



2020

VISION

The Arizona University System
Long-term Strategic Plan
2008-2020

Arizona Board of Regents

www.azregents.edu/2020.pdf



ARIZONA'S UNIVERSITIES

“A top-performing state university system, nationally recognized for excellence in academic and research pursuits that support and stimulate a growing vibrant economy and a high quality of life for Arizonans.”

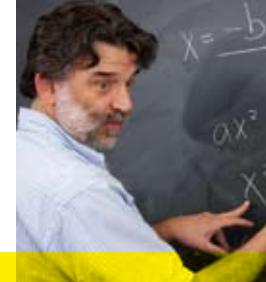
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INTRODUCTION TO THE
**STRATEGIC
PLAN**



INTRODUCTION TO THE PLAN

THE MISSION

- To increase the educational attainment of Arizona citizens by producing enough high-quality university degrees for the state to be nationally competitive by the year 2020.
- To increase the prominence of the system's research enterprise so that it can contribute to the knowledge economy and improve the quality of life in Arizona.
- To provide the educated workforce needed to fill shortages and to stimulate demand for higher paying jobs in Arizona.

The Arizona Board of Regents presents in this 2020 Vision a framework for the Arizona University System to improve the economic strength of our state and quality of life for Arizonans over the next 12 years. This plan lays out a series of touchstones for this ambition organized around four key themes: Educational Excellence, Research Excellence, Community Engagement and Workforce Impact, and Productivity.

This plan builds on a foundation manifested in previous strategic planning efforts of the universities and the Board, including the establishment of a medical college in Phoenix, development of new health professions programs not offered by public institutions in the state, growth in the research enterprise, and increasingly intensive efforts to provide baccalaureate access to all regions of the state.

WHY THE PLAN IS SO IMPORTANT

Educated Arizonans will enjoy greater economic prosperity

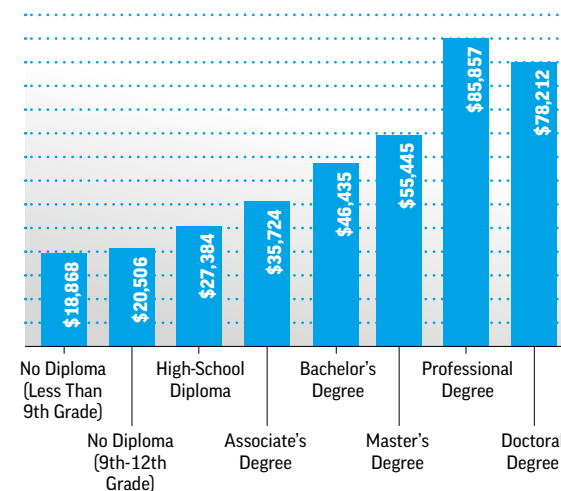
All Arizonans, not just those with a degree, will benefit as more become educated

Arizona will reap both economic and social rewards from university research

Moving Arizona's economy forward will demand higher paying, more economically diverse jobs that require a more highly educated workforce

Connecting the work and service of the universities to the communities will improve the quality of life in Arizona

MEDIAN EARNINGS BY EDUCATION: 2006



Source: U.S. Census Bureau, Current Population Survey, Educational Attainment in the U.S. : 2005



MORE EDUCATION HIGHER LIFETIME EARNINGS

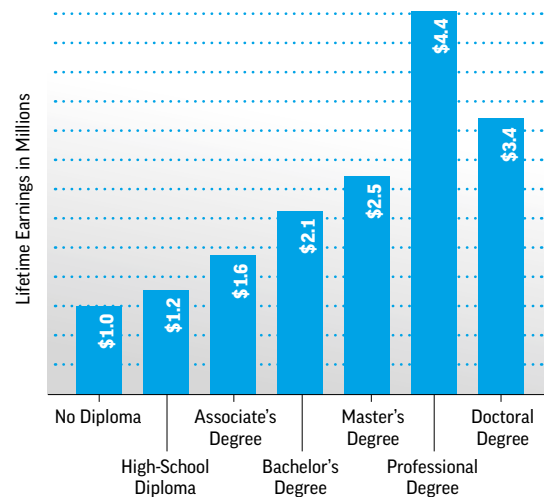
The more education a person attains, the higher that person's lifetime earnings. The financial impact over a person's working life is significant. Someone with a bachelor's degree can expect to earn, on average, over \$1 million more than someone with only a high school education.¹

Furthermore, this differential between the lifetime earnings of college graduates and high school graduates has increased over time. For example, full-time male workers between the ages of 35 and 44 experienced an increase in this differential from 38% between 1980-84 to 94% between 2000-2003.²

Additionally, people without a degree also benefit as others become more educated. A recent study found that a 1 percentage point increase in the proportion of a state's population with a bachelor's degree raises wages in all educational attainment groups, even those without a college degree. This benefit ranged from about 1.2% for workers with some college to almost 2% for those with less than a high school diploma.^{3 2}

2020 Vision calls for Arizona to add between 670,000 and 700,000 new bachelor's degree educated workers over the period between 2006 and 2020 which would increase the proportion of our adult population with a bachelor's degree between 3.7 and 4.1 percentage points.

LIFETIME EARNINGS BY EDUCATION

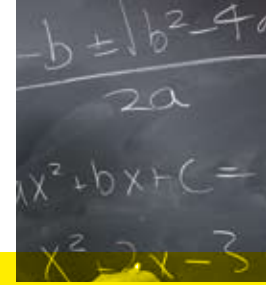


¹ Census 2000

² Dennis Hoffman, March 2008, Quantitative examples of the financial and economic benefits of higher education

³ Enrico Moretti, Journal of Econometrics, "Estimated Social Return to Higher Education: Evidence from Longitudinal and Repeated Cross-Sectional Data," 2004





RESEARCH ACTIVITY

MORE RESEARCH ACTIVITY – HIGHER ECONOMIC RETURNS AND QUALITY OF LIFE

This plan focuses on increasing the number of college-educated citizens so we can reap the benefits just discussed; however, the universities also contribute a great benefit to Arizona through their research. University research expenditures flow down to private-sector activities, having significant effect on both the level of industrial research and development and the transfer of technology to the public. This in turn creates innovations and higher paying jobs in the same fields; the average real wage in urban areas with research universities is nearly \$3,300 higher than the average wage in all urban areas, and the per capita income differential is about \$2,800.

While most studies of the impact of research revolve around spending or money circulating in the economy—the creation of jobs, wages and sales—knowledge creation itself is important.¹ Significant knowledge is created by university research and can be measured by inventions, patents, and start-up companies, all of which fuel the private sector and translate into jobs—high paying, highly skilled jobs.

The full impact of research is hard to measure, but several studies suggest two impacts that contribute to the multiplier effect of research spending:

- Direct impact of university expenditure of research funds; and
- Indirect impact on private sector companies that license university technology and start-up and spinoff companies, including general corporate research and development operations.

These studies suggest that the university research multiplier could be as high as 7 or 8. Therefore, a \$100 million research grant could have a total impact in Arizona of about \$750 million.²

- More college-educated people produce benefits, but to achieve optimal impact it must be coupled with economic development strategies stimulating more higher quality jobs
- Financial benefits of research are important, but benefits to the quality of life include the infusion of well-trained graduates into the economy and services for our communities

¹ Council for Community and Economic Research Cost of Living Index

² Hoffman, 2008





PROFILE OF ARIZONA IN 2020

What will Arizona look like in 2020 if the plan is successful? The following chart illustrates specific outcomes of the plan ranging from the educational attainment rates to degree production and performance targets necessary to meet these objectives.

The outcomes and assumptions are displayed in a range. There are three standards referred to as Bronze, Silver, and Gold. Achieving any of the standards will result in increases in performance, but the magnitude of change is differentiated within a range. The differentiation reflects the extent to which success will depend on the performance of other sectors, not just the university sector.

Profile of Arizona Now and Arizona in 2020			
Arizona Now	Arizona in 2020		
	Bronze Target	Silver Target	Gold Target
25% Of Adults Have Bachelor's Degree 1 Million Adults	26%	29%	30%
19,100 Bachelor's Degrees Produced Annually In Arizona University System	20,200	28,200	36,000
78% Freshman Retention Rate	80%	84%	86%
56% 6-Yr Graduation Rate	57%	59%	65%
45% College Going Rate (from K-12)	50%	52%	53%
8,400 Community College Transfers	8,900	16,000	24,000
5,700 Community College Transfers Who Go On To Earn A Bachelor's Degree	5,800	10,500	15,700
99,700 Undergraduate Enrollment	105,400	128,300	155,800
\$783 Million Total Research Expenditures	\$822 Million	\$1.7 Billion	\$1.8 Billion

Achieving either the Silver or Gold standard will depend heavily on how well the K-12, Community College, and University sectors are able to attract more students through the pipeline and for more of them to be prepared to succeed.

In some ways, this plan extends beyond the ambition of our own university system, since a large part of the plan revolves around increasing the educational attainment rate of the entire state. Achieving either the Silver or Gold standard will depend heavily on how well the K-12, Community College, and University sectors are able to attract more students through the pipeline and for more of them to be prepared to succeed. In other words, the university system alone lacks the ability to reach either the Silver or Gold standard. These levels of increase in the system can be achieved only if significant change occurs throughout the entire educational pipeline. Universities also have a role in making sure the pipeline is strengthened and continue to share in this responsibility through collaborative programs and partnerships with both sectors.





PROFILE OF ARIZONA IN 2020

Currently, just over 25% of our adult population, or just over 1 million Arizonans, have at least a bachelor's degree. This plan outlines a range of ambitious targets for improving this statistic so Arizona can enjoy all the rewards associated with an educated population.

THE CURRENT ECONOMIC CRISIS WILL IMPACT THIS PLAN

The current economic crisis has punished Arizona more deeply than any other state in the nation. Achieving the goals and objectives of this plan will depend on the ability of the system to minimize the impact of drastic reductions in state appropriations, not only to the higher education sector, but also to our K-12 and community college pipeline. In the worst-case scenario, achieving the gold targets could be put out of reach and the Silver targets very challenging.

The framework and the priorities of the long-term plan will drive strategies for managing the impact over the short term while the economy is recovering. In addition, the longer-term horizon of the plan allows for thoughtful planning in spite of short-term economic setbacks.



The image features abstract light trails in the top-left and bottom-left corners. These trails are composed of multiple overlapping, curved lines in various colors including red, orange, yellow, green, and blue, creating a sense of motion and energy. The trails are set against a dark background, making the bright colors stand out.

GOALS AND METRICS OF **THE PLAN**



01

GOAL ONE

EDUCATIONAL EXCELLENCE

“To be nationally competitive in the percentage of Arizona’s citizens with a high-quality bachelor’s degree by providing affordable access through a well-coordinated and aligned system.”

01

GOAL ONE BACKGROUND

In 2006, Arizona was the fastest-growing state in the nation and is regularly among the top growth states. As can be seen in the figure below, tremendous growth (shown in white) is predicted between 2000 and 2020, with even more dramatic growth between 2020 and 2040.

KEY INDICATORS OF PROGRESS

- Number of bachelor's degrees awarded
- Number of Master's degrees awarded
- Number of Arizona community college students who transfer to a university
- Number of Arizona community college transfer students awarded bachelor's degrees
- Educational quality as reported in National Survey of Student Engagement (NSSE)
- Cost of attendance as a percentage of Arizona median family income

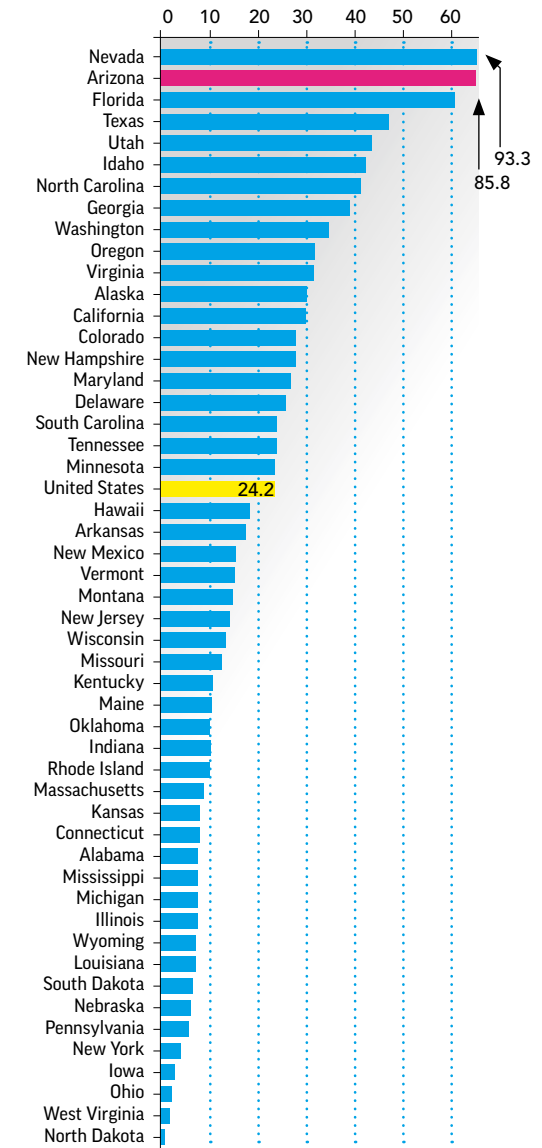
Only Nevada is expected to grow faster than Arizona between now and 2025. The national average expected growth rate is about 24%, with Arizona at just under 86%.

POPULATION GROWTH



Source: ASU Decision Theater

Projected Percent Change in Total Population, 2000 - 2025

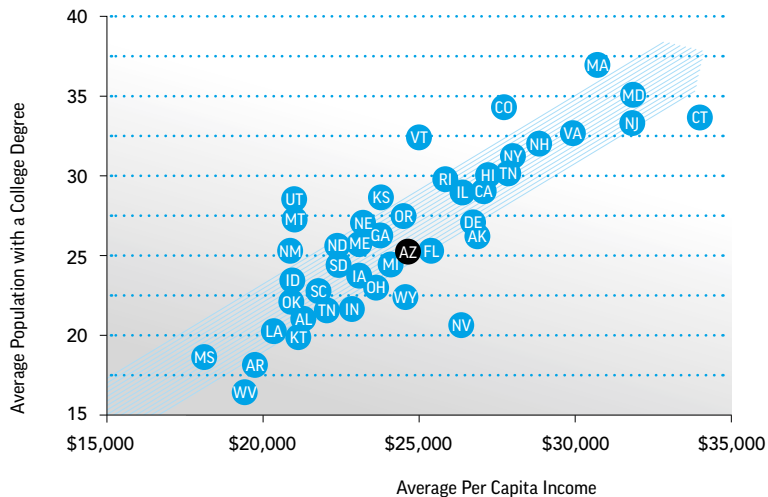


Source: U.S. Census Bureau



Currently, just over 1 million Arizonans—barely 25% of our population, have at least a bachelor's degree. This plan outlines a range of ambitious targets for improving this statistic so that Arizona can enjoy all the rewards associated with an educated population.

COLLEGE DEGREES VS. PER CAPITA INCOME



Numerous studies and data bear out a strong correlation between educational level and personal income, productivity, civic participation, life expectancy, employment status and community strength. The quickest way to increase the per capita income is to increase the percentage of Arizonans with a bachelor's degree, which is at the heart of this plan.

BENEFITS OF HIGHER EDUCATION

Public economic benefits	Increased tax revenues, greater productivity, increased consumption, increased workforce flexibility, decreased reliance on government financial support
Individual economic benefits	Higher salaries and benefits, higher employment levels, higher savings levels, improved working conditions, personal/professional mobility
Public social benefits	Reduced crime rates, increased charitable giving and community service, increased quality of civic life, social cohesion, appreciation of diversity, improved ability to adapt and use technology
Individual social benefits	Improved health and life expectancy, improved quality of life for children, better consumer decision making, increased personal status, more hobbies and leisure activities

AN EDUCATED POPULATION

“States with more college graduates have stronger economies... lower unemployment and poverty rates, higher ranking on measures of economic strength.”

- THE INFORMATION TECHNOLOGY AND INNOVATION FOUNDATION



ACHIEVING THE GOLD STANDARD

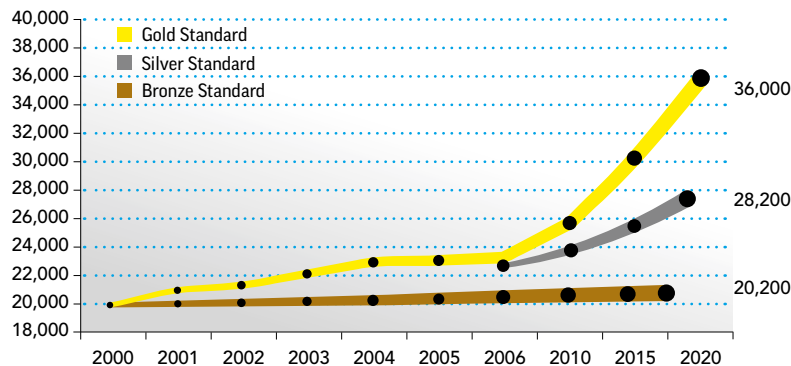
The 2020 Vision calls for Arizona to be nationally competitive in educational attainment by 2020.

The plan defines this ambition within the following range:

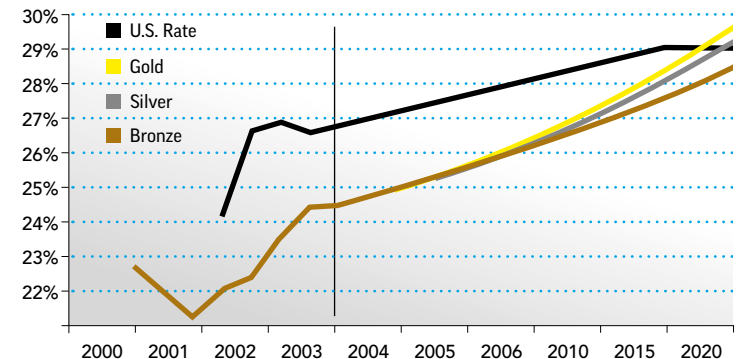
- **Bronze Standard** – the increase in educational attainment based mainly on changes in population, assuming some increases in performance rates, such as graduation and retention rates. It will be more difficult to maintain current performance levels as demographic changes require greater resources to serve a larger concentration of students who historically have lower college preparation and college-going rates.
- **Silver Standard** – the increase in educational attainment assuming modest improvements in performance from other educational sectors in the pipeline and ambitious improvements in performance from the Arizona University System necessary to achieve the national average by 2020.
- **Gold Standard** – the increase in educational attainment assuming very significant improvements in all sectors of the educational pipeline, including early education, K-12, community colleges, private colleges and universities, and our three public universities. This target represents what will be required of all sectors in order to achieve Governor Napolitano's call in her January 2008 State of the State address to double the number of bachelor's degrees produced in the Arizona University System.

Achieving the Gold Standard – doubling the number of bachelor's degrees produced – would take Arizona above the national average in educational attainment by 2020.

BACHELOR DEGREE TARGETS



MOVING ARIZONA TO NATIONAL AVERAGE





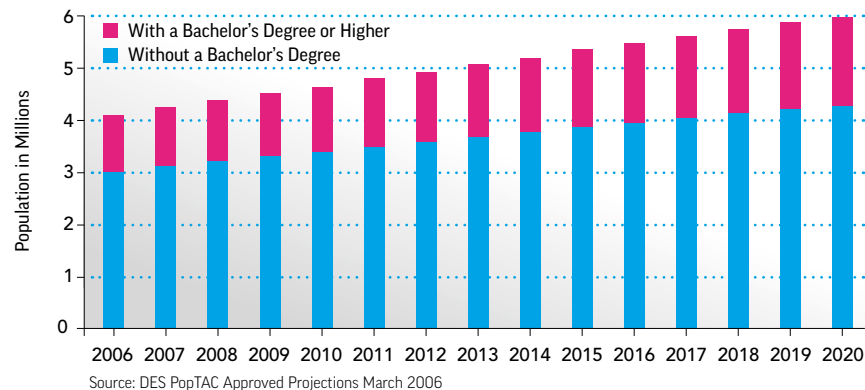
WHAT WILL IT TAKE FOR ARIZONA TO ACHIEVE OR EXCEED EDUCATIONAL PARITY WITH THE REST OF THE NATION?

- Decision Theater models quantify the challenge through a dynamic decision support tool
- Assumptions concerning population projections crucial to the modeling was based on the most sophisticated projections available from the U.S. Census Bureau¹
- Final analyses show that as much as 28.7% of the adult population in the U.S. will have a bachelor's degree by 2020—a full 3.7% higher than Arizona's current 25%
- Arizona must add more than 670,000 bachelor's degree holders to reach national parity

SO WHAT WILL THIS MEAN FOR ARIZONA?

- Gold standard moves Arizona above the expected national average to 30% of adults with a bachelor's degree
- Silver standard would achieve national parity in adults with a bachelor's degree at 28.5%
- 2020 university graduates are already in the 5th grade – thus success will require immediate and concerted efforts from all sectors
- Rapid improvements and immediate investments to increase performance in K-12 and connections between community colleges and universities will be critical to achieving these goals

MOVING ARIZONA EDUCATIONAL ATTAINMENT TO NATIONAL AVERAGE POPULATION 25 YEARS AND OLDER



¹Day, Jennifer Cheesman and Bauman, Kurt J. Have we reached the top? Educational Attainment Projections of the U.S. Population Working Paper Series No. 43, Population Division, U.S. Census Bureau: Washington D.C. May 2000

ACHIEVING THE GOLD STANDARD

01

Demographers predict that in 2020, about 1 of 3 Americans will have a bachelor's degree. In 2000, fewer than 1 in 4 Arizonans had a bachelor's degree.

If past trends continue, Arizona will fall short of the national average by about 220,000 college graduates.



01

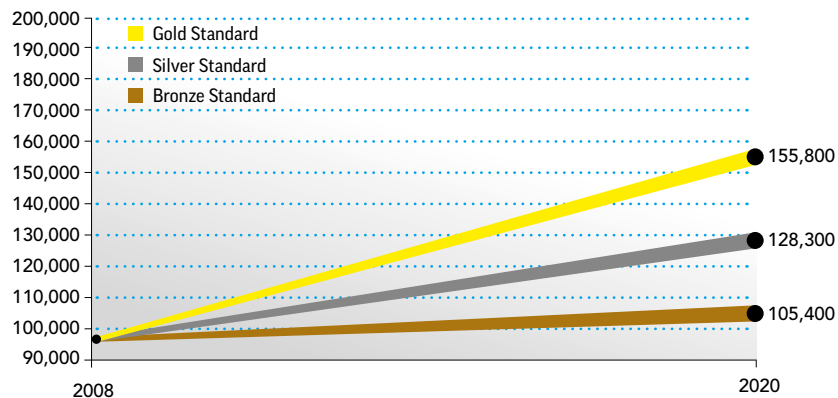
INCREASED CAPACITY

While degree production is the standard measure of the goals, achieving the degrees requires a substantial increase in enrollment capacity in the system. The chart below illustrates the level of capacity change that must be addressed by 2020 in order to achieve the degree targets. In 2008 the undergraduate enrollment in the Arizona University System was just under 100,000 students (about 130,000 in total enrollment). The Gold standard would require almost a 60% increase to just over 156,000. The Silver standard would require a 47% increase to about 128,000 undergraduates.

- Achieving the Gold standard would add about the same number of students in 12 years than currently attend Arizona State University (one of the largest universities in the nation)
- Achieving the Silver standard would add more students in 12 years than currently attend Northern Arizona University

Achieving these goals will require dramatic new investments to support larger numbers of students as well as changes in system design that may include the creation of new educational platforms and campuses, the expansion of on-line and distance education programs, more 2+2 programs, and other collaborative partnerships. In addition, the system would have to deliver academic programs by every means possible, to every corner of the state, and to students of all ages – this without reducing the value of an Arizona university diploma.

UNDERGRADUATE ENROLLMENT TARGETS





ALIGNMENT OF THE EDUCATIONAL PIPELINE

01

EDUCATIONAL EXCELLENCE

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Microbi

Achieving the 2020 Vision is attainable only to the extent we are successful in motivating more of our K-12 students to plan for, prepare for, and succeed in earning a bachelor's degree.



Arizona ranks low in the percentage of students in our K-12 system that proceed on to a bachelor's degree. The U.S. average is just over 38% compared to about 30% in Arizona.

If Arizona is to achieve the aggressive degree production outlined in the 2020 Vision, more work will be needed to shore up this pipeline and encourage more of our K-12 students to plan, prepare, and succeed in obtaining a bachelor's degree. The chart below illustrates the pipeline issues by showing how many students out of every 100 students in the 9th grade make it through the system and how Arizona compares to the United States and to best-performing states.

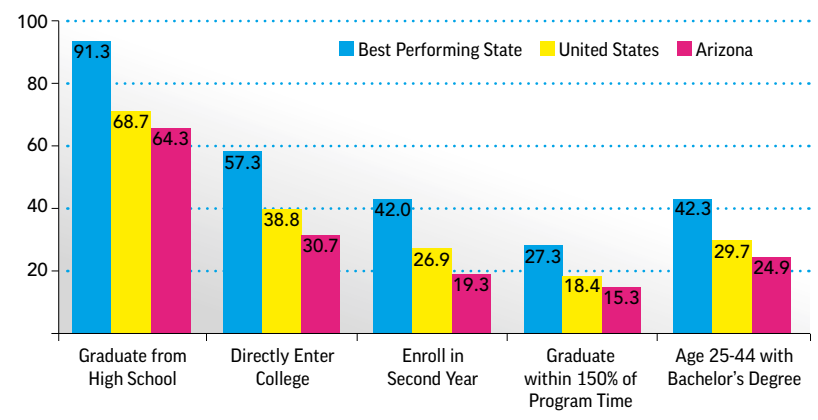
STRENGTHENING THE PIPELINE WILL REQUIRE:

- Successful collaborative partnerships between and among all educational sectors with clearly articulated and aligned expectations
- Innovative methods to engage first-generation, rural, and non-traditional students in higher education
- Smooth transitions from one sector to the next
- Support for Governor's and P-20 policy changes aimed at ensuring that more students are prepared to succeed in college and careers

INITIATIVES INCLUDE:

- Increasing high school graduation requirements
- Expanding early college options
- Improving rigor of academic standards
- Improving assessments
- Creating multiple pathways to earn a high school diploma

EDUCATIONAL PERFORMANCE



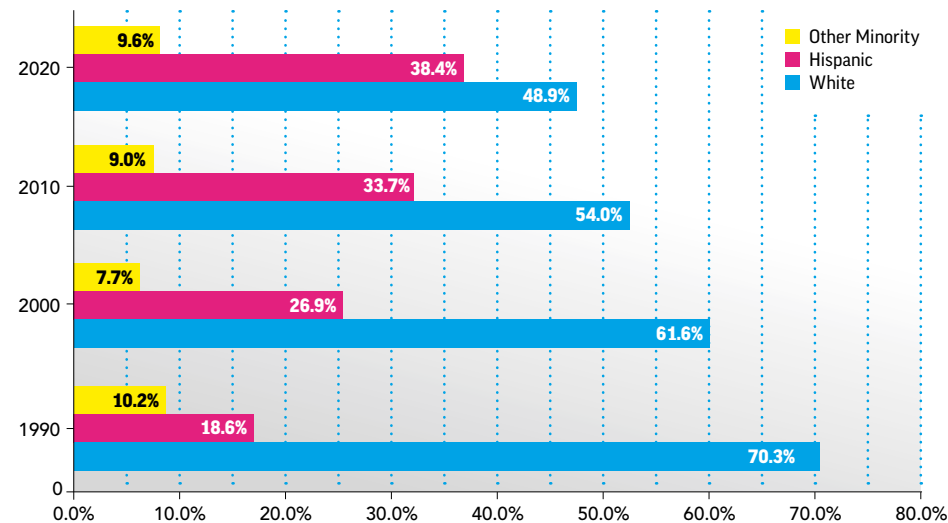
Source: Tom Mortenson

01

CLOSING THE GAPS

The 2020 Vision assumes that the opportunity to earn a bachelor's degree will be available to all Arizonans. In fact, the plan will not succeed without addressing the participation and achievement gaps of Arizona, especially those segments that have participated in college at lower rates. Of particular interest is the forecasted growth in the Hispanic population. The chart below details the shifts in demographics expected over the next 12 years. In 1990 over 70% of our population was white, which is expected to decline to less than 50% by 2020. By contrast, the Hispanic population is projected to move from less than 20% in 1990 to just under 40% by the year 2020.

**POPULATION DISTRIBUTION 1990-2020
BY RACE AND ETHNICITY**



Evidence suggests that in order to achieve the 2020 Vision, we must address several college participation and success gaps in our system:

- (1) Racial and ethnic gaps
- (2) Low income families
- (3) Younger generation in Arizona
- (4) Students from rural areas
- (5) Non-traditional students

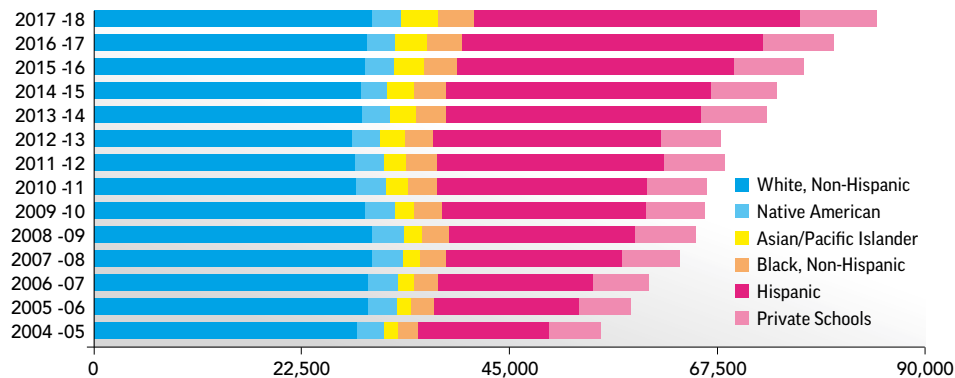


CLOSING THE GAPS

01

Additionally, the chart below shows the pipeline of high school students necessary to achieve the degree production needed for the goals over the next 12 years to 2020. The university system must reach out to these underserved populations with resources and strategies so that more can be successful. Sufficient support services will be needed as well, to ensure smooth transitions from year to year. Without specific and effective strategies to close the gaps, parity with the national average by 2020 will be unattainable.

AVERAGE HIGH SCHOOL GRADUATES BY RACE AND ETHNICITY



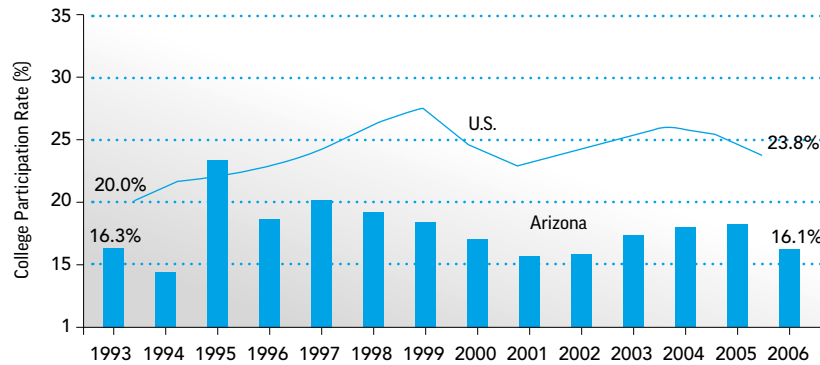
College participation among Arizona's low income families is also well below the national average and likely to get even worse without policy intervention. In 2006 only 16% of children from low income families went to college compared to over 23% nationally.



01

COLLEGE PARTICIPATION IN LOW INCOME FAMILIES

ARIZONA COLLEGE PARTICIPATION RATES FOR STUDENTS FROM LOW INCOME FAMILIES FY1993 TO FY2006



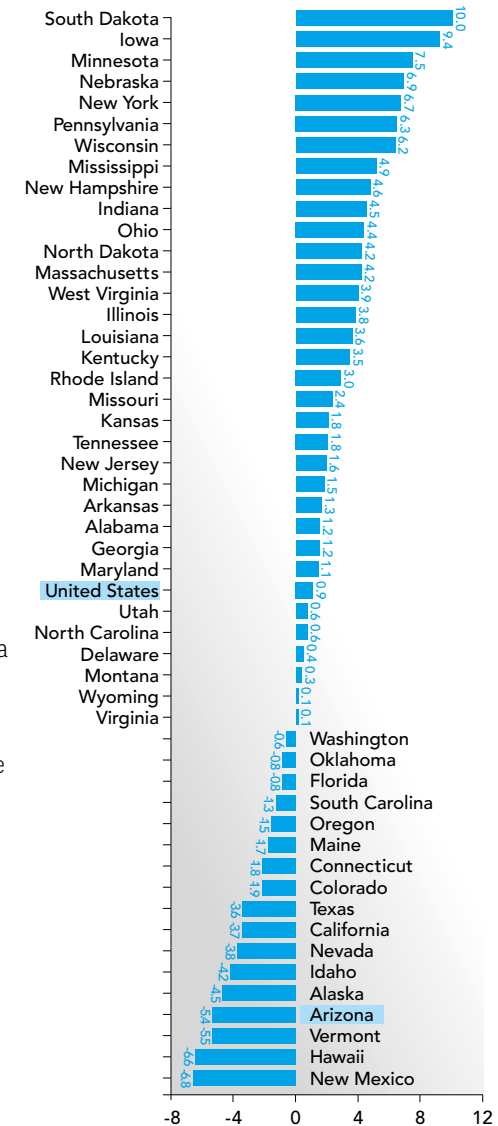
Source: Arizona Postsecondary Commission - November 8, 2007 - Phoenix, AZ
www.postsecondary.org

Part of the 2020 Vision involves ensuring that financial barriers do not prevent students from low income families from participating in college. The chart above shows a significant gap between Arizona and the national average on participation in college for low income students. A key to success will be our ability to align the system's policies to balance the need for additional resources against the desire to maintain affordability for all students. This policy balance will incorporate tuition policy, state funding policies, and financial aid policies.

Three additional points of emphasis include the younger generation in Arizona, students in rural areas, and adult non-traditional students. Universities must recruit enrollments beyond traditional first time freshmen in order to meet the goals. Strategies to engage a diverse group of students will be important, especially since the predicted number of K-12 students in the pipeline over the next 12 years, even with increases in college going rates, will be insufficient to meet the enrollment and degree demands of the Silver and Gold standards.

The chart to the right illustrates how Arizona ranks in the proportionate difference between our college-educated younger and older generations. Furthermore, data suggest this gap may be widening.

PERCENTAGE DIFFERENCE BETWEEN YOUNGER (AGE 25-34) AND OLDER (45-54) POPULATIONS WITH COLLEGE DEGREES, ASSOCIATE AND HIGHER, 2005



Source: U.S. Census Bureau, 2005 ACS



STRATEGIES FOR EXCELLENCE

01

MACRO STRATEGIES FOR EDUCATIONAL EXCELLENCE:

1. **Align the educational pipeline**

- a. Strengthen existing and support new partnerships with all educational sectors to facilitate and improve the pipeline to university education (enrollment initiatives, curricula alignment, teacher education improvements, etc.)
- b. Increase transfers and degree completions from the community colleges to the universities

2. **Close opportunity and success gaps**

- a. Increase opportunities for students from low income families and from rural areas with low educational attainment rates
- b. Increase the number of younger adults in the population with a bachelor's degree
- c. Close the opportunity and success gaps for underserved ethnic and racial groups of students
- d. Provide student support such as mentoring, tutoring, and advising

3. **Plan for and incentivize higher degree production**

- a. Provide incentives and rewards to increase the degree production and to serve additional students
- b. Expand the capacity to serve additional students (examine potential for creative solutions—joint admissions (hybrid) models, distance learning, technology, new branch campuses, 2+2 programs, and other collaborative partnerships, etc.)

4. **Minimize financial barriers for low income families**

- a. Improve tuition policies to ensure affordability for low income families, to balance state and student share of the costs, to increase predictability, and to ensure resources are available to achieve the plan





RESEARCH EXCELLENCE 02

GOAL TWO

“To increase the research capabilities and performance of the Arizona University System to a level of competitive prominence with peer rankings of top American research universities.”



BACKGROUND 02

“Greener” energy sources, crops that thrive in the desert, cheaper and faster communications devices, ways to secure international borders but still promote trade, personalized medicine, protecting our country and the world from pandemic disease—advances like these are the products of intense research and development and are needed now more than ever.

Much of the innovation that improves people’s lives and drives societal change springs from research performed in universities, by researchers and scholars educated and trained in universities. Universities around the world serve as incubators for innovative activity and educate a populace that is creative and capable.

KEY INDICATORS OF PROGRESS

Total research expenditures

Number of doctoral degrees awarded

Number of invention disclosures transacted

“Twenty-nine of the top thirty high-technology metropolitan areas in the U.S. are home to, or adjacent to, major research universities. The presence, or absence, of high-technology enterprises explains most of the difference in economic growth across U.S. metropolitan areas.”

- MILKEN INSTITUTE; AMERICA’S HIGH-TECH ECONOMY, JULY 13, 1999.





02

THE INTERNATIONAL MARKETPLACE

U.S. LOSING POSITION IN INTERNATIONAL MARKET

U.S. universities have been international leaders in generating research and development and have helped to fuel the strongest economy, the greatest affluence, and among the most well-educated citizenry known.

Some fear that the U.S. may soon lose its position as the world's leader in science and technology. This trend is coupled, almost certainly causally, with a declining level of basic science literacy in the U. S.

The university enterprise, and research-enriched education it provides, constitute the essential foundation of a knowledge-based society. Yet today the maintenance of that foundation is seriously threatened.

“...the age of the global knowledge economy is firmly taking root... Of particular importance in today’s super-charged technology world is the convergence of technology and the value it brings into new markets and technology advances... This new emphasis on technology convergence is most pronounced in academic research where scientific discoveries and advances are often found at the intersection of key fields...”

- ADVANCING ARIZONA'S INNOVATION ECONOMY, ARIZONA ECONOMIC RESOURCE ORGANIZATION, 2008.



RESEARCH FUNDING

02

THE FUNDING CHALLENGE:

- In recent years federal support for university research has not kept pace with past growth – funding levels are basically flat
- Non-defense related support has decreased since 2004
- Private sector investment in research is high but not focused on the basic research that ultimately must form the basis for applications

RETURN ON INVESTMENT

All three of Arizona's public universities can demonstrate through economic impact studies that the state gains a solid return on investment for funds that go into the research enterprises. Even though the Arizona Board of Regents' Technology and Research Initiative Fund (TRIF) is a small portion of the entire research enterprise, it provides a strong illustration of this point. TRIF includes a myriad of examples of strong returns on investments from the various programs at the three universities. In 2008 The University of Arizona's investments from TRIF yielded about \$5.70 for every \$1.00 invested. In the same year, Arizona State University will generate almost \$4.00 in grant and contract expenditures for every dollar invested in research from returned overhead and TRIF. Northern Arizona University is generating \$3.50 of competitive funding for every TRIF dollar invested.

THE TRANSFER OF NEW KNOWLEDGE

The transfer of new knowledge is crucial to the quality of life in Arizona and the economy. Better solutions to difficult problems facing society make a profound and measurable impact on the well-being of Arizonans.

BENEFITS OF NEW KNOWLEDGE

- More licenses, patents, spin-offs and venture capital investment in Arizona
- Increased national and international recognition – improves competitiveness in the international marketplace
- Better solutions to difficult problems facing society – makes a profound and measurable impact
- Better researchers = better educators – brings innovation and discovery to the classroom, which will better prepare Arizona's workforce



02

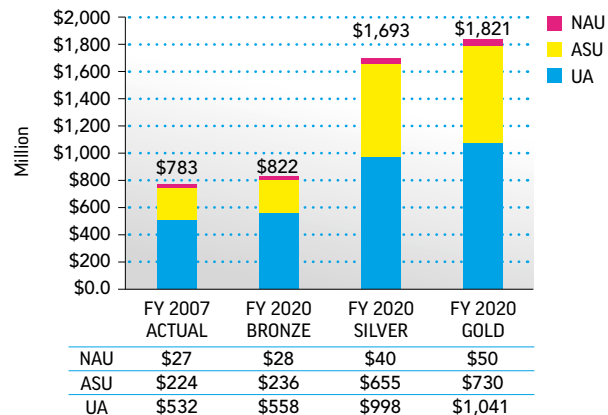
2020 TARGET FOR RESEARCH EXPENDITURES

The 2020 target for building the research enterprise is measured by total research expenditures in the three universities. Research expenditures, as defined by the National Science Foundation as a basis for national rankings of universities, are a measure of the total R&D activity of an institution, including that funded by extramural grants and contracts and that performed with institutional support.

The goals for the Arizona University System were generated by the Vice Presidents for Research at the three universities. Rather than a simple one-size-fits-all analysis, each university made estimates based on assumptions and goals consistent with its particular mission; and the goals for Gold, Silver, and Bronze levels of growth reflect the differences in each unique mission. While research is important at all three universities, the focus of research activities and the overall magnitude varies.

Collectively, the System's research expenditure levels were about \$780 million in 2007. The Bronze level of research expenditures are predicted to reach \$822 billion in 2020. The Gold scenario extends this to \$1.8 billion in 2020.

PROJECTED FY 2020 RESEARCH EXPENDITURES



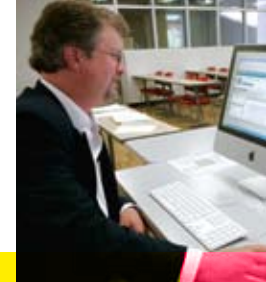
Actual annual research expenditures will be those reported to NSF

DOCTORAL DEGREES PRODUCED

Increased doctoral degree production is essential for the creation and transfer of new knowledge. Doctoral students are a critical part of the university research workforce. If we can keep them in Arizona, the new Ph.Ds we produce will drive the research engine of tomorrow and help create new high wage jobs.

TRANSLATING RESEARCH TO SERVE ARIZONA

Research leads to innovation that has the capacity to improve the human condition. Arizona's public universities do research that is responsive to community needs and push their discoveries and inventions into the community for practical and beneficial use in many ways. Formal technology transfer through the licensing of intellectual property is a key facet of a broader portfolio of knowledge transfer. Licensing provides a mechanism for entrepreneurial commercialization of products and generates revenues that can be reinvested in the universities' research enterprises. New knowledge also is transferred in many ways that are harder to measure but have critical impact. These mechanisms of dispersion include public lectures and workshops, county extension services, telemedicine, continuing education for working professionals, and diverse forms of public service.



MACRO STRATEGIES FOR ACHIEVING RESEARCH EXCELLENCE

1. **Increase access to new and existing sources of federal and state research support:**
 - a. Strengthen information-gathering capacity at all three universities for the early identification of federal and state research opportunities and promote collaboration among the three universities
 - b. Develop support for a powerful research infrastructure distributed across the universities as appropriate to their missions and opportunities to advance the larger research agenda; coordinate activities in areas most likely to provide future economic benefit to Arizona
 - c. Create a long-term and sustainable research funding plan for Arizona that supports research and innovation and particularly the research agenda in areas key for Arizona
2. **Recruit, develop, and retain top research faculty and faculty teams**
 - a. Increase support for top-quality faculty who can compete and succeed in the peer-reviewed granting environment
 - b. Increase support for Master's and Ph.D.-level education, both as a faculty recruiting tool and as a tool for developing the workforce needed for a knowledge-based economy; provide incentives for Post-doctoral students and research scientists to locate in Arizona
3. **Promote the transfer of new knowledge into the Arizona and global communities**
 - a. Support and provide incentives to facilitate technology transfer and commercialization of intellectual property, and to encourage entrepreneurship activities from research faculty
 - b. Establish strong clinical and corporate partnerships both inside and outside Arizona to improve the translation of research into practice

STRATEGIES FOR EXCELLENCE

02

“To compete in the global economy, the US depends on its ability to conduct basic and applied research and then translate that research into technological innovations. Economic growth results when the commercialization of technology takes place.”

- NATIONAL GOVERNORS ASSOCIATION, 2007





WORKFORCE & COMMUNITY **03**

GOAL THREE

“To utilize research, economic development, community engagement, and service contributions of the universities to create and disseminate knowledge to strengthen Arizona’s economy and improve Arizona’s quality of life.”





GOAL THREE BACKGROUND

03



COMMUNITY ENGAGEMENT AND THE ARIZONA ECONOMY

America's public university system is founded on three primary missions: teaching, research, and service or community engagement. Our communities benefit not only through formal technology transfer and infusion of well-trained graduates into our economy, but also through programs such as forest health and environmental sustainability efforts, mentoring and professional development of teachers, community planning or development efforts, Cooperative Extension programs and telemedicine.

Our universities also host extensive public access programs, whether through art or research museums or direct-participation outreach programs. Moreover, the universities are directly impacting the entire educational system in Arizona, providing extensive support to the state's K-12 system through training, curriculum development and the development of new teaching methodologies and technologies.

A recent report by the National Association of State University Land Grant Colleges (NASULGC)¹ noted that engagement is a fundamental and essential characteristic of public higher education equal with learning and discovery. The authors noted that while universities use learning and discovery to educate students and extend knowledge to communities, they must take this effort further by "fostering interaction with communities to assure that students and university-based knowledge provide more direct benefits to society."

KEY INDICATORS OF PROGRESS
Impact of community engagement activities
Total income and expenditures related to service and engagement activities
Number of degrees awarded in high demand fields

¹ NASULGC position paper dated Oct 26, 2007, "NASULGC on Engagement"

“...institutions do not engage in occasional community service, but rather make a sustained commitment to the economic, social, and cultural vitality of communities and regions through collaborative leadership on key issues.”

- AASCU ON REGIONAL STEWARDSHIP, 2005



03

COMMUNITY ENGAGEMENT

Sharing knowledge through service mechanisms drives an economy through direct and early adoption of that knowledge. Further, community engagement often most directly expresses the fundamental public understanding of a university's role in developing and delivering that knowledge. Our universities must partner closely with our communities to assure economic success for Arizona, and our plan specifically encourages and evaluates that engagement.

In "The Rise of the Creative Class," Richard Florida notes the importance of livable and engaged communities in advancing an economy. Universities are a critical part of a successful community, not only through degrees granted and the resulting increase in earning capacity and tax revenue, but also through the exposure to arts, culture, new technology, cutting-edge information, and the provision of services uniquely suited to the capabilities of our universities. In addition, engagement has a direct impact on the nature of our students' educational experience.

“Public engagement is a fundamental and essential characteristic of public higher education... an equal with learning and discovery.”

- NASULGC ON ENGAGEMENT, 2007



WORKFORCE IMPACT

03

While this plan has at its core the goal to increase educational attainment of Arizonans, the types of degrees produced and their impact on Arizona's economy are critical measures of success in meeting workforce demands. Creating a stronger economy is not just about degree production; it also requires an increase in demand for greater numbers of high paying jobs. Universities play a role here by disseminating practical knowledge to help advance Arizona industry, spinning off and attracting new companies, and producing graduates with the engaged and relevant experience which allows them to have a more immediate impact in those companies and in our communities.

According to a recent study released by the National Center for Higher Education Management Systems (NCHEMS), the state's 12 industries of opportunity account for about 30% of Arizona's employment. Over the past 15 years, it has become more important to have a college degree in these major Arizona industries, as all but one have increased the percentage of their employees with college degrees over that time period. A recent study by Public Works shows that almost all of these occupational areas that pay a livable wage will require some postsecondary education.¹ Arizona's economy will advance only as we rise to meet the need for an educated population.

“High levels of ‘educational capital’ are key to the economic development of their states and the quality of life of their citizens.”

- EWELL, 2003

¹“Education to Work: Is Arizona Prepared, The Alignment Project Report.” Public Works, 14, February 2006





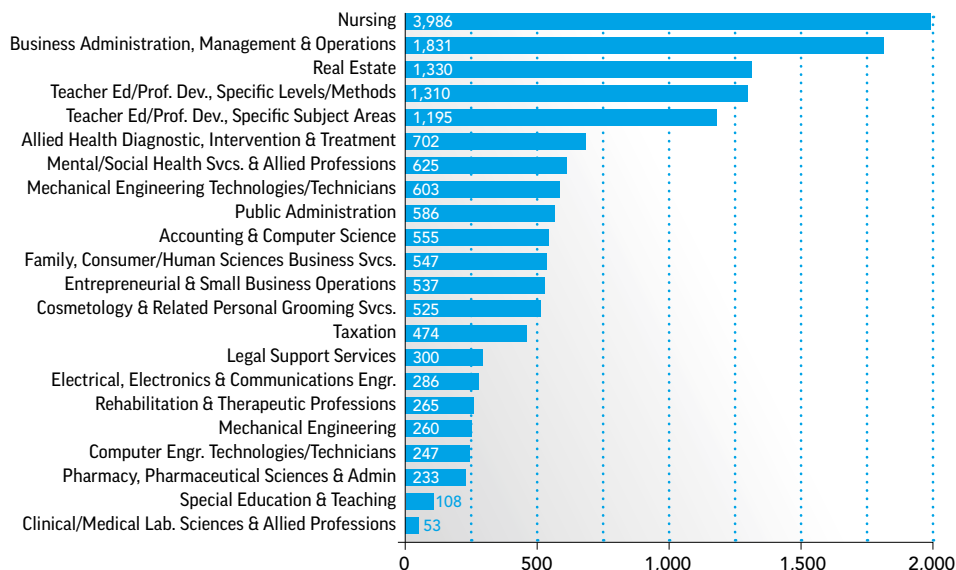
03

HIGH DEMAND FIELDS

The chart below illustrates the need to address high demand fields such as health-related occupations, teacher education, business, and science, technology, engineering, and mathematics (STEM) fields. Openings projected in these fields through 2025 will require a workforce enabled with a college education that goes beyond simply holding a high school diploma. Further, we will expect our universities to enhance the performance of Arizona's economy by embedding and engaging our universities in Arizona's communities and meeting the growing need of our state for relevant knowledge, whether disseminated through our graduates, through sharing that knowledge with Arizona industry and communities, or through other mechanisms of knowledge diffusion.

The 2020 Vision calls for increases in the kinds of degree production that will benefit the workforce and support the economy of Arizona in 2020. These fields include education, science, technology, engineering and math (STEM), health professions, medicine, and other high demand fields to be identified as further analyses become available.

PROJECTED ANNUAL SHORTAGES IN ARIZONA OCCUPATIONS, 2005-2025 (Annual Openings Minus Annual Degree Production)



Source: Arizona Dept. of Economic Security;
NCES, IPEDS Completions Surveys (2003-04 to 2005-06)



MACRO STRATEGIES FOR COMMUNITY ENGAGEMENT AND WORKFORCE IMPACT

1. **Expand partnerships with business and community**
 - a. Increase the number of partnerships with business, industry, government, community, and educational entities to stimulate Arizona's economic vitality
 - b. Develop mechanisms for incentivizing partnership opportunities which have a direct impact on Arizona's economy, with direct and measurable benefits to Arizona industry and communities through the sharing of new knowledge, processes and technologies
2. **Advance Arizona's communities through more extensive service and engagement**
 - a. Develop comprehensive system-level survey tools to evaluate community support for university-based service activities
 - b. Advance Arizona's quality of life through measurable knowledge dissemination and public programs aimed at health, environmental and regional stewardship, community and economic development, life-long learning, and access to arts and culture
 - c. Evaluate federal, state and community investment in engagement activities and create processes for leveraging those investments for increased service output
3. **Prepare Arizona's workforce for the knowledge economy**
 - a. Identify high demand fields and increase the production of degrees in these fields in collaboration with educational and community partners
 - b. Develop new pathways for workforce training and degree attainment for non-traditional and adult populations

STRATEGIES FOR EXCELLENCE

03






PRODUCTIVITY 04

GOAL FOUR

“To maximize the use of existing resources so that the system can produce greater numbers of degrees and with greater efficiency of resources per degree without sacrificing quality.”



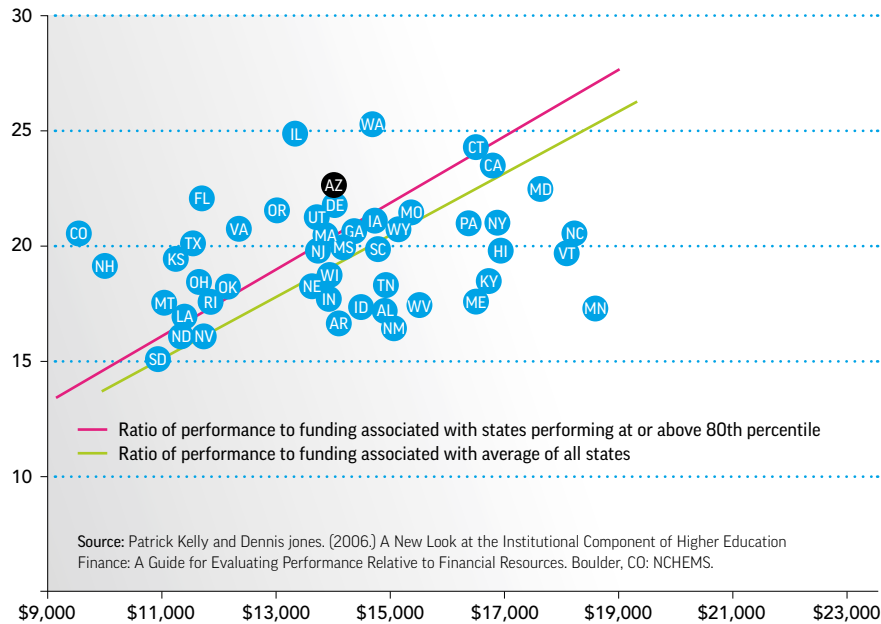
This strategic plan calls for aggressive increases in the production of degrees at the three public universities, which could require adding into the system as many as 80,000 undergraduate students by 2020. The reality of finite state resources combined with the magnitude of funding needed to serve such a large increase in student population illustrates why productivity will be so important. The system will need to assure effective and efficient expenditures per degree while finding ways to maintain quality. The strategies incorporated in the plan seek to provide this crucial balance.

The productivity component of the plan encompasses three important policy issues:

- (1) Producing more degrees more efficiently without sacrificing quality (includes maximizing use of current resources)
- (2) Determining adequate funding levels to achieve the plan while factoring in appropriate levels of increased productivity
- (3) Evaluating our financial strength and productivity

According to research completed by the National Center for Educational Management Systems (NCHEMS), Arizona ranks high on the metric used to evaluate productivity. In bachelor's degrees awarded per 100 FTE, and total funding per FTE, Arizona ranks above the 80th percentile.

PERFORMANCE RELATIVE TO RESOURCES: DEGREE-TO-ENROLLMENT RATIO



GOAL FOUR BACKGROUND

04

KEY INDICATORS OF PROGRESS

- Number of bachelor's degrees awarded per 100 FTE students
- Total educational expenditures per degree awarded
- Composite financial index (CFI)





04

EDUCATION COSTS

DELTA COST PROJECT

Significant research into university costs, productivity, and accountability is currently underway by the Delta Project on Postsecondary Education Costs, Productivity, and Accountability (Delta Cost Project). ABOR is following this work closely and will retain best practices, strategies and metrics that follow from this national initiative.

According to Dr. Jane Wellman of the Delta Cost Project¹, measuring productivity will require considering total costs and how resources are used to produce outcomes, which include graduates, trained workers, and new knowledge. In addition, examining the relationships among the quality of entering students, costs, and learning outcomes will allow institutions, boards, and state policymakers to better understand the consequences of a change in any one of these variables on total productivity.

PRODUCTIVITY INITIATIVES

- Board initiative utilizing the best practices of national policy analyses through the Delta Cost Project
- Facilitate deeper understanding of college costs, the role of tuition, state subsidies, net price, and financial aid impact
- Utilize performance metrics with national comparability
- Identify cost-saving, cost containment, and cost avoidance measures
- Examine university cost drivers
- Advance innovative qualitative changes that will lead to more effective and efficient educational programs





EVALUATING PROGRESS

04



Additional analyses and background measures will be employed to evaluate and track progress related to productivity such as:

- Number of bachelor’s degrees awarded per 100 FTE students
- Average number of years to graduation for students who began as freshmen
- Average cumulative hours at graduation for students who began as transfer students
- Full educational costs per FTE student enrolled and per degree awarded
- Student share of costs (discounted price, or net tuition)
- Average subsidy portion of costs (average dollar amount of full educational costs covered by institutional resources, endowment, or state funding) per FTE student

This work will enable ABOR to make informed decisions about where resources can be deployed more effectively in order to produce more outcomes—degrees—while maintaining access for students with financial need and educational quality.

EVALUATING FINANCIAL STRENGTH:

Effective management of financial resources is critical to achieving the goals of this strategic plan. Four financial ratios will be calculated using data in the universities’ audited annual financial statements:

- Primary Reserve Ratio
- Viability Ratio
- Return on Net Assets Ratio
- Net Operating Revenues Ratio

These four ratios will then be used to calculate a composite financial index (CFI), one overall measurement of each institution’s financial health. The CFI is useful in helping governing boards and senior management understand the financial position that the institution enjoys in the marketplace. “Moreover, this measurement will also prove valuable in assessing future prospects of the institution, functioning as an ‘affordability index’ of a strategic plan”¹ Such an index will help the system maximize its strengths while adopting strategies to mitigate any weaknesses.

¹Strategic Financial Analysis for Higher Education, 6th edition, KPMG

FUNDING THE VISION:

The ability of the system to fully articulate and integrate all sources of revenue with methods and best practices for spending those resources more effectively will be crucial to achieving the plan. Strategic planning efforts in this regard include:

- Comprehensive funding review – to define funding adequacy for the system in light of specific goals and targets of the 2020 Vision
- Budget recommendations – to articulate more explicitly the link between resources needed to fuel the 2020 Vision and outcomes the state can expect for the funding
- Long-term financial projections – to articulate funding necessary for the next 12 years to successfully achieve the 2020 Vision including capital and operating needs
- Tuition policy – to align the tuition setting process more closely to resource adequacy related to the 2020 Vision balanced with the policy goal to ensure affordability and predictability for students with financial need



04

STRATEGIES FOR EXCELLENCE

MACRO STRATEGIES FOR PRODUCTIVITY

1. **Productivity initiatives**

- a. Productivity initiatives to identify strengths and weaknesses and to develop recommendations for better utilization of resources in the future including, among others, policies that encourage students to improve predictable and efficient time-to-degree and increased university access for rural students

2. **Comprehensive funding review**

- a. Complete a comprehensive funding policy review:
 - (1) determine adequate funding levels for the system to achieve 2020 goals; and
 - (2) examine allocation of current resources and appropriate incentives to meet priorities of the plan
- b. Consistent with the funding review, complete a long-term financial projection model that identifies resources needed in both operations and capital, aligned to system and state priorities in the 2020 Vision
- c. Incorporate the use of peer and national benchmark data to assess productivity and new initiatives in the system and at the universities

3. **Track the financial strength of the universities**

4. **Improve tuition and financial aid policies to align with affordability needs, funding adequacy and share of responsibility for educational costs**

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