University of Phoenix, as well as a handful of nonprofit institutions, have begun more ambitious efforts to track students and alumni throughout their lives to better understand the long-term impact of their offerings. But such initiatives are only in their infancy. As early adopters of Big Data techniques demonstrate encouraging results, many others will be likely to follow suit, forcing colleges and universities to struggle with difficult ethical and practical questions surrounding the tradeoffs associated with the collection and use of data.

Teachers and researchers will have increasing access to large data sets that can help evaluate student progress and teacher success more generally. For example, the ENGAGE program created by the Defense Advanced Research Projects Agency (DARPA) is exploring how to optimize educational content and instruction

from data gleaned through interactive technologies used by tens of thousands of K-12 students served by the U.S. Department of Defense Education Activity, a government-sponsored organization responsible for educating the children of military personnel around the world. And a DARPA initiative to teach information systems administration in the U.S. Navy created a digital tutor program modeled after expert human tutoring approaches. An evaluation of the program found that trainees who used the digital tutor program for 16 weeks outperformed students with more than double that in classroom time and sailors with seven years of experience.[107]

A national repository of such data focused on undergraduate education, based on an agreed-upon set of standards and carefully enforced privacy protocols, might advance the understanding of education—at the individual, institutional, and systemic levels—as rapidly as Big Data have advanced the understanding of the human genome. Nevertheless, a great deal of further development still needs to happen to go from predicting an individual's purchasing habits to understanding and fostering how a student comprehends complex and challenging academic material. This would be a jump of great magnitude that is still quite far from being realized. It should also be remembered, as stressed throughout this report, that some of the most important kinds of learning involve critical thinking, creative problem-solving, and successful human interaction. We have at this point little evidence that emerging learning technologies will find application in these areas.

A potential future developing out of a new willingness among institutions to gather and share student data would also benefit from the free distribution of basic knowledge through digitized libraries and museums as well as by the next generation of MOOC offerings. The continued expansion of online lectures, digitized textbooks, and wikis of all kinds would not only continue to make information more widely available but could speed the evolution of teaching. Challenging problems will need to be faced. How can the hard work of discovering and communicating new knowledge and understanding be encouraged if the products of this work are immediately given away for free? How can people get better at identifying reliable sources of knowledge in a world where sense and nonsense are equally available?

Self-motivated students would no longer expect to learn basic skills in classroom settings when they could access such information through various online options like Khan Academy. There could be an acceleration in the shift toward reserving classroom time (in brick-and-mortar or online settings) for hands-on demonstrations, personalized instruction, and collaborative explorations—or else for hybrid models tailored to each individual student's needs. In one version of an ideal future, students from all backgrounds would have access not only to these technologically enabled learning opportunities but also to the concomitant personal mentoring and support needed to fully benefit from them.

In many ways, primary and secondary education are already leading the way. Adaptive learning software such as Mindspark, ALEKS, and Knewton—which identify patterns in student learning and adjust to correct the most common errors—are already yielding notable

results, including higher test scores among K-12 students.[108] Private and charter school networks like AltSchool and Summit Public Schools—both of which are connected to Silicon Valley companies and entrepreneurs—are testing the limits of traditional classroom teaching, offering personalized lesson platforms and tailoring content on individual student tablets, among other methods.[109] The effectiveness of these methods is not fully established, and these programs are not yet scalable for the entire nation, but they indicate a data-based and, potentially, more effective way for primary and secondary education to evolve and improve. For undergraduate education, they suggest that tomorrow's students will be very different from the students of the past. If precollege education develops as is speculated here, undergraduates of the future will expect their education to be tailored to their individual needs and ways of learning and will be less dependent upon any of the usual methods. In this imagined future, meeting the expectations of tomorrow's students will require colleges and universities to make a concerted effort to evolve and modernize quickly. Again, the United States would do well to ensure that all undergraduates of the future, regardless of background, have equal access to and support for engaging in the most advanced, high-quality learning experiences available.

The combination of these two phenomena—the sweeping collection of student data and the free, digital distribution of basic human information—could fundamentally alter the way education has been delivered for centuries. The change would be iterative, and possibly the result of a dizzying period of experimentation, perhaps accompanied by unintended and unwanted consequences, but the results could be truly transformative if all of the possibilities are fully realized. And while total transformation is a possibility, such deep changes may take place only in part, or even not at all.

FACTOR #4: A VULNERABLE PLANET

The past two decades have demonstrated that the ordinary circumstances of everyday life—our capabilities, our goals, our challenges—can change in an instant, perhaps more quickly than at any other time in human history. The era of the iPhone and the rise of social media, both technologies transformative in ways that are only beginning to be understood, have also been the decades of global terrorism, the Great Recession, and an acceleration in the degradation of the natural environment. In a moment, the breakthroughs and catastrophes of yesterday can seem like distant memories. Colleges and universities are not immune to the forces of rapid change, natural or human made. In fact, they are well positioned to help society respond thoughtfully and effectively by examining new ideas, teaching new skills, and producing new research. Their importance will only be amplified in a future characterized by transformative discovery or world-changing cataclysm, and they would serve the world more effectively by maintaining a certain level of financial, curricular, and intellectual flexibility in order to meet unforeseen challenges.

Over the past 150 years, higher education has displayed its true value in times of rapid change, the inflection points that follow great discovery or great calamity. During the Civil War, the Morrill Act created a set of public institutions designed to prepare a wide segment of the population for the changes, including mass industrialization, that would certainly follow. After

World War II, the G.I. Bill expanded educational access to accommodate vast numbers of returning soldiers in an effort to heal a nation once weakened by war and economic depression and to propel a new era of innovation and productivity. During the Cold War, the nation's universities responded to the launch of Sputnik by expanding their research agenda and nurturing new expertise as well as by working closely with government and business to foster new discoveries. Today, American colleges and universities are addressing an array of national and global challenges—among them, the provision of clean air and water, food, medicine, energy, universal education, human rights, and the assurance of physical safety—through ambitious research and, perhaps just as important, by attempting to model a safe and sustainable future to the next generation of leaders. These are not mere historical anecdotes. They are, instead, proof of the importance of higher education in times of crisis, when people are feeling most vulnerable and when change is most dramatic.

The great challenge for higher education, as for any sector, is the unpredictability of sweeping change, the suddenness with which it demands attention, and the unintended consequences that can ripple through society when the dust clears. In addition to higher education's unquestionably great achievements in times of rapid change, it has also been forced to respond to challenges like the rise of McCarthyism in the 1950s, the student riots and occupations of the late 1960s, new limits on international recruitment following the terrorist attacks of 2001, and the politicization of scientific research today. It is impossible to plan for every possibility; inevitably, the nation will be caught off guard by some future development—domestic or international terrorism, war, climate change, political upheaval, and so on. Yet higher education is often better prepared than any other sector to respond effectively and productively to surprise because it values the breadth of human knowledge as well as its depth. It supports scholarship and teaching in global health even when there is no immediate threat of an outbreak, or the study of a distant culture long before international conflict makes such knowledge a national imperative. There is always room for improvement, especially in the translation of research and discovery for public use. For a variety of reasons—institutional policies, arduous regulations, poor communications strategies, and so on—important information often fails to reach an audience beyond campus walls. Nevertheless, the ideal that drives higher education—to teach and study over a broad range, without preordained limits—lends it a special status in times of crisis: it becomes a source of resilience and, hopefully, of progress.

Recent reports of the American Academy—including *The Heart of the Matter* on humanistic inquiry, *ARISE* and *Restoring the Foundation* on the importance of basic scientific research, and the publications of The Lincoln Project on public research universities[110]—have all documented the wisdom and social benefits of a broad and expanding portfolio of teaching and research. A future characterized by real uncertainty and increasing vulnerability will require a richer fund of knowledge than the nation possesses today—if only as preparation for a seemingly infinite variety of potential scenarios. And this knowledge must be shared as broadly as possible. Every American must acquire the breadth of knowledge that is the basis of resilience and creativity in the face of accelerating change. In this regard, higher edu-

cation serves as both a safeguard and a source of new hope for present and future generations.

AREAS FOR FURTHER DISCUSSION AND RESEARCH

While the Commission has tried to be rigorous in its analysis, recommendations, and even its speculations by responding to and incorporating the best available data and by canvassing as many institutions as possible to collect best practices, it recognizes, with humility, that there is still much to learn. In particular, important questions either remain unanswered or have been answered only provisionally or incompletely. Research on educational practice and policy can be extremely challenging, since it often depends on the study of complex, variable, and multifaceted human interactions.[111] Nevertheless, Americans need to keep asking these questions in the hope that our research methods and our technologies will evolve to match our curiosity. Convinced that more knowledge about teaching and learning and about the structures and contexts that support this essential process is key to the pursuit of a better future, the Commission offers several priorities for further discussion and research.

A deeper understanding of the relationship of teaching to student learning is needed and the many factors that affect this dynamic. Such factors include the discipline being taught, student characteristics, faculty awareness and commitment to effective teaching strategies, the delivery methods and uses of educational technology, and institutional rewards and incentives. There is far more systematic work on these matters in K-12 than in higher education, and while some of the findings from earlier levels of education can transfer to undergraduate education, researchers should embark on an equally rigorous study of undergraduate teaching and learning in its own right. Institutions would do well to engage in further research exploring how successful teachers go about their work and how less successful teachers can learn to improve, including such practical matters as determining what strategies can help already busy faculty improve their effectiveness as teachers.

As more is understood about the teaching and learning dynamic, **the systematic measurement of what students have learned, how well they learned it, and whether some groups are learning more than others should continue to be pursued.** The Commission recommends the development of more reliable measures of student learning gains and the relationship between such gains and teaching practices, whether traditional or digital. In order to do so, further research is needed on ways to measure and report on student learning within particular subject matters and concentrations as well as across undergraduate institutions.

As a corollary, **more needs to be known about what students expect and how well they connect what they learn in college to their lives after college.** It seems reasonable to suppose that an incoming student who is more deliberate about course selection, more self-aware about personal strengths and weaknesses, and more focused on specific future goals might proceed more efficiently toward a degree. But undergraduate education as a whole has struggled to link coursework to specific skills and outcomes for students, in part because it lacks baseline knowledge about how students understand, interpret, and respond to their own educational choices.

As noted throughout this report, the significant support and attention being dedicated to research on teaching and learning in the STEM fields is generating a large body of knowledge as well as real changes in educational processes. We should continue to build upon this knowledge and practice base and **explore how all disciplines, from business to nursing, from the humanities to the social sciences, can develop their own discipline-based research agendas and transfer the knowledge gained into practice.** These findings will likely have strong implications, across and within institutions, for how good teaching is recognized and rewarded.

This report details various strategies for increasing completion rates and reducing inequities among student populations, including the implementation of guided pathways and transfer redesign. **The research base for evaluating the efficacy of completion initiatives, however, is relatively small and needs expansion.** For example, there is little understanding of why some underserved populations respond positively to completion initiatives while others continue to struggle, or which group-specific barriers are most resistant to change. Further evaluation of these examples will help administrators, faculty, and policy-makers to understand what works and what does not. Such evaluations should also take into account the extent to which effective college teaching affects completion.

This report has pulled from the most reliable data sources on costs and affordability to formulate recommendations aimed at making undergraduate education financially accessible to all. **Continued research is needed on ways to address student debt such that borrowers can meet their responsibilities with appropriate support from taxpayers, addressing the question of the appropriate division of the responsibility between students and taxpayers in general.** And further research and discussion must continue on how the structure of public finance of undergraduate education needs to change.

The report focuses primarily on American topics and policy. Future work in this area would benefit from **exploring the approaches used in other countries to improve their own postsecondary education systems**—how other countries and their institutions seek to improve learning, increase completion rates, and make college more affordable. Institutions in different countries have developed methods and educational practices quite different from those in the United States, and further research on and assessment of these methods would be beneficial. Countries around the world are also experimenting with innovations in educational technologies. Connecting and coordinating efforts globally would help with determining whether and how beneficial, scalable, and effective such innovations are. Moreover, U.S. colleges and universities train leaders from many countries and enable this country to attract talented people from throughout the world who contribute to the American economy and society. Further research into the changing international role of the American higher education system would also contribute to the understanding of the opportunities and challenges facing undergraduate education in this country.

Considerations on the Further Future 4

The fourth section of the report considers a distant future through four lenses: the country's level of social cohesion; the needs and characteristics of the workforce; the use of Big Data and the level of access to information and advanced educational technologies; and unforeseen natural or human-generated global challenges. The Commission focuses on these factors because they seem the most plausible and pertinent to its principal concerns of quality, completion, and affordability. Speculating on a range of possibilities, the Commission imagines what the nation's needs may be and how colleges and universities might respond:

1 In a future that may lean toward greater social division, colleges and universities should play a large and constructive role in promoting greater cohesiveness. As cultural crossroads and sites of reasoned debate, they could set new standards for civility and mutual understanding in a society sorely in need of new models. An increasingly fractured nation will require more common spaces and more opportunities for meaningful interaction, whether they exist physically or virtually.

2 Advanced robotics, artificial intelligence, and enhanced and virtual reality technologies are all evolving so rapidly that many of the tasks now performed by humans may increasingly come to be performed by machines, while a growing "gig economy" could mean a significantly greater share of the workforce hired on a task-by-task basis. Colleges and universities will need to meet the demand for more shorter-term, flexible options available to students over a lifetime that support a highly skilled, technical, and adaptable workforce. But institutions must also double down on teaching the skills that are most difficult for machines to replicate, such as solving unstructured problems, working flexibly with new information, and working effectively in groups.

3 The amount of data collected by technology giants like Google, Facebook, and Amazon on their users is seemingly boundless, while the growth in smartphones and tablets along with the digitization of libraries is making information available across the world at the touch of a screen. Colleges and universities will need to define their own parameters for the collection and use of student data, balancing privacy concerns with the potential of Big Data to help refine and personalize teaching and advising. Colleges and universities may even take the lead in the public debate about the proper use of personal data more generally. The continued expansion of online lectures, digitized textbooks, and wikis of all kinds would not only continue to make information more widely available but could also speed the evolution of teaching.

4 The era of the iPhone and the rise of social media have been accompanied by global terrorism, the Great Recession, and an acceleration in the degradation of the natural environment. Colleges and universities are well positioned to help society respond thoughtfully and effectively by examining new ideas, teaching new skills, and producing new research. Their importance will only be amplified in a future characterized by transformative discovery or world-changing cataclysm, and they would serve the world more effectively by maintaining a certain level of financial, curricular, and intellectual flexibility in order to meet unforeseen challenges.

Whatever combination of these scenarios should come about—or whatever else comes about that we have not anticipated—the fundamentals of strong undergraduate education this report has identified will continue to be important:

- High-quality teaching and learning that addresses both students' practical career needs in conjunction with their more lasting capacities for critical thinking, problem-solving, communication, and civic participation.
- An educational system that does as much as possible to put students in a position not only to access higher education, but also to succeed in the programs they undertake.
- Ensuring that educational opportunities are widely available to all who can benefit.

CONCLUSION

Some members of this Commission have a deep knowledge of one or another piece of the higher education landscape—perhaps public or private research universities, or community colleges, or institutions with large online or competency-based delivery systems. Others brought perspectives on undergraduate education from other walks of life—business, technology, journalism, and public affairs. But none of us, even the few who study higher education for a living, had the full picture of this complex and ever-changing mosaic. And we still don't. This is a system that will not sit still with its millions of diverse students, thousands of institutions, and continual adoption of technological and organizational innovations as society's needs for education evolve in a changing global economic and political context. Our collective learning and analysis have left us with a sober sense of the great challenges ahead for undergraduate education—intellectual, financial, and ethical—and much of this report aims at clarifying their nature and scope and proposing effective responses to them. Most of all though, as we complete this stage of our work, we come away hopeful.

There is a long-standing debate about whether undergraduate education is a private good, serving the needs of individuals, or a public good, meeting larger civic and community needs. The answer, we are convinced, is that undergraduate education is both a public and a private good. Those who invest in an education are consistently rewarded with higher earnings and more stable employment—important private benefits. The earnings advantage for college graduates, on the average, has in recent decades been higher than ever before. Expanding the numbers of degree and certificate holders helps individuals and also honors America's self-understanding as a nation of economic opportunity and strengthens our democracy. Our primary goal in writing this report, therefore, has been to help guide the next stage in the evolution of American undergraduate education, in which all students can afford, complete, and enjoy the benefits of the education they seek when they enroll, an education that truly prepares them for life in the 21st century. Beyond the benefits to individuals, though, we also know that more educated communities are more prosperous and have a richer civic life—real public benefits of undergraduate education.

Our primary goal in writing this report, therefore, has been to help guide the next stage in the evolution of American undergraduate education, in which all students can afford, complete, and enjoy the benefits of the education they seek when they enroll, an education that truly prepares them for life in the 21st century.

As we have explored these benefits more deeply, we have come to identify a more pro-

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found role that undergraduate education can and indeed must play for the sake of our nation's future. We are a nation polarized—by race, by class, by political and religious convictions, and in other ways. We must, even as we acknowledge and respect difference, find opportunities to knit people and communities together on terms of equality and mutual respect. This is not a problem undergraduate education can "solve," but colleges and universities are among the few American institutions in which significant numbers of people from different backgrounds and communities come together for a shared purpose. At this juncture, our divisions sometimes produce painful and risky confrontations, but they also, less visibly, create opportunities to build relationships and further mutual understanding. This is, in our view, a core component of education and a crucial need for our civic and political future.

We face huge challenges. Yet the reasons for optimism are real. Our remarkably large set of colleges and universities has a greater reach across our population than ever before. For all the challenges and tensions evident on many of today's campuses, we must remember that the long-run trend on campuses has been toward more diversity and inclusion. We harbor no doubts about the value and benefits of a quality college education—it delivers on its promises of greater individual and social prosperity. We are hopeful because more and more colleges are learning how to help students succeed in moving to complete their programs and are developing effective practices that other colleges can emulate. And we are hopeful because there are real financial changes and technological opportunities that, if enacted smartly, can further facilitate student success. Progress is not guaranteed, and good things will happen only with sustained effort, but if we can sustain focus on the work, combining patience with urgency, we can, through undergraduate education, make great advances as individuals and as a nation.

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63. See, for example, Bowen, Chingos, and McPherson, *Crossing the Finish Line*; John Bound, Michael F. Lovenheim, and Sarah Turner, "Increasing Time to Baccalaureate Degree in the United States," *Education Finance and Policy* 7 (4) (Fall 2012): 375–424, doi: 10.1162/EDFP_a_00074; and D. Shapiro, A. Dundar, P. K. Wakhungu, X. Yuan, A. Nathan, and Y. Hwang, *Time to Degree: A National View of the Time Enrolled and Elapsed for Associate and Bachelor's Degree Earners* (Herndon, Va.: National Student Clearinghouse Research Center, September 2016), https://nscresearchcenter.org/wp-content/uploads/SignatureReport11.pdf.

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65. Bailey, Jaggars, and Jenkins, *What We Know about Guided Pathways*, 45.

66. NSSE tracks the benchmark "enriching educational experiences." CCSSE tracks "support for learners."

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68. Wisconsin Hope Lab, http://wihopelab.com/publications/investing-in-student-completion-wi-hope_lab.pdf.

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71. D. Shapiro, A. Dundar, P. K. Wakhungu, X. Yuan, and A. Harrell, *Transfer and Mobility: A National View of Student Movement in Postsecondary Institutions, Fall 2008 Cohort* (Herndon, Va.: National Student Clearinghouse Research Center, July 2015), https://nscresearchcenter.org/wp-content/uploads/SignatureReport9.pdf.

72. Davis Jenkins and John Fink, *Tracking Transfer: New Measures of Institutional and State Effectiveness in Helping Community College Students Attain Bachelor's Degrees* (New York: Community College Research Center, January 2016), https://ccrc.tc.columbia.edu/media/k2/attachments/tracking-transfer-institutional-state-effectiveness.pdf.

73. See, for example, *The Transfer Playbook: Essential Practices For Two- and Four-Year Colleges* (New York: Community College Research Center, 2016), http://ccrc.tc.columbia.edu/media/k2/attachments/transfer-playbook-essential-practices.pdf; and National Conference of State Legislatures, http://www.ncsl.org/documents/educ/student-transfer.pdf.

74. Sophie Quinton., "Why Central Florida Kids Choose Community College," *The Atlantic*, February 10, 2014.

75. Massachusetts Department of Higher Education, http://www.mass.edu/strategic/comp_transferpathways.asp.

76. Western Interstate Commission for Higher Education, http://www.wiche.edu/passport/about/overview.

77. See *A Primer on the College Student Journey* for a full discussion of college enrollment rates.

78. See, for example, Mandy Savitz-Romer and Suzanne Bouffard, *Ready, Willing, and Able: A Developmental Approach to College Access and Success* (Cambridge, Mass.: Harvard Education Press, 2012); Daniel Klasik, "The College Application Gauntlet: A Systematic Analysis of the Steps to Four-Year College Enrollment," *Research in Higher Education* 53 (5) (August 2012): 506–549, doi: 10.1007/s11162-011-9242-3; Andrea Venezia and Laura Jaeger, "Transitions from High School to College," *Future Child* 23 (1) (Spring 2013): 117–136; Scott Carrell and Bruce Sacerdote, "Why Do College-Going Interventions Work?" *American Economic Journal: Applied Economics* 9 (3) (2017): 124–151, doi: 10.3386/w19031; and Lindsay C. Page and Judith Scott-Clayton, "Improving College Access in the United States: Barriers and Policy Responses," *Economics of Education Review* 51 (2016): 4–22, doi: 10.3386/w21781.

79. *A Primer on the College Student Journey*.

80. See Judith Scott-Clayton, *Undergraduate Financial Aid in the United States* (Cambridge, Mass.: American Academy of Arts and Sciences, 2017) for a full discussion on undergraduate student financial aid.

81. Support for veterans is the second-largest federal grant program, distributing almost $12 billion in educational assistance in 2016–2017.

82. The IRS Data Retrieval Tool was first made available for the 2009–2010 school year and later shut down in March 2017 by the IRS due to concerns about misuse of information by identity thieves. It returned on October 1, 2017, and is available to use with the 2018–2019 FAFSA form.

83. See Eric P. Bettinger, Bridget Terry Long, and Philip Oreopoulos, *The FAFSA Project: Results from the H&R Block FAFSA Experiment and Next Steps* (Cambridge, Mass.: Harvard Graduate School of Education, 2013); and Page and Scott-Clayton, "Improving College Access."

84. College Board, *Trends in Student Aid 2014*, 23, Figure 14A, https://secure-media.collegeboard.org/digitalServices/misc/trends/2014-trends-student-aid-report-final.pdf.

85. Ibid., Figure 15A.

86. Only 9 percent of student borrowers who graduated from college in 2012 went into default on their loan repayments, compared with 24 percent of the student borrowers who did not graduate. Further, students who graduated from private nonprofit four-year institutions had the lowest default rates (5 percent), while students who borrowed but did not graduate from community colleges and for-profit institutions had the highest default rates (29 percent and 28 percent, respectively). While default rates are similar in the for-profit and two-year public sectors, the vast majority of for-profit students borrow, while nearly two-thirds of community college graduates do not take out student loans. See *A Primer on the College Student Journey*, Figure R.

87. Tiffany Chou, Adam Looney, and Tara Watson, *A Risk-Sharing Proposal for Students,* Policy Proposal 2017–04 (April 2017), The Hamilton Project, http://www.hamiltonproject.org/assets/files/risk_sharing_proposal_student_loans_pp.pdf.

88. State Higher Education Executive Officers, http://www.sheeo.org/sites/default/files/project-files/SHEEO_SHEF_2016_Report.pdf.

89. In FY 2016, elementary and secondary education was the largest category, representing 35.1 percent of general fund expenditures, with Medicaid second at 20.3 percent, and higher education at 9.7 percent.

90. As per student state funding has declined, federal aid has increased, more than doubling from $53 billion in 2000 to $122.7 billion in 2014. Debate continues about the interplay between these trends, with some arguing that increased federal financial aid lets states off the hook, making it too easy for institutions to raise tuition. There is no doubt that the strain on state budgets, especially during the recent recession, pressed the federal government to contribute more. The federal government can and should run deficits in recession to stimulate the economy, while most state constitutions prohibit state borrowing for operating expenses. Are states more ready to make cuts to undergraduate education because they know there is a good chance of federal help? Most likely. Is the federal government more likely to spend money when state cuts are causing public institutions to turn away students because they cannot afford to educate them, as happened in some places during the recession? The Commission hopes so. But these dynamics are the result of discretionary judgments by political actors, not mechanical formulas put in place to make this happen.

91. Raj Chetty et al., *Mobility Report Cards: The Role of Colleges in Intergenerational Mobility*, July 2017, http://www.equality-of-opportunity.org/papers/coll_mrc_paper.pdf.

92. David Deming and Christopher Walters, "The Impacts of Price and Spending Subsidies on U.S. Postsecondary Attainment," NBER Working Paper, January 2017, show that increasing available funds at public colleges is associated with better student performance—in fact, investing in the institution is more effective than investing in student aid.

93. The Lincoln Project, https://www.amacad.org/content.aspx?d=22174.

94. The Lincoln Project, *Public Research Universities: Serving the Public Good* (Cambridge, MA: American Academy of Arts and Sciences, 2016), 15, note 4.

95. National Association of State Student Grant and Aid Programs, "46th Annual Survey Report on State-Sponsored Student Financial Aid," 2014–2015 Academic Year, http://www.nassgap.org/survey/NASSGAP_Report_14-15_final.pdf.

96. A relatively small number of institutions have substantial endowments, reflecting accumulated savings from past gifts that support the educational operation. In 2015, five private institutions, out of more than 500 reporting data on endowments, held 25 percent of all the endowment funds in that sector. The same is true of the top six public institutions. The endowment of the median private institution, out of more than a thousand places reporting endowments, is not large enough to contribute as much as $1,000 to the cost of educating their average student. Among more than 500 public institutions reporting, the median endowment can contribute less than $250 per student. See National Center for Education Statistics, IPEDS (Integrated Postsecondary Education Data System) (U.S. Department of Education, Institute of Education Sciences), https://nces.ed.gov/ipeds/.

97. See William F. Massy, *Reengineering the University: How to be Mission Centered, Market Smart, and Margin Conscious* (Baltimore: Johns Hopkins University Press, 2016).

98. See Carl Wieman, *Improving How Universities Teach Science: Lessons from the Science Education Initiative* (Cambridge, Mass.: Harvard University Press, 2017); Pallas, Neumann, and Campbell, *Policies and Practices to Support Undergraduate Teaching Improvement*; and Kurzweil and Martin, *The Complex Universe of Alternative Postsecondary Credentials and Pathways*.

99. Bowen and Tobin, *Locus of Authority*; and Bowen and McPherson, *Lesson Plan*.

100. Levin and Garcia, *Benefit Cost Analysis*.

101. See *A Primer on the College Student Journey*, 26, note 42.

102. Task Force on Federal Regulation of Higher Education, *Recalibrating Regulation of Colleges and Universities* (2015), http://www.acenet.edu/news-room/Documents/Higher-Education-Regulations-Task-Force-Report.pdf.

103. Commission on Language Learning, *America's Languages: Investing in Language Education for the 21st Century* (Cambridge, Mass.: American Academy of Arts and Sciences, 2017), 11–12.

104. Bureau of Labor Statistics, https://www.bls.gov/careeroutlook/2016/article/what-is-the-gig-economy.htm.

105. Jamie Merisotis, *America Needs Talent: Attracting, Educating, and Deploying the 21st Century Workforce* (New York: Rosetta Books, 2016), 79–80.

106. Most colleges and universities will likely increasingly introduce variations of e-badging and microdegrees, and much of this activity will take place at the postgraduate level, which is beyond the focus of this report. However, the federal government is already experimenting with aid programs that support micro-master's programs. Eventually, the entire structure of student financial aid may have to be restructured to ensure that microdegrees will be available to students of every economic background.

107. DARPA, https://www.darpa.mil/program/engage; and J. D. Fletcher and John E. Morrison, *DARPA Digital Tutor: Assessment Data* (Alexandria, Va.: Institute for Defense Analysis, 2012), http://www.acuitus.com/web/pdf/D4686-DF.pdf.

108. "Machine Learning," *The Economist* 424 (9050) (July 22–28, 2017): 16.

109. Ibid.

110. See *The Heart of the Matter*, https://www.humanitiescommission.org/_pdf/hss_report.pdf; *ARISE*, https://www.amacad.org/multimedia/pdfs/publications/books/ariseReport.pdf; *Restoring the Foundation*, https://www.amacad.org/multimedia/pdfs/publications/researchpapersmonographs/AmericanAcad_RestoringtheFoundation.pdf; and The Lincoln Project, https://www.amacad.org/content.aspx?d=22174.

111. For a fuller discussion, see Paul E. Lingenfelter, *"Proof," Policy, and Practice: Understanding the Role in Evidence in Improving Education* (Sterling, Va.: Stylus Publishing, 2016); and National Research Council, *Improving Measurement of Productivity in Higher Education*.

APPENDIX A

Commission Members, Staff, and Funder

COMMISSION ON THE FUTURE OF UNDERGRADUATE EDUCATION

Commission Chairs

Roger W. Ferguson, Jr., President and CEO, TIAA
Michael S. McPherson, President Emeritus, Spencer Foundation

Commission Members

Joseph E. Aoun, President, Northeastern University
Deborah Loewenberg Ball, William H. Payne Collegiate Professor, University of Michigan
Sandy Baum, Senior Fellow, Urban Institute
Rebecca M. Blank, Chancellor, University of Wisconsin-Madison
John Seely Brown, former Director, Xerox PARC Research
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Carl A. Cohn, Executive Director, California Collaborative for Educational Excellence
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Jonathan F. Fanton, President, American Academy of Arts and Sciences
Robert Hormats, Vice Chairman, Kissinger Associates; former Under Secretary of State for Economic Growth, Energy, and the Environment
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J. Michael Locke, former CEO, Rasmussen Inc.
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Diana Natalicio, President, University of Texas at El Paso
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Funder

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APPENDIX B

Groups and Individuals Consulted

STUDENT AND FACULTY DISCUSSION GROUPS

The Commission met with nearly 200 students and faculty members to gather perspectives and discuss concerns about the future of American undergraduate education.

September 15, 2016
Northeastern University
Boston, MA

September 20, 2016
LaGuardia Community College
New York, NY

February 6, 2017
University of Texas, El Paso
El Paso, TX

April 11, 2017
Babson College
Wellesley, MA

April 18, 2017
Eastern Connecticut State University
Willimantic, CT

April 24, 2017
University of Wisconsin-Madison
Madison, WI

April 25, 2017
Rasmussen College
Chicago, IL

MEETINGS WITH ACADEMY MEMBERS AND AFFILIATES

The Commission met with more than 50 Academy members and experts to discuss the work of the Commission.

May 19, 2015
New York, NY

May 20, 2015
Cambridge, MA

June 4, 2015
Chicago, IL

June 16, 2015
Washington, DC

July 1, 2015
Stanford, CA

November 13, 2016
Los Angeles, CA

December 12, 2016
New York, NY

February 7, 2017
Austin, TX

April 19, 2017
Cambridge, MA

CONGRESSIONAL VISITS

The Commission met with 21 members of Congress and their key legislative advisors. Of the individuals consulted, 47 percent were Republicans, 53 percent were Democrats, 38 percent were from the Senate, and 62 percent were from the House of Representatives.

September 13–14, 2016
October 3–4, 2016
March 30–31, 2017

HIGHER EDUCATION ORGANIZATIONS AND FOUNDATIONS

The Commission met with 25 leaders and staff from national higher education groups and foundations, including:

American Association of Community Colleges
American Association of State Colleges and Universities
American Council on Education
Association of American Universities
Association of Public and Land-grant Universities
The Bill & Melinda Gates Foundation
Center for American Progress
Knight Foundation
Lumina Foundation
National Association of Independent Colleges and Universities
National Center for Higher Education Management Systems
New America
The Public Policy Institute of California
State Higher Education Executive Officers Association
Western Interstate Commission for Higher Education

ROUNDTABLE DISCUSSIONS

March 21, 2017
Boulder, CO

Commission members met with educational technology experts, including **David Figlio** (Northwestern University), **Charles Isbell** (Georgia Institute of Technology), **Stephen Kosslyn** (Minerva Schools at KGI), and **Peter Smith** (University of Maryland University College), about the role of technology and online programs in undergraduate education.

March 29, 2017
Washington, DC

Commission members met with experts on higher education–workforce partnerships, including **Wes Bush** (Northrop Grumman), **Brian Fitzgerald** (The Business-Higher Education Forum), **Dane Linn** (Business Roundtable), and **Stan Litow** (IBM), about ways for the business community to support underserved students and specific examples of programs that could be scaled or replicated.

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