Is Higher Education Ready for Arizona's Future?

ARIZONA
TOWN HALL
Creating Solutions

The 102nd Arizona Town Hall
April 21-24, 2013

2012-2013 ARIZONA TOWN HALL OFFICERS, BOARD OF DIRECTORS, COMMITTEE CHAIRS, AND STAFF

The 102nd Arizona Town Hall, which convened in April 2013, developed consensus on the topic of Higher Education in Arizona. The full text of these recommendations is contained in this final report.

An essential element to the success of these consensus-driven discussions is the background report that is provided to all participants before the Town Hall convenes. The University of Arizona prepared a detailed and informative background report that provided a unique resource for a full understanding of the topic.

Special thanks go to the following individuals from the University of Arizona for spearheading this effort and marshaling many talented professionals to write individual chapters: Ron Marx, Dean of the College of Education; Gary Rhoades, Head of the Department of Educational Policy Studies & Practice, and Professor and Director of the Center for the Study of Higher Education; and Jenny J. Lee, Associate Professor in the Center for the Study of Higher Education.

The 103rd Town Hall could not have occurred without the financial assistance of our generous Professional Partners, which include Premier Partner APS, and Civic Leaders Cox Communications and Snell & Wilmer.

The consensus recommendations that were developed during the course of the 102nd Town Hall have been combined with the background information prepared by the University of Arizona into this single final report that will be shared with public officials, community and business leaders, Town Hall members and many others.

This report, containing the thoughtful recommendations of the 102nd Town Hall participants, is already being used as a resource, a discussion guide and an action plan for higher education in Arizona.

Sincerely,

Ron Walker
Board Chair, Arizona Town Hall

The Arizona Town Hall gratefully acknowledges the support of sponsors who understand the importance of convening leaders from throughout the state to develop consensus-based solutions to critical issues facing Arizona. Our sincere thanks are extended to the sponsors of the 102nd Arizona Town Hall.

Report of the 102nd ARIZONA TOWN HALL
Is Higher Education Ready for Arizona's Future?
April 21-24, 2013

RESEARCH COMMITTEE MEMBERS

Warren Prostrollo (Chair)
Jay Kittle (Vice Chair)
Arlan Colton
Kimberly Demarchi
Darryl Dobras
Susan Goldsmith
James Holway
Sue Kater
Jenny Lee
Paul Luna
Rita Maguire
Ron Marx
Elizabeth McNamee
Robyn Nebrich
Ray Newton
Pat Norris
Gary Rhoades
Scott Rhodes
Fred Rosenfeld
David Snider
Devan Wastchak
Larry Woods

CONTENTS

LIST OF TABLES AND FIGURES

Participants of the 102nd Arizona Town Hall
"Is Higher Education Ready for Arizona's Future?"
Tucson, Arizona
April 21-24, 2013

REPORT COMMITTEE

David B. Gass, Judge, Arizona Superior Court, Maricopa County, Phoenix Report Chair

Michael J. Minnaugh, Attorney, Righi Law Group, Phoenix Report Co-Chair

Shanna Orlich, Attorney, Jennings, Strouss & Salmon PLC, Phoenix Recorder

Elise Piatt, Senior Public Affairs Advisor, Triadvocates LLC, Phoenix Recorder

Eric H. Spencer, Attorney, Snell and Wilmer LLP, Phoenix Recorder

Ryan Williams, Attorney, Ryley, Carlock & Applewhite, Scottsdale Recorder

PANEL CHAIRS

Linda J. Elliott-Nelson, Dean of Instruction, Arizona Western College, Yuma Panel Chair

Gordon Lewis, Attorney, Jones, Skelton & Hochuli, Phoenix Panel Chair

Patricia (Pat) Norris, Judge, Arizona Court of Appeals, Phoenix Panel Chair

Laine Page Sklar, Attorney, Town of Marana Legal Department, Marana Panel Chair.

PLENARY SESSION PRESIDING CHAIR

Ron Walker, Board Chair, Arizona Town Hall; Ret. Mohave County Manager, Kingman

TOWN HALL SPEAKERS

Monday morning authors' panel presentation:
> Panel Moderator: **Jonathon Koppell**, Dean of the College of Public Programs, Director of the School of Public Affairs, ASU
> Panel Members:
>> **Dan Anderson,** Director for Institutional Analysis, Arizona Board of Regents;
>> **Gary Rhoades,** Director, Center for the Study of Higher Education at UA;
>> **Debra Thompson,** Vice Chancellor for Business Services for Maricopa Community Colleges

Monday lunch panel presentation: Higher Education and the Arizona Legislature.
> Panel Moderator: **Ivan Johnson,** COO, DeMenna & Associates/Avant Strategies
> Panel Members:
>> **Ethan Orr,** Republican Representative on the Higher Education Committee;
>> **Victoria Steele,** Democrat, District 9, Arizona House of Representatives;
>> **Nancy Tribbensee**, Senior VP and General Counsel, Arizona Board of Regents

Monday dinner speaker:
> **Diane Elliott,** Research Manager for the Economic Mobility Project, The Pew Charitable Trusts

DISCUSSION PANEL PARTICIPANTS

Morgan Abraham, Student, University of Arizona, Tucson

Alan Baker, Executive Director, Chamber of Commerce, Willcox

Leonard (Len) Bell, Director, Biomedical Sciences Program, Midwestern University, Glendale

Jack Beveridge, President & CEO, Empowerment Systems, Inc., Apache Junction

Johnson Bia, President, Pima Community College Desert Vista Campus, Tucson

Fred T. Boice, Principal, Boice Financial Company, Tucson

Patricia (Patty) Boland, Assistant Chief Counsel, City of Phoenix, Phoenix

Richard (Rich) Bowen, Vice President, Northern Arizona University, Flagstaff

Veronica Brana, Corporate Giving Specialist, Arizona Public Service, Phoenix

Mark Bryce, President, Eastern Arizona College, Thatcher

Linda Buchanan, Community Education Director, Yavapai College, Clarkdale

Bruce A. Burke, Attorney, Bruce A. Burke, PC, Tucson

Patrick Burkhart, Provost, Mesa Community College, Mesa

Jennifer Burns, Consultant, Consulting & Policy Development, Tucson

Ernest (Ernie) Calderon, Partner, Ridenour, Hienton & Lewis; President Emeritus, Arizona Board of Regents, Phoenix

Michael (Mick) Carroll, Dean of Students, Benedictine University at Mesa, Mesa

Felix Cervantes, Student, Estrella Mountain Community College, Buckeye

Janice Cervelli, Dean, University of Arizona College of Architecture & Landscape, Tucson

Margaret (Maggie) Chrisman, Investor, Community Volunteer, Tucson

Bonnie Culver, Interim Executive Director, Wilkes University & Director, Mesa

Imelda V. Cuyugan, Assistant Vice Chancellor for State Government Relations, Pima Community College, Tucson

Leticia de la Vara, Vice President, Outreach & Mobilization, Expect More Arizona, Phoenix

George Dean, President & CEO, Greater Phoenix Urban League, Phoenix

Dennis DeConcini, Former United States Senator; Secretary, Arizona Board of Regents, Phoenix

Rita H. Dickinson, Education Consultant, Phoenix

Darryl B. Dobras, Chairman, DBD Investments, Inc., Tucson

Jeffrey (Jeff) Fairman, Economic Development, City of Avondale, Avondale

Karen Francis-Begay, Assistant Vice President for Tribal Relations, University of Arizona, Tucson

William (Bill) Hawgood, Lawyer & Educational Tutor, Capitol Elementary School; Former Chair, Arizona Town Hall, Phoenix

John Hay, Attorney, Gust Rosenfeld PLC, Phoenix

Jay Heiler, Attorney; Journalist; Political Analyst; Former Chief of Staff, Governor Fife Symington; Regent, Arizona Board of Regents, Phoenix

Doris Helmich, President, Central Arizona College, Coolidge

Will A. Hill, Student, Cochise College, Sierra Vista

Ted H. Hinderaker, Attorney, Partner, Hinderaker, Rauh & Weisman, Tucson

Laura F. Huenneke, Provost & Vice President for Academic Affairs, Northern Arizona University, Flagstaff

Diane J. Humetewa, Special Advisor & Counsel to President Crow, Arizona State University, Tempe

Bonnie Humphrey, Ret. Teacher, Lake Havasu Unified School District #1, Lake Havasu City

Russell (Russ) L. Jones, Russell L. Jones Customhouse Brokers; State Representative, Arizona House of Representatives (Dist. 24), San Luis

Heidi Kimball, Vice President/Designated Broker, Sunbelt Holdings, Scottsdale

Jonathan Koppell, Dean, College of Public Programs, Arizona State University, Phoenix

Malia R. LaQuinta Griffith, Student, Cochise College, Sierra Vista

Joseph (Joe) La Rue, Executive Vice President, Sun Health, Peoria

Jerome (Jerry) Lee, Program Administrator, Albright College, Mesa

Carol A. Lockhart, Health Care Consultant, C. Lockhart Associates, Tempe

Luke Lujan, Student, Scottsdale Community College, Tempe

Roberta (Bobbi) Magdaleno, Director, Community Relations, Office of Public Affairs, Arizona State University, Glendale

Jo Markette, Director, University of Mary, Tempe

Joseph Martin, Special Advisor to President Haeger, Northern Arizona University, Flagstaff

Joe McGrath, Student, Pima Community College, Tucson

Michael (Mike) Medici, Architect; Senior, Vice President, SmithGroupJJR, Phoenix

Sharon B. Megdal, Director, Water Resources Research Center, University of Arizona, Tucson

Frances (Francie) Merryman, Vice President and Senior Wealth Strategist, The Northern Trust Company, Tucson

Paul Mittman, Pres & CEO, Southwest College of Naturopathic Medicine, Tempe

Alec Moreno, Student, Pima Community College, Tucson

Robert Moreno, Program Aide & Student, Glendale Community College, Glendale

James (Jim) Morrow, Partner, Quarles & Brady, LLP, Tucson

Linda L. Morrow, Superintendent of Schools, Navajo County, Holbrook

Robert (Bob) Moya, Attorney, Quarles & Brady, LLP, Phoenix

Lillia Mrza, Student Aide, Glendale, Community College, Glendale

Nina Mullins, Senior Director, Water Shareholder Operations, Salt River Project, Phoenix

J.C. Mutchler, Associate Research Historian & Professor, The Southwest Center, University of Arizona, Hereford

Richard T. (Rick) Myers, Vice President & General Manager, IBM Tucsson; Chairman, Arizona Board of Regents, Tucson

Rich W. Nickel, President & CEO, Arizona College Scholarship Foundation, Phoenix

Gary J. Northam, Dean, Embry-Riddle Aeronautical University, Prescott

Tessa Otero, Student, Phoenix College, Avondale

Michael G. (Mike) Parascandola, City Prosecutor, City of Goodyear, Goodyear

Hank Peck, Partner, TCI Wealth Advisors, Inc., Tucson

Donald Pitt, President, Cornerstone Capital Management Ltd., Tucson

Report of the

102nd ARIZONA TOWN HALL

"Is Higher Education Ready for Arizona's Future?"

Tucson, Arizona
April 21-24, 2013

<u>**Introduction**</u>

This is the second time since 2000 that Arizona Town Hall has brought citizens from across the state together to discuss the topic of higher education. This report captures the consensus that emerged from those discussions. Although not every Arizona Town Hall participant agrees with every conclusion and recommendation, this report reflects the overall consensus achieved by the 102nd Arizona Town Hall.

Since the 2000 Report, Higher Education in Arizona for the 21st Century (67th Arizona Town Hall) ("the 2000 Report"), Arizona has experienced many changes that have affected Arizona's higher education institutions, notably the 2008 recession and the resulting hundreds of millions of dollars in funding cutbacks.

Some issues, however, persist. The percentage of Arizonans with college degrees remains below the national average, funding for higher education is declining and unpredictable, and access to postsecondary education remains a challenge for many. The 2000 Report began by saying, "Of 100 children who start in the Arizona educational system, only 22 will go on to college and only 6 will obtain a bachelor's degree." That translates to 27% of high school graduates who start college completing their bachelor's degree. In 2012, that number is down to only 21% for the 2003-2004 graduating high school classes.

The participants of the 102nd Arizona Town Hall conclude that the state's system of higher education is not prepared to support a competitive and prosperous future for Arizona.

- Arizona's public institutions of higher education are underfunded.

- Arizona's students lack access to sufficient financial resources enabling them to afford and complete skill-based training, associates degrees, and bachelor's degrees.

- Too many of Arizona's graduating high school seniors are ill prepared academically and culturally to succeed in higher education.

- Arizona's employers continue to face a skills gap in sourcing technical and specialized talent.

- While 61% of future jobs will require a postsecondary education, only 40% of adult Arizonans possess a high school education or less.

• Substantial evidence exists that new and emerging information and communications technologies will dramatically change the modalities of delivering education at all levels.

To achieve readiness by 2020, the state – its government, businesses, and citizens – must unite and embrace and aggressively pursue as its highest priority the strengthening of its educational structure and outcomes. The effort must include:

• The cost of higher education to a student and family must return to its historical levels in the early 21st century through a mix of state funding increases for institutions and a universal financial aid program.

• The institutions must continue to build their capacity for teaching, technology, research, technology transfer, and industry attraction. Student affordability cannot come at the expense of quality.

• The preK-12 system must, through direct investment and large scale community support structures, embrace the goal and the means of graduating every student prepared for appropriate postsecondary education or training.

• The breadth of educational opportunities must be better represented in the rural areas. This requires a large scale effort to provide universal network connectivity.

The most significant factors that will provide a student with a successful higher education include:

• A strong preK-12 system that adequately prepares a student for success at the postsecondary level.

• Access.

• Higher education institutions that possess the resources to provide quality faculty and facilities necessary to deliver an array of programs that benefit the student and the needs of society, particularly the state of Arizona.

The Role of Higher Education

Higher education is rapidly evolving from the traditional notion of a four-year degree into a more continuous lifelong learning process that includes community and tribal colleges, part-time programs, online courses, and any form of education beyond high school, including technical and vocational programs, apprenticeship programs, and trade schools. Higher education is a "game-changer" for individuals, families, and society.

An increased education attainment level correlates to reduced unemployment rates. The following table shows January 2013 unemployment rates in the United States for persons 25 years of age with various levels of educational attainment. Persons with a bachelor's degree have an unemployment rate less than half the overall unemployment rate.

Unemployment Rate by Educational Attainment in January 2013

United States	Unemployment Rate
Less than high school	12.0%
High school	8.1%
Some college or associates degree	7.0%
Bachelor's degree and higher	3.7%
TOTAL	**7.9%**

Source: US Department of Labor, Bureau of Labor Statistics, Table A-4.

Current Status of Higher Education in Arizona

Currently, public institutions of higher education provide quality education and research, while controlling the cost of tuition. Arizona's tribal and community colleges and public universities remain a strong option for Arizona's students. Private institutions provide students with other options, though the choice of private institutions is limited. With Arizona's growing population and the need for lifelong learning, Arizona's institutions of higher education provide ongoing opportunities for growth and improvement.

Higher education institutions also are economic drivers in their communities and provide unique opportunities for economic development. Workers in Arizona with bachelor's degrees earned 80% more than those with only a high school diploma and those with graduate degrees earn 135% more than those with only a high school diploma. Between 2005 and 2011, the median income for those with a bachelor's degree increased 9.6%, from $42,399 to $46,485, while the median income for those with only a high school diploma fell by 2.4% during the same time period.

Higher education in Arizona is largely represented by public institutions. These public institutions, however, continue to face declining funding from the state, forcing the students and their families to bear more of the cost. Given the income profile of Arizona, these costs will mean that Arizona cannot meet the current and future needs for a skilled and educated workforce. Going forward, 61% of all jobs in Arizona will require some form of credentialed higher education, yet only 20% to 25% of Arizona's high school students go to college. With the current graduation rate, Arizona will need to continue to import workforce to meet its future employment needs. Prospective employers may reject Arizona if faced with an underperforming education system. Prospective employees also may be reluctant to come to Arizona because of the impact that Arizona's education system will have on their children.

Investment in education also attracts companies that grow and support arts, cultural, health, and social issues through corporate giving and engaged employees. It has a net positive effect. Education brings companies that reinvest in their communities. Quality companies expect a vibrant education system and arts community, also a direct result of corporate involvement.

Arizona's higher education system, nonetheless, has unique strengths and attributes that provide great opportunity for improvement. Arizona's community college system is among the largest and best in the country. Arizona's students recognize the value that these colleges offer. Arizona's tribal and community colleges provide broad access in rural areas, and they provide a valuable pathway for students who want to transfer to universities. The tribal and community colleges offer Arizona's high school graduates great access to educational and cultural programs.

Arizona's universities remain first class, considered to be some of the best in the world.

The recent recession and other financial stresses have resulted in increased innovation, collaboration, and partnership within and between the universities, the tribal colleges, and the community colleges. The university system, the tribal colleges, and the community college system have become more efficient at delivering education to Arizona's students.

Arizona has many areas in which it can improve its higher education system.

First, Arizona must do a better job of preparing students for entry into higher education. By having better prepared students, Arizona's tribal and community colleges and public universities will not need to divert resources toward remedial classes, which cannot fully remediate insufficient preparation in the preK-12 system. As part of the preparation, Arizona must do a better job making sure that students know their options for and pathways to higher education, including financial aid, and are engaged in preparation for college.

Second, Arizona must expand access to higher education, especially for Arizona's underrepresented students, including minority students and students from low-income families, rural areas, and tribal areas. Arizona must address the unique challenges these students face, such as promoting its successful programs to our tribal and low-income populations.

Third, Arizona must maintain strong tribal colleges, as well as strong community college and public university systems. Arizona students and their families do not always recognize the value of higher education. Arizona, however, must address the gap between the systems. Transferability and flexibility should be improved by promoting dual enrollment and portability of credits, such as using "2+2" and "3+1" transfer programs. Such programs would allow greater access because students could move seamlessly without repetition or loss of credits. Increased collaboration and camaraderie between the systems will improve the systems and improve the perception among Arizona's residents and transplants. Private institutions also can help fill the gaps.

Fourth, Arizona must address the public perception that higher education is not available or is not worthwhile. Though many Arizonans recognize the value of higher education, others do not or do not believe it is attainable, which contributes to segments of society that are under-educated. Certain graduating seniors fear the unknown and mistakenly believe that they are not suited for higher education or do not need higher education, leading to a segment of society that is perpetually under-educated.

Fifth, Arizona must ensure that our people understand and value investments in higher education. If the people of Arizona believe in higher education and in educating

children, the state will expand access. Arizona must educate students so that they know about the options available to allow them to pursue higher education, including private institutions, the tribal colleges, community college system, transfer opportunities, financial aid, and other programs.

Sixth, funding is an area in need of improvement. Arizona underfunds higher education. Funding education, however, really is investing in Arizona's future. In reality, it is a co-investment with the student. The focus should be on the return on investment from our higher education dollars. The shift away from public investment means increased tuition, which disproportionately affects underrepresented students, including minority students and students from low-income families, rural areas, and tribal areas.

Creating Successful Students

Graduation rate has been the traditional measure of success, but it merely provides a snapshot view of what is going on. We must take pride in infusing the joy of learning in our students. Students must be prepared for the rigors of higher education, which includes completing required preparatory course work, including standard Common Core and STEM classes that meet or exceed national standards.

The preK-12 system and its faculty play critical roles in educating and preparing students for higher education. For instance, as demographics evolve the preK-12 schools must align their educational mission with the academic requirements of higher learning institutions so that students are prepared to grow their intellectual curiosity when they enter higher education institutions.

Equally important is family support. Education starts in the home, and as such, parents are responsible to ensure students are provided the foundation and encouragement to learn. Business, tribal, and community leaders also play an important role in encouraging our students to pursue higher education.

Higher education should be responsible for coordinating mentorship and bridge programs for underrepresented individuals to assist in transitioning into higher education programs. Higher education should incorporate internship programs as an opportunity for students to implement their education skills in the real world environment.

Higher education institutions need to emphasize student retention. Only 17% of Arizona high school students have a bachelor's degree six years after graduation. Better retention can be accomplished by improving environmental conditions, like the quality of basic living conditions. Higher education institutions should begin to view students as customers. Students are more likely to succeed when they are engaged, happy, and treated well.

Higher education must be accessible to everyone. One way of accomplishing this goal is to make bachelor's degrees available in key locations around the state through partnerships between Arizona's universities, tribal colleges, and community colleges. We must continue to do more for underrepresented students and their families, including financial support, wider availability of classes, childcare services, and one-on-one accessibility to advisors and counselors.

Finally, the long-term post-enrollment measurements should be tracked to obtain accurate information on higher education enrollment and outcomes. However, in the end, students must take ownership of their success.

Higher Education and the Economy

Higher education, as a driving force behind Arizona's economy, will carry Arizona beyond the five Cs into the 21st Century. Arizona's long-term future economic growth depends on Arizona's ability to expand, retain, and attract successful businesses. The ability to produce a highly educated workforce will allow Arizona to be competitive in the ever evolving global economy, attracting capital, global talent, and economic activity. Business leaders from other states consider the quality of Arizona's higher education system as a major factor when they evaluate Arizona's attractiveness and competitiveness.

Arizona's higher education system, therefore, must develop a sophisticated, highly skilled workforce. Well-educated employees will be more willing to move to Arizona if Arizona offers them, family members, and their children a quality higher education system.

Arizona's higher education system itself is an economic engine. Investing in Arizona's higher education, technology, and research has a multiplier effect on Arizona's economy and tax base. Technology transfer and spinoff companies from the research universities, particularly in the biomedical, healthcare, financial services, and technology industries, play a vital role in Arizona's economy. In 2011, students who graduated from Arizona public universities between 1989-1990 and 2010-2011 earned $11.9 billion in wages. So financially, the 236,000 graduates are contributing over $800 million in tax revenue annually.

The key to securing Arizona's future through higher education is collaboration between employers, economic development organizations, and Arizona's higher education institutions. The challenge is getting these diverse organizations to work together. Employers need to understand that they are in the business of lifelong learning. When employers and higher education institutions align their economic interests, the economy as a whole benefits.

Employers should work with higher education institutions to develop experiential learning opportunities, internships, externships, apprenticeships, and clinical experiences. Higher education institutions also should work with local employers to identify their workforce needs.

In a global economy, Arizona must produce a world-class work force. Arizona's proximity to Mexico offers a unique opportunity for Arizona students to gain a global perspective and cultural awareness.

Role of Technology

Technology increasingly plays a transformative role in Arizona's higher education system. Technology reinvents how higher education institutions deliver education and improve productivity. The range of educational technologies is growing at an exponential rate. Adaptive learning technologies and multi-modal course design delivered through online and in-person modalities have already changed higher education. They present

opportunities to meet the wide range of means by which individual students learn best and outcomes can be analyzed and improved. New technologies and online delivery facilitate participation by non-traditional students, such as persons with disabilities, seniors, working adults, and gifted youngsters working beyond their grade levels.

The digital divide that currently exists needs to be addressed over time. The implementation of technology in instruction needs to recognize the importance of critical thinking and that human interaction is an important element of learning for some individuals and a requirement of some disciplines.

Distance learning also comes with its own set of problems, namely the "digital divide" and the lack of human element. They will cause some students to drop out of online courses due to lack of interaction. Technology, therefore, should not replace the role of face-to-face interaction or be championed at the expense of failing to develop necessary social skills. In addition, poor quality online programs at some higher education institutions must be improved.

There also are upfront expenses to implement new technology and security needed to administer the networks and to protect individual privacy. We also must address the fact that many Arizona communities and constituencies have restricted access to technology and infrastructure needed to support online education. While technology introduces higher education to most areas, some will be left behind.

As already mentioned, only 17% of Arizona high school students have a bachelor's degree six years after they graduate. Higher education institutions need to emphasize student retention in the context of accessible enrollment. Better retention can be accomplished by better understanding student risk, success factors, a positive student experience, and incorporating programs to focus on improving college success.

Coordination and Collaboration

Arizona's higher education institutions, including public universities, tribal colleges, community colleges, and some private institutions, coordinate their efforts to benefit students. Generally speaking, communication is solid among public higher education institutions in Arizona. Examples include dual admission programs, student transfer arrangements, and common course numbering.

Professional organizations and councils, such as the Joint Council of Presidents, the Intertribal Council of Arizona, and economic development organizations, should further facilitate communication between higher education institutions. Special academic task forces helped obtain specific goals such as addressing transfer credits and a clearinghouse for data sharing. The downtown Phoenix medical campus is an example of increased cooperation between the universities. The Arizona Board of Regent's enterprise model is designed to facilitate even more coordination.

Arizona should review the tribal colleges, community college system, and university system to evaluate and determine ways to improve coordination. Changes to the public structure of universities, tribal colleges, and community colleges could improve coordination,

collaboration, and partnership among those institutions. Arizona should review, evaluate, and determine ways to improve coordination among the tribal and community colleges and the universities.

Measurements and Outcomes

Arizona has developed solid objective metrics of success. Subjective metrics remain a greater challenge.

The Arizona Board of Regents (ABOR), community colleges, and private institutions have developed models for creating objective performance metrics to measure academic success. ABOR has adopted the enterprise model for public universities as a way of measuring success. In a recent report, Vision 2020, ABOR established 32 different targets and goals for the public university system to achieve by the year 2020. The metrics used to measure success include input, output, and demographics. Input metrics include student enrollment numbers, face-to-face courses, online courses, and number of transfer students. Output metrics include the number of degrees awarded per year in various academic programs. Demographic metrics include a comparison of tuition to family income. Institutions of higher education have made significant movement away from enrollment-based metrics and toward outcome-based metrics. This movement gives higher education institutions better information and allows them to make better use of resources to improve outcomes.

We can identify objective indicators and proxies of subjective metrics, including student outcomes. They include accreditation, professional licensing, grading, merit-based scholarships, faculty evaluation by students, individual student assessment of that student's education experience, and post-degree employment.

Measuring subjective goals, however, is difficult. Some qualitative measures are unknown and unknowable, including some aspects of the quality of the education itself. Some outcomes can never be measured. Higher education institutions would benefit greatly if they had the ability to capture the student's intent at the time of enrollment and subsequently measure that student's progress toward that goal. As ABOR continues to define and refine the metrics and as the community college system develops performance metrics appropriate to two-year institutions, it is important to prioritize and weight metrics in ways that are specific to the particular goals and mission of the particular institutions.

The metrics and the incentives that we select impact the delivery of higher education. Measuring and rewarding by the numbers can invite abuse such as "teaching to the test." External forces, such as federal requirements and accreditation, affect the metrics and the delivery methods.

The complexity of student enrollment makes measuring outcomes challenging as multiple higher education institutions have played a role in many students' success, but that role may not be measured by the metrics. That lack of measurement may cause the system to overlook some students. The metrics and incentives also need to take into account their potential adverse impact on underrepresented students, including minority students and students from low-income families, rural areas, and tribal areas. The changes put in place as a result of the metrics may have unintended consequences on these populations.

20

When developing metrics, private institutions face different challenges. These institutions by necessity must focus on outcomes and value added. The audience for their performance metrics is potential students. They also use enrollment as a proxy for subjective goals and public perception of the institution.

Looking forward, all metrics and incentives must encourage learning and reflect the goals and needs of the students, institutions, and Arizona.

Government's Role

Higher education is a public good essential to the vitality of our democracy and economy. An educated citizenry is an important part of democracy. Government, therefore, plays several significant roles in higher education; most important is serving as a source of funding. The cost of higher education instruction should be "nearly as free as possible" per Article 11, section 6 of the Arizona State Constitution. Getting state per-student investment to the national average would facilitate this. Access also should be expanded through public support for financial aid.

The state should play a role in subsidizing the cost of higher education through scholarships and grants as a function of financial need. Arizona must make higher education more accessible to the poor and "near" poor. Otherwise, that student population risks becoming disenfranchised. Means testing should be used to ensure that all Arizonans have access to quality higher education. The national average is $450 in financial aid and $172 in merit scholarships. Arizona's average is $36 per student for financial aid and $50 for merit scholarships.

Arizona should establish other funding sources for students to use in funding their higher education. Arizona has reduced funding for public universities by $406 million from 2008 to 2012. State-level scholarship funding could leverage the limited, but currently available, higher education scholarship funds. Arizona also could expand existing tax credits so that they apply to higher educational institutions. The federal government should expand established funding programs for veterans to enhance access. Arizona's congressional delegation should maintain and seek to increase available PELL grant funds. Private resources, including for profit businesses and not-for-profit foundations, also are important and should be tapped to fund educational opportunities.

Higher education is critical to Arizona's future success, so higher education spending should be perceived as a necessary, long-term investment in Arizona's future. On the federal level, higher education institutions should continue to seek the benefits of funding for research and other grants. Those institutions must be careful not to get distracted by overly burdensome regulations. On the state level, we should urge the Legislature to consider a return of over $400 million to the university and community college systems. The restored funding would be focused on making higher education more accessible and affordable for Arizona students. State funding should support capital improvements and competitive faculty salaries necessary to maintain our universities' status as top-tier research institutions.

Additionally, merit-based scholarships, grants, and partnerships between higher education institutions and local governments are important ways to provide access to

higher education. We also should improve the preK-12 education pipeline and graduation requirements to relieve our higher education institutions of the burden of the remedial instruction sometimes required for admitted students. Realistic metrics and accountability must continue to be applied to all institutions receiving government funding to measure overall success and return on investment.

Affordability

When it comes to higher education, access and affordability are not consistent across Arizona. Particularly at the tribal and community college level, public education in Arizona is fairly affordable and accessible today. Arizona also has done well at diversifying the choices and price points for higher education. Arizona's institutions should provide significant scholarships and student aid, particularly for students from low-income families, and also for middle-income families who do not qualify for PELL grants but who do not otherwise earn enough money to support their educational needs. In general, Arizona students are able to complete their higher education with low indebtedness.

The link between cost and access is direct and critical. Cost remains a principal barrier for large populations of poor and near poor who are one paycheck away from financial disaster. People in this economic group and even middle-class families are frozen out of higher education because of economic pressures and lack of disposable income to invest in higher education today.

The economic impact has a geographic and cultural component, particularly when it comes to baccalaureate programs. People in rural and tribal communities in Arizona are struggling. Compared to a 12% poverty rate statewide, Arizona's rural areas have nearly 25% poverty rates and tribal areas have 40% to 48%. Many Hispanics and tribal members also have strong cultural ties to where they live, creating mobility constraints that restrict their access. We should be more culturally sensitive to underrepresented students and their families by providing improved awareness of higher education opportunities.

Arizona could take several actions to improve access and affordability to all students. Some of those actions include educating students and their families regarding higher education, helping them identify available resources, helping them become wise consumers, and providing them greater access to options. Arizona also should do more to reduce the cost of higher education.

Arizona students and their families need greater access to information regarding funding options for higher education. Arizona could do more to educate students and their families about those funding options. The process for seeking scholarships and financial aid is confusing. Arizona should consider creating a clearinghouse to publicize these opportunities so that they do not go unused.

Students and their families need to be wise consumers of higher education. Students and their families need to learn the actual cost of higher education, taking into account available resources. Arizona also should improve higher education financial counseling for students and their families while the students are in preK-12, maybe even adding financial

planning for higher education to the preK-12 core curriculum. Part of that counseling should educate students about making wise short-term and long-term financial decisions when looking at higher education funding and should address non-tuition expenses such as books, supplies, and housing.

Arizona must do more to formalize pathways, including alternative pathways, between institutions of higher education to facilitate access. Coordination of institutional scholarships will reduce barriers to transfer students. This coordination will benefit underserved communities, including rural and tribal communities that lack access to four-year programs.

Recommendations

To be competitive on the state and worldwide platforms, Arizona must commit to student success in higher education.

> • Arizona's education systems at all levels must continue to refine and improve the preK-12 pipeline so that incoming higher education students have successfully completed their Common Core Curriculum and are prepared for higher education. High school graduation requirements must be aligned with higher education entrance requirements.

• Critically, higher education requires dedicated and sustainable funding sources. Arizona's government leaders, specifically the Governor and the Legislature, must make this a top priority and respond to the strong desires of the people of Arizona to provide long-term, balanced solutions to funding education at competitive levels. This should include, at a minimum, increasing financial aid for students, expanding tax credits so they apply to higher education institutions, increasing funding for public higher education, and targeting programs for underrepresented, minority, and first generation students.

• Government at all levels should develop public-private partnership alternatives that promote investment in higher education.

• We encourage ABOR to periodically analyze the coordination between, and the proper weightings, effects, and effectiveness of metrics used by universities, tribal colleges, and community colleges.

• ABOR should be given state appropriations and, to the extent necessary, bonding authority to finance statewide research infrastructure. There are structural barriers to increasing funding for higher education that we should consider removing, including the repeal of Proposition 108, which requires the consent of a supermajority of the Legislature to develop new revenue resources.

• The Legislature and Governor should consider changes to Article 9, section 7 of the Arizona Constitution to allow public higher educational institutions to invest directly in private entities whose principal asset is intellectual property developed at the institution.

- On the state level, we should urge the Legislature to consider a return of over $400 million to the university and community college systems. The restored funding would be focused on making higher education more accessible and affordable for Arizona students.

- Implement a grant and scholarship program focused on low and middle income students.

- Restore the required state match funding for the system-wide adult basic education program that provides pathways to post-secondary education to 800,000 individuals in Arizona who currently do not have a GED.

- ABOR, universities, the tribal colleges, and the community colleges must identify and support alternative approaches to increase funding, including expanding partnerships between higher education institutions and local and state community foundations to raise funds for loans and gifts. They also should support the enhancement of current endowment models.

- Advocate for restoration and continued funding of programs such as the federal TRIO programs that include Upward Bound, Talent Search, Student Support Services, and Gear Up, which prepare middle school and high school students to be college ready. Local business leaders, charitable organizations, tribes, and communities must contribute time and resources to higher education.

- Arizona's institutions of higher education must identify why so many potentially qualified high school graduates do not pursue higher education and address the reasons. For example, if the reason is largely based on financial restrictions, then improving funding sources can reduce or eliminate the reason.

- Remove the requirement that enrolled members of Arizona tribes be "on reservation" residents to qualify for "in state" tuition.

- Eliminate JCCR (Joint Committee on Capital Review) review of university projects.

- Authorize DREAMERs to qualify for "in state" tuition. DREAMERs are individuals who came to Arizona at a young age and who graduated from Arizona high schools.

- Arizona's institutions of higher education must expand mentoring opportunities and job skills training for students, including mentoring students and families before they enter higher education.

- Experiential learning should play an expanded role in higher education to provide context and job skill training. Students should be able to participate in internships and have other workforce opportunities. This will require active partnerships between higher education institutions and businesses, local governments, and other organizations.

- Higher education institutions should continue to develop and implement technological innovations that improve the efficient delivery of education.

- Higher education institutions also must continue to enhance formal and informal coordination with each other to improve access to higher learning. The goal of the coordination should be to devise a long-term strategic plan. Coalitions should be formed to promote solid education policy, including increasing pathways for students.

- Higher education institutions and state and local economic development agencies must work to better align and coordinate strategic plans and initiatives in order to achieve a more diversified and sustainable economy for Arizona.

- Arizona's institutions of higher education must meet, discuss, and encourage implementation of best practices for higher education, including coordination with high schools and middle schools and their students and families. They must meet, discuss, and encourage implementation of best practices at high schools and middle schools for students and families so that they understand, engage in, and prepare for higher education. Student leader organizations in the public universities, tribal colleges, and community colleges should be included in the discussion. The exchange of information will provide pathways for improved efficiency and accessibility for all students.

Town Hall Participant Actions

We must become advocates for improving higher education in Arizona. We must share the message from this Town Hall, including sharing this Town Hall Report with all of our contacts. We must participate in follow-up activities related to this Town Hall, and we should encourage our friends and colleagues to participate as well. We should create public service announcements to broadcast our message. We must spread the word.

We also should organize a youth summit to strengthen student engagement in higher education. Individually, we should look for opportunities to provide internship or scholarship support to higher education students.

We also must send a clear message about the importance of higher education to Arizona's leaders, including the Governor and Legislature. We must ask our leaders pointed questions about Arizona's higher education and score their voting record. We must become engaged in the legislative process, including monitoring legislation. We must pressure our leaders to support and to promote higher education in Arizona. Their support must include investment in higher education for Arizona's future, which must include reliable and dedicated funding and merit-based financial aid. We must recruit and support leaders who champion higher education. We must vote.

Report of the 102nd ARIZONA TOWN HALL
Is Higher Education Ready for Arizona's Future?
April 21-24, 2013

**BACKGROUND REPORT PREPARED BY
THE UNIVERSITY OF ARIZONA**

PREFACE

By Gary Rhoades and Jenny J. Lee, Center for the Study of Higher Education, The University of Arizona

Arizona's future as a state is inextricably linked to its higher education system. Hence the title of these background papers for the May 2013 Arizona Town Hall: "Is higher education ready for Arizona's future?" Choices that are made today regarding higher education policy and practice will have a profound influence on the state's future. The background papers provide a foundation to Arizona Town Hall for understanding the choices that lie before the state. The papers detail higher education's current challenges and opportunities. They clarify the effects of continuing the system's current trajectory, and set the stage for making recommendations for securing a strong future for the state.

The background papers in this current town hall build on the May 2000 Arizona Town Hall, "Higher Education in Arizona for the 21st century." This 2000 report and the Town Hall report the following year, "Moving All of Arizona into the 21st Century Economy," spoke to the centrality of the state's higher education system to the state's possible futures. Its recommendations emphasized the critical role higher education plays in the economic and community life of the state. About the latter, the report stated: "All agreed that higher education improves the intellectual and cultural quality of life for the individual, as well as for the communities in which higher education institutions are set and for society as a whole" (p.xiii). About the former, the report stated in the first paragraph:

> The New Economy places a premium on the state's ability to create an environment fostering research and economic development, and on a highly trained and educated work force. The key linchpin for success in the New Economy is the educational system and it is at risk because of a lack of funding, coordination, and a sense of urgency from the Governor, the Legislature, and the public. (p.xi)

The closing sentences of that paragraph speak bluntly about the existing path.

> The Governor and the Legislature must act cooperatively now to create a resurgence in education for the benefit of all Arizonans. If we fail to do so, Arizona's economy will slip backward, making us a "have not" state, and this will harm the quality of life for generations of our citizens. (p.xi)

Some important progress has been made on the recommendations of the 2000 Arizona Town Hall. However, the basic trajectory of higher education policy and practice, particularly with the effects of the great recession, has continued. In order to secure a bright Arizona future, that trajectory needs to be changed.

As the background papers of this report indicate, Arizona has tremendous potential given its diverse demographics and geographical location. Indeed, in some significant regards it has the opportunity to chart a promising future path not only for itself, but also for the nation. Although on many indicators, educational and otherwise, the state lags far behind the national average, we believe that Arizona has the chance to take a leadership role nationally, capitalizing on opportunities embedded in the current context of the state and its higher education system.

We offer these background papers to inform and enrich the town hall discussion in ways we hope will facilitate coming to consensus on recommendations about a series of policy choices that will shape the higher education system's and state's ability to realize their full potential.

CHAPTER 1

Arizona Higher Education Overview

By The Arizona Board of Regents

A B S T R A C T

The following chapter provides a broad overview of Arizona Higher Education.

I N T R O D U C T I O N

This chapter provides data to demonstrate the role of higher education in Arizona's economy and the correlation of educational attainment with the State's economic well-being, including higher education's effect on job growth, employment, increased personal income and Arizona's future workforce.

The chapter also describes Arizona's higher education institutions and provides background on enrollment, graduation, and tuition and student debt. In addition, information is provided on higher education research's contribution to the economy.

For this report, higher education is defined as two- and four- year public and private, regionally-accredited, degree-granting institutions; postsecondary certificate-only technical and professional schools are not addressed in this chapter.

Arizona's Economy and Higher Education

H I G H E R   E D U C A T I O N   A N D   A R I Z O N A ' S   L A B O R   F O R C E

Educational attainment is strongly correlated with a state's economic well-being. Arizona's economy is dependent on the skills, knowledge and ability of its labor force. The future of Arizona's economic well-being is connected to the labor force it is able to create, attract, and retain.

Figure 1. Educational Attainment & Per Capita Personal Income by State in 2011
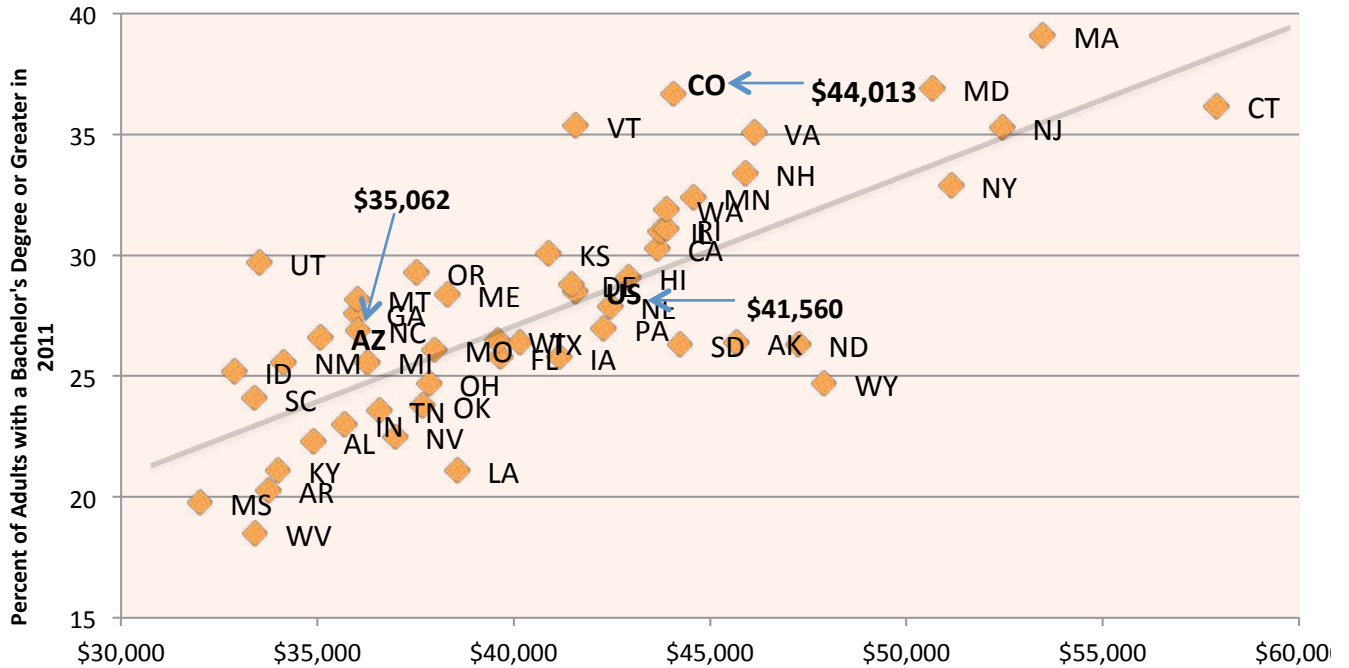
Source: *Arizona Board of Regents and US Census Bureau, 2011 American Community Survey*

As **Figure 1** indicates, Arizona is below the national average in educational attainment and per capita personal income. By comparison, West Virginia and Mississippi are on the low end of both educational attainment and average income while Massachusetts and Colorado have higher levels of educational attainment and higher average per capita incomes. Increasing Arizona's education attainment levels to that of Colorado, for example, may result in a significant increase in Arizona's per capita income.

FUTURE JOB GROWTH

From 2010 to 2020, it is anticipated that Arizona will have over 1.1 million job openings across nearly all occupational groups. Some of this growth will come from newly created jobs while others will come from replacing existing workers who retire or leave the workforce. Nearly 28 percent of those jobs created will require additional education beyond high school.

The most in-demand occupations in 2018 (see **Table 1**) will require educational attainment beyond a high school diploma.

Table 1

ARIZONA IN-DEMAND OCCUPATIONS AND EDUCATION REQUIREMENTS IN 2018		
OCCUPATION	**RANK**	**EDUCATION LEVEL**
Registered Nurse	1	Associate Degree
Network System & Data Communications Analyst	2	Bachelor's Degree
Medical & Health Services Managers	3	Bachelor's Degree or Higher
Pharmacists	4	First Professional Degree
Computer Systems Software Engineer	5	Bachelor's Degree
Computer Applications Software Engineers	6	Bachelor's Degree
Sales Managers	7	Bachelor's Degree or Higher
Physical Therapists	8	Master's Degree
Industrial Engineers	9	Bachelor's Degree
Dental Hygienists	10	Associate Degree
Accountants & Auditors	11	Bachelor's Degree
General Dentists	12	First Professional Degree
Civil Engineers	13	Bachelor's Degree
Family & General Practitioners	14	First Professional Degree
Postsecondary Health Specialties Teachers	15	Doctoral Degree
General Internists	16	First Professional Degree
Anesthesiologists	17	First Professional Degree
Management Analysts	18	Bachelor's Degree or Higher
Computer System Analysts	19	Bachelor's Degree
Lawyers	20	First Professional Degree
Medical Scientist, Except Epidemiologists	21	Doctoral Degree
Network & Computer System Administrators	22	Bachelor's Degree
Training & Development Specialists	23	Bachelor's Degree
Licensed Practical & Vocational Nurses	24	Postsecondary Vocational Training
Business Teachers, Postsecondary	25	Doctoral Degree
		Source: Arizona Department of Administration Office of Employment and Populations Statistics

EDUCATION AND UNEMPLOYMENT

An increased education attainment level is correlated to reduced unemployment rates. The following table shows January 2013 unemployment rates in the United States for persons 25 years of age with various levels of educational attainment. Persons with a bachelor's degree had an unemployment rate (**Table 2**) less than half the overall unemployment rate.

Table 2

Unemployment Rate by Educational Attainment in January 2013

United States	Unemployment Rate
Less than high school	12.0%
High school	8.1%
Some college or associates degree	7.0%
Bachelor's degree and higher	3.7%
TOTAL	**7.9%**

Source: US Department of Labor, Bureau of Labor Statistics, Table A-4.

EDUCATIONAL ATTAINMENT AND PERSONAL INCOME

Individuals with higher education levels are more likely to have higher earnings and more potential for earning growth. The following tables provide data for the most recent six-year change in median income by higher education attainment in Arizona (**Table 3**). Those with no higher education had a net reduction; conversely, the greater the education al attainment, the greater the increase.

Table 3

Median Earnings in Arizona by Educational Attainment for 2005 and 2011

	2005 Median Earnings	2011 Median Earnings	% Change
Less than high school	$18,223	$17,925	-1.6%
High school graduate	$25,621	$24,995	-2.4%
Some college or Associates degree	$32,074	$32,066	-0.0%
Bachelor's degree	$42,399	$46,485	9.6%
Graduate degree	$51,534	$57,249	11.1%
TOTAL	**$31,205**	**$32,165**	**3.1%**

Source: Arizona Board of Regents and US Census Bureau, 2005 & 2011 American Community Survey.

Other studies point to a strong correlation between education level and personal income, productivity, civic participation, and life expectancy, employment status and community strength.[1]

As might be expected, higher education attainment (**Table 4**) also has a direct correlation to an increase in the average family income.

---

[1] Source: Kentucky Council on Postsecondary Education.

Table 4

AVERAGE FAMILY INCOME BY EDUCATIONAL ATTAINMENT

Less than 9th Grade	$36,450
Grade 9-12, No Diploma	$40,000
High School Graduate	$59,567
Some College	$70,547
Associates Degree	$76,601
Bachelor's Degree	$109,065
Master's Degree	$130,876
Doctorate Degree	$160,498
Professional Degree	$188,930
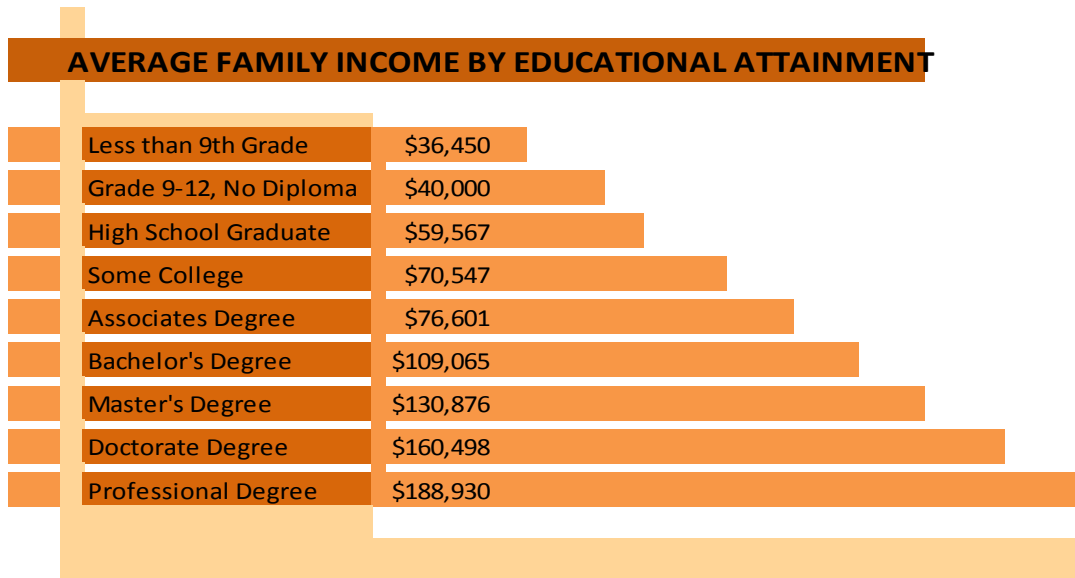
Source: Postsecondary Education Opportunity, 2009; The Mortenson Research Seminar on Public Policy Analysis of Opportunity for Postsecondary Education

FUTURE WORKFORCE

Similar to other states, Arizona's challenge is to prepare their young adults for the workforce of the future. Arizona currently ranks 40th in the nation in the percent of our high school graduates who go on to higher education. This is the highest ranking Arizona has achieved since 1990. **Figure 2** compares the percentage of high school graduates who go on to higher education in the year immediately following high school graduation with those states that send the largest and smallest percentage of high school graduates on to higher education.

Figure 2

College Going Rate in 2010 by State
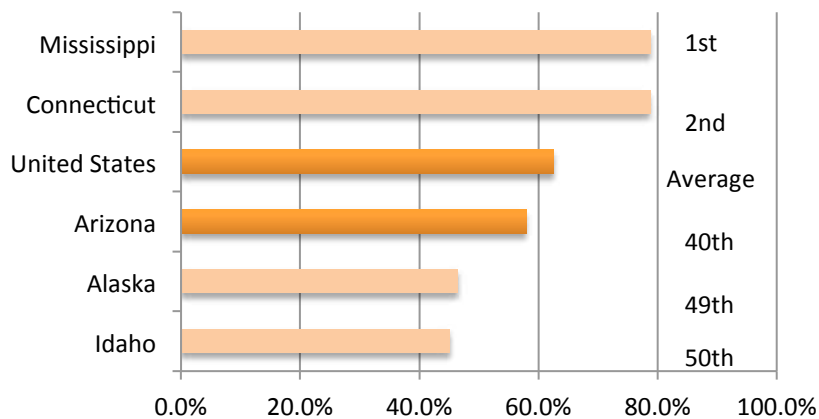
Source: Postsecondary Education Opportunity, January 2013

As an example of Arizona's comparatively low college going rate, **Table 5** shows the higher education status for the Arizona high school graduating class of 2011-2012. Over 46 percent of the 2011-2012 graduating class has chosen not to enroll in any form of higher education.

Table 5

Class of 2011-12, Number and Percentage, for Educational Status

Class of 2011-12	Number	Percent
Graduated from an Arizona High School	59,382	100.00%
Graduated from a <2 Year Institution	2	0.00%
Graduated from a 2 Year Institution	316	0.50%
Arizona Private Institution	0	0.00%
Arizona Public Institution	314	99.40%
Non-Arizona Institution	2	0.60%
Graduated from a 4-Year Institution	4	0.00%
Arizona Private Institution	3	75.00%
Arizona Public Institution	0	0.00%
Non-Arizona Institution	1	25.00%
Have Some College, Not a Graduate	31,427	52.90%
Arizona Private Institution	1,190	3.80%
Arizona Public Institution	26,859	85.50%
2-Year	16,216	60.40%
4-Year	10,665	39.70%
Non-Arizona Institution	3,378	10.70%
No Postsecondary Education	**27,633**	**46.50%**

Source: Arizona Board of Regents, January 2013

According to the latest U.S. census, 25.6 percent of Arizonans had a bachelor's degree in 2009, as compared to the national average of 27.9 percent. If this level of educational attainment continues, Arizona will fall short of the national average by about 220,000 college graduates by 2020.

Arizona's younger generations are less educated than its older adult population. Eight years after high school, only 21.2 percent of Arizona's high school class of 2003-2004 have received a postsecondary four-year degree and only 26.6 percent of Arizona's entire adult population has a bachelor's degree or higher.

HIGHER EDUCATION RESEARCH

Research performed in Arizona higher education institutions also contributes to Arizona's economy. In fiscal year 2011, Arizona's public and private universities generated over $1 billion in research expenditures, which flows directly into Arizona's economy.

Table 6

2010-11 Research Expenditures by University	Dollar Value
University of Arizona	$610,565,000
Arizona State University	$355,215,000
Northern Arizona University	$30,785,000
Thunderbird School of Global Management	$2,915,751
Dine College	$639,891
Midwestern University	$438,488
Tohono O'Odham Community College	$106,894
Southwest College of Naturopathic Medicine	$53,330
TOTAL	**$1,000,719,354**

OVERVIEW OF ARIZONA'S HIGHER EDUCATION INSTITUTIONS

This section provides basic information on Arizona's various higher education institutions, including enrollment, number of degrees awarded and graduation rates. Information on specific institutions is provided in **Appendix A**. Although this chapter creates a fairly comprehensive picture of higher education within Arizona, it does not include data for every Arizona higher education institution because there is no central database from which to collect information for all higher education institutions.

TOTAL ENROLLMENT BY TYPE OF INSTITUTION

Figure 3 shows the total enrollment numbers for two-year and four-year public and private higher education institutions. Arizona currently has approximately 479,415 students enrolled in a higher education institution.

Figure 3*
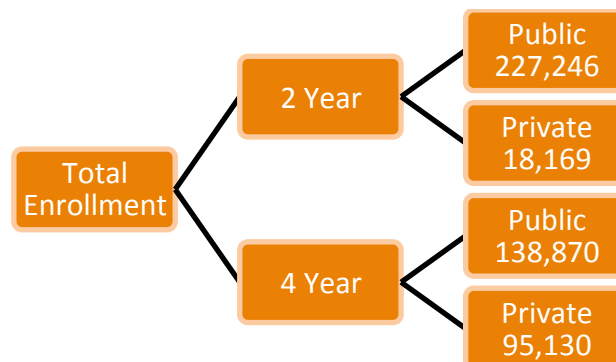
*These enrollment numbers exclude purely online enrollments from the four-year private for-profit institutions: University of Phoenix Online Campus, Argosy University – Phoenix Online Division, Carrington College – Online due to the fact that online students are not necessarily located within Arizona.

DEGREES AWARDED BY ARIZONA INSTITUTIONS

By 2018, 61 percent of all jobs in Arizona will require some form of higher education. Though workforce trends indicate the need for a more college-educated population, only a little more than half of Arizona's high school graduates pursue any form of higher education after graduating from high school. Only 17 percent of Arizona high school students have a bachelor's degree six years after graduation.

The charts (**Figure 4** and **Figure 5**) following show the number of awards and certificates for two-year institutions and baccalaureate and graduate degrees for four-year institutions.

Figure 4

2-Year Institutions: Degree Production
Academic Year 2010-2011

Figure 5

4-Year Institutions: Degree Production
Academic Year 2010-2011
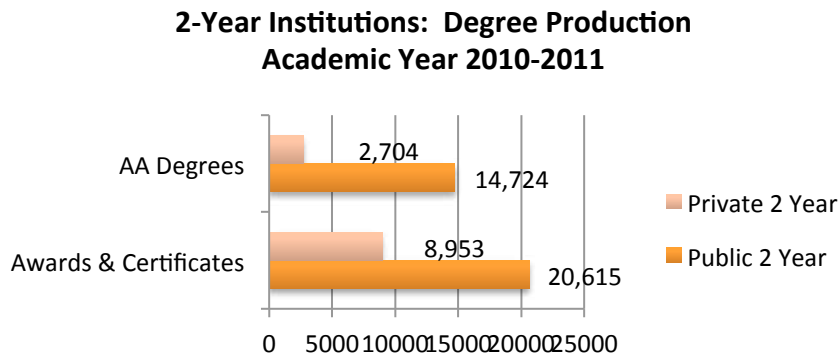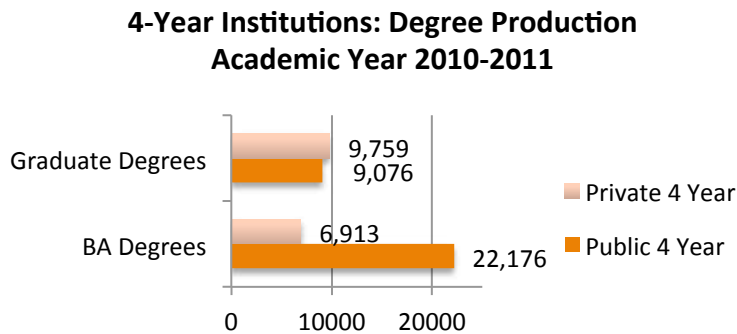
THREE- AND SIX-YEAR GRADUATION RATE

The three- and six-year graduation rate is a federally required metric for institutions receiving any federal money, such as Pell grants, and is one of several measures to monitor institution productivity. Graduation rates indicate the supply of skilled workers entering the workforce to support the economy. **Figure 6** below displays the percentage of first-time, full-time undergraduate students who graduate within three and six years respectively.

Figure 6

2-Year Institutions
3-Year Graduation Rate 2011

4-Year Institutions
6-Year Graduation Rate 2011
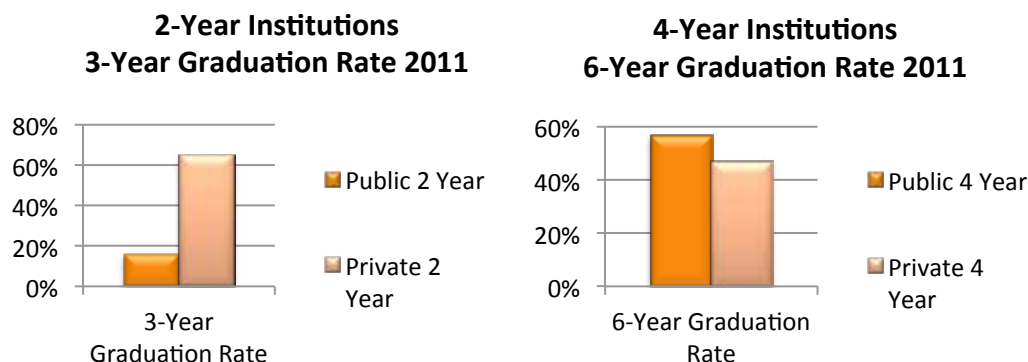
Overview of Tuition Costs, Student Loans and Debt

STUDENT COST INFORMATION

On a national scale, tuition has continued to increase for higher education at a faster pace than inflation. Nationally, tuition increased an average of 4.8 percent for fall 2012 (both private and public institutions).[2]

Table 7 below shows the average tuition and fee amounts along with other financial information for Arizona Institutions for 2011-2012.

	Tuition & Fees	Net Price	Average Loan	% of Students Taking Loans	Average Loan Across all Undergraduates
Public 2 Year	$1,813	$7,449	$5,425	17%	$900
Private 2 Year	$21,836	$19,773	$6,766	70%	$4,751
Public 4 Year	$9,325	$11,472	$7,335	47%	$3,424
Private 4 Year	$14,644	$21,652	$8,964	79%	$7,039

Although not all students take out loans, computing the loan amount across total enrollment provides a common measure for relative loan amounts.

STUDENT DEBT

Student debt levels can vary considerably among post-secondary institutions due to a number of factors, including differences in tuition and fees, living expenses in the local area, the demographic makeup of the graduating class, and the availability of need-based aid from the institutions and the states. In addition, not all students take out debt.

---

[2] Source: College Board 2012 Trends in College Pricing.

In its 2012 report, the Institute for College Access and Success estimates that nationally 66 percent of college seniors who graduated in 2011 had student loan debt, with an average of $26,000 for those with loans.

A graduate's likelihood of having debt and the average debt load also varied widely. State averages for students who have debt at graduation from four-year institutions ranged from $17,250 to $32,450. **Table 8** below shows the states with the highest and lowest average student debt levels for the Class of 2011.

Table 8

States with the Highest and Lowest Average Student Debt Levels,
Class of 2011

High Debt States

High Debt States		Low Debt States	
New Hampshire	$32,440		
Pennsylvania	$29,959	Utah	$17,227
Minnesota	$29,793	Hawaii	$17,447
Rhode Island	$29,097	California	$18,879
Connecticut	$28,783	Arizona	$19,950
Iowa	$28,753	Nevada	$19,954
Ohio	$28,683	Tennessee	$20,703
Vermont	$28,273	North Carolina	$20,800
District of Columbia	$28,241	Oklahoma	$20,897
		Texas	$22,140
New Jersey	$27,610	Washington	$22,244

Source: The Institute for College Access & Success Project on Student Debt

Please note that for-profit colleges are not included in the state averages. Less than two percent of the for-profit four-year institutions that awarded bachelor's degrees in the U.S. report student debt at graduation. However, for-profit colleges do report their annual student loan amounts. The average annual student loan amount for private institutions in Arizona is recorded in **Table 7**.

STATE FUNDED FINANCIAL AID

Arizona ranks near the bottom of the 50 states for state-funded financial aid for undergraduate students, as shown in **Figure 7.**

Figure 7

State Undergraduate Grant Aid per Undergraduate Student, 2010-11

NASSGAP, 42nd Annual Survey Report on State-Sponsored Student Financial Aid, 2010-11
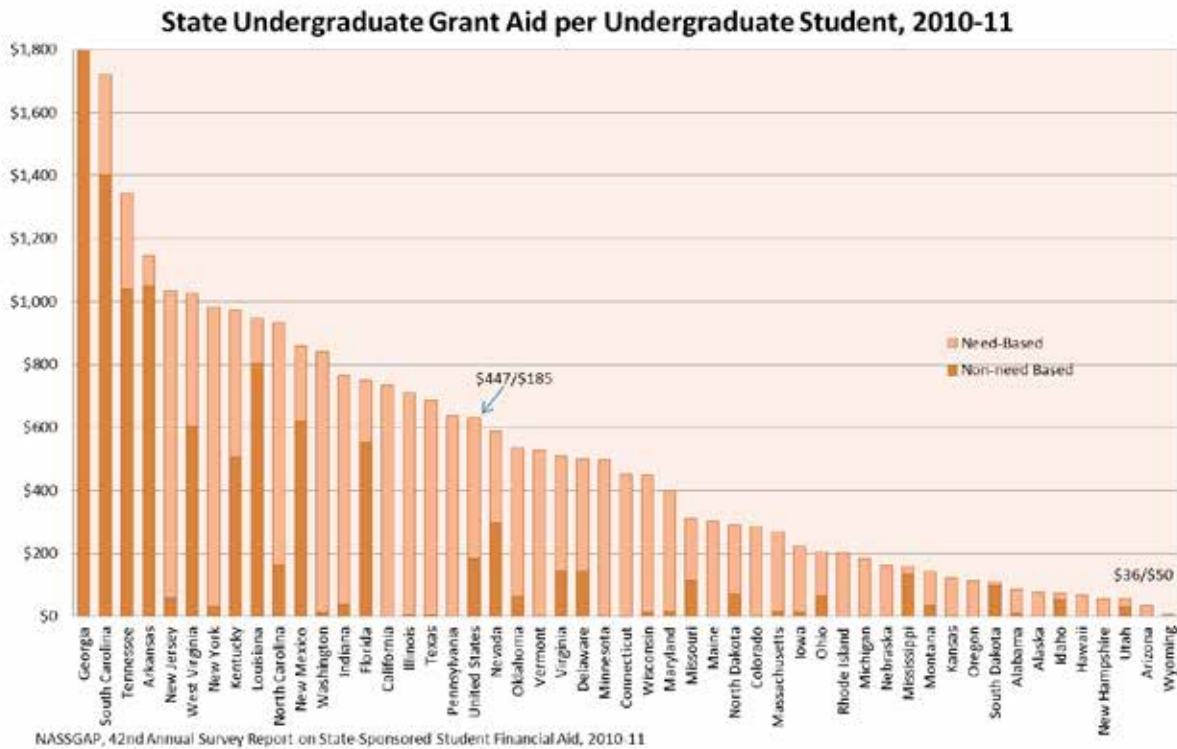
ARIZONA PUBLIC HIGHER EDUCATION INITIATIVES

Since the Seventy-Sixth Arizona Town Hall which focused on higher education in May 2000, there has been significant growth within Arizona's public higher education institutions. As well, Arizona's public institutions have engaged in several strategic initiatives to strengthen Arizona's higher education outcomes.

ARIZONA PUBLIC UNIVERSITIES AND THE ENTERPRISE PLAN

In 2010, the Arizona Board of Regents, which governs Arizona's three public universities (Arizona State University, Northern Arizona University and the University of Arizona), adopted an enterprise model for governing and managing the Arizona public university system. The university system has been reengineered to become more integrated with a focus on outcome-driven higher education. The Board's strategic enterprise plan recognizes each university's unique history and mission, but mandates the creation of synergies to ensure return on investment for students and Arizona.

Under the enterprise plan, the Arizona Board of Regents adopted 32 performance metrics to measure productivity. A list of the enterprise metrics is included in the appendix. Using the metrics, the Board monitors the universities' progress in meeting the goals which the Board established for the year 2020.

Figure 8 shows several of the enterprise metric goals for 2020 and the university system's progress towards those goals, as of February 2013. The public may view each university's progress toward each metric goal via the enterprise metrics dashboard available on the Arizona Board of Regents' website.

Figure 8

Arizona Higher Education Enterprise
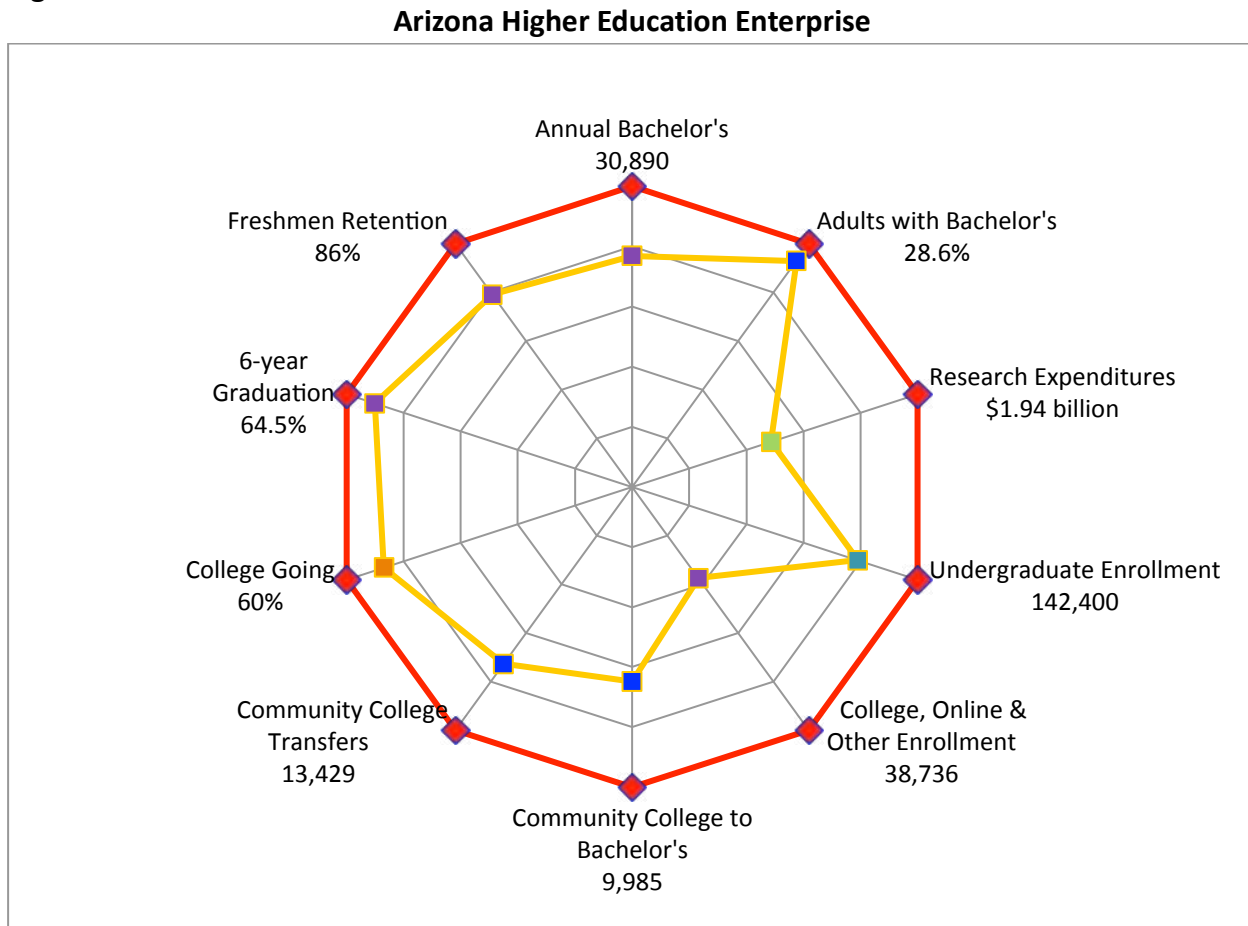
COMMUNITY COLLEGE STRATEGIC VISION

In 2011, Arizona's community colleges adopted a long-term strategic vision to increase the number of Arizonan's who achieve their postsecondary education and training goals, complete a degree or certificate, and/or transfer to a university. The plan outlined a clear vision for Arizona's 10 accredited community college districts and identified 30 key indicators of progress toward three major goal areas: broad access to postsecondary education and training, improved retention, and greater completion and transfer. To measure progress, the colleges implemented a rigorous self-assessment and accountability process centered on the annual collection and distribution of data related to the 30 indicators. Many indicators are aligned with those included in the American Association for Community Colleges' Voluntary Framework of Accountability initiative, which will allow for comparisons with national norms in the future. Data are used to guide continuous improvement efforts and are distributed to policymakers and education, business, and community partners to assist in the improvement of P-20 educational pathways, the economic strength of our state, and the quality of life for Arizonans.

A list of Arizona's public community colleges and their performance indicators are included in **Appendix C** and **Appendix D**.

Figure 9

Highlights of the Arizona's Public Community College's
2012 Strategic Vision Outcomes Report

Access
- Three quarters of all Arizona high school graduates who enter higher education the following fall matriculate at a community college. At 46 percent, Arizona's community college-going rate is higher than the national average of 26 percent.

Retention
- Arizona community colleges retain 93 percent of credential-seeking learners from fall to spring semesters, and 77 percent to the following fall. These are significantly higher than comparative national retention rates.

Completion
- Arizona's community colleges awarded close to 35,000 degrees and certificates in 2011, a   15 percent increase from 2010.

- In-state and overall transfer rates from Arizona community colleges, both 28 percent, exceed the national average of 25 percent.

- Statewide, 77 percent of community college students achieve a successful outcome within six years.

(ArizonaCommunityColleges.org, www.arizonacommunitycolleges.org/outcomes).

ACCESS AND AFFORDABILITY

Arizona has a long history of community college-university collaboration, which is a critical partnership in achieving the increased goals for degree production for the state. Recently, the public universities and community colleges created more clearly defined pathways and partnerships for students to pursue and obtain a degree, often at a reduced cost and with more locally based options. The universities and community colleges have developed partnerships to ease credit transfer, increase online programs, and develop new university/community college hybrid campuses and teaching-only campuses that offer high demand degrees.

Baccalaureate degree programs are available locally in all 15 Arizona counties through collaborations between universities and community colleges. The universities and community colleges estimate that students, who choose a community-college-to-university pathway will save 15 to 50 percent in tuition costs by following a prescribed set of courses leading to seamless transfer of credits, receive support from cross-trained advising staff, access to scholarships, and, in some degree areas, guaranteed program admissions. Currently, over 13,000 community college students are enrolled in university - community college pathway programs and the number of Arizona community college students who transfer to a university has increased by 16 percent to nearly 10,000 students in the fall of 2010. Nearly 6,500 transfer

students received a degree from one of the universities in 2010-11, an 11.5 percent increase over the previous five years.

The universities also offer 44 AAS (associate of applied science) to BAS (bachelor of applied science) degree programs, providing a degree pathway for students who pursue a technical degree at a community college programs directly tied to workforce development. In addition, there are multiple instructional delivery pathway options for the students, including:

- o   420 programs offering more traditional face-to-face instruction;
- o   598 on-line programs providing greater access and flexibility; and,
- o   35 programs combining face-to-face and online instruction.

PERFORMANCE FUNDING

A portion of the universities' state funding is now provided based on a performance funding model. Performance funding output-driven model rewards the universities in proportion to their gains in producing more degrees, more completed student credit hours, and more externally-financed research expenditures.

Under the performance funding model future appropriations to the universities comes through one of two paths:

- ❖ Performance funding, which is based on:
  - degrees conferred;
  - completed credit hours;
  - increased research funding.
- ❖ Strategically focused decision packages, including specific initiatives such as UA-College of Medicine

The following figure (**Figure 10**) provides an overview of the changes in funding for the Arizona universities over the past 10 years.

Figure 10

Changes in Funding for the Arizona Universities Over the Past 10 Years
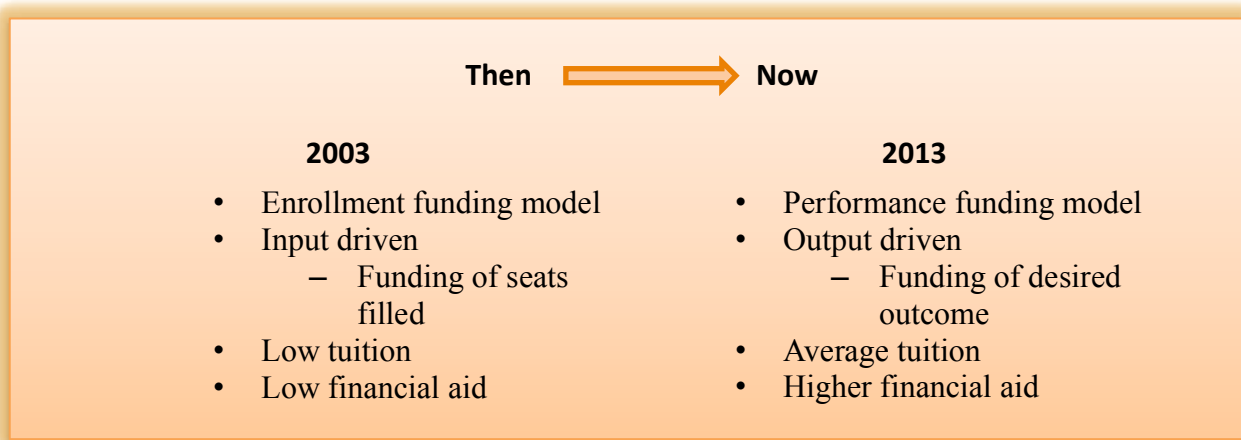
Then ➡ Now

2003
- Enrollment funding model
- Input driven
  - Funding of seats filled
- Low tuition
- Low financial aid

2013
- Performance funding model
- Output driven
  - Funding of desired outcome
- Average tuition
- Higher financial aid

Appendix A

Higher Education Institutions in Arizona

Public 2-Year Institutions	Total Enrollment	FTE Enrollment	2 Year Degrees Only	Certificates	3 Year Graduation Rate	Net Price	Federal Undergrad Loan Aid 2010-11		
								% Taking Loan	Avg Loan Across All Undergrads
2011-12	Fall 2011	Fall 2011	2010-11	2010-11	Fall 2011	2010-11	Avg. Loan		
Arizona Western College	8,418	4,687	656	970	16%	$8,518	$4,128	8	$330
Central Arizona College	7,442	4,020	440	534	29%	$7,681	$4,217	16	$675
Chandler/Gilbert Community College	14,030	7,650	747	775	15%	$8,218	$4,417	16	$707
Cochise College	4,912	2,748	1,198	1,488	15%	$3,805	$3,693	8	$295
Coconino Community College	4,373	2,263	236	46	7%	$9,240	$7,210	22	$1,586
Eastern Arizona College	6,997	3,780	296	685	25%	$7,039			
Estrella Mountain Community College	8,243	4,411	649	560	16%	$7,377	$4,801	24	$1,152
GateWay Community College	6,801	3,195	554	1,099	20%	$8,915	$7,073	21	$1,485
Glendale Community College	21,376	12,160	1,419	1,734	15%	$7,649	$4,443	16	$711
Mesa Community College	25,695	14,489	1,952	1,951	13%	$8,661	$5,089	22	$1,120
Mohave Community College	6,107	3,184	399	573	21%	$19,552	$5,943	26	$1,545
Northland Pioneer College	3,917	1,900	143	281	19%	$7,144			
Paradise Valley Community College	9,874	5,331	637	934	22%	$7,540	$4,649	14	$651
Phoenix College	12,565	6,542	901	1,227	19%	$7,898	$6,853	23	$1,576
Pima Community College	36,969	21,532	2,283	2,874	12%	$2,971	$4,858	16	$777
Rio Salado College	25,109	11,009	484	3,283	27%	$10,156	$6,941	20	$1,388
Scottsdale Community College	11,548	6,318	906	887	17%	$8,417	$4,853	16	$776
South Mountain Community College	4,738	2,573	363	334	16%	$8,089	$6,122	8	$490
Tohono O'Odham Community College	295	130	4	27	100%	$5,701			
Yavapai College	7,837	3,828	457	353	19%	$4,597	$4,917	10	$492
TOTAL	227,246	121,750	14,724	20,615	16%	$7,449	$5,425	17%	$900

Private 2-Year Institutions

2011-12	Total Enrollment Fall 2011	FTE Enrollment Fall 2011	Degrees & Certificates 2010-11	2 Year Degrees Only 2010-11	Certificates 2010-11	3 Year Graduation Rate Fall 2011	Net Price 2010-11	Avg. Loan	% Taking Loan	Avg Loan Across All Undergrads
Arizona Automotive Institute	1,321	1,321	1,312		1,312	87%	$23,761	$7,081	74	$5,240
Arizona College of Allied Health	691	691	483	66	417	50%	$18,072	$8,410	98	$8,242
Brookline College-Tempe	583	583	451	33	418	62%	$22,696	$7,500	79	$5,925
Brookline College-Tucson	849	849	772	112	660	60%	$22,018	$6,880	73	$5,022
Carrington College-Mesa	853	853	656	88	568	63%	$19,767	$6,941	46	$3,193
Carrington College-Tucson	592	592	465	17	448	56%	$18,888	$6,344	46	$2,918
Carrington College-Westside	600	600	322	172	150	62%	$26,001	$7,001	59	$4,131
Fortis College-Phoenix	316	316	48	0	48	61%	$16,111	$7,704	94	$7,242
Golf Academy of America-Chandler	197	186	176	176	0	69%	$21,655	$10,515	54	$5,678
Kaplan College-Phoenix	487	487	343	137	206	50%	$17,849	$7,839	64	$5,017
Lamson College	180	180	246	46	200	61%	$15,739	$7,912	47	$3,719
Pima Medical Institute-East Valley	491	491	579	2	577	91%	$14,583	$5,320	60	$3,192
Pima Medical Institute-Mesa	1,559	1,559	1,064	146	918	61%	$14,651	$6,732	59	$3,972
Refrigeration School Inc	782	782	426	52	374	64%	$22,548	$6,555	77	$5,047
Sanford-Brown College-Phoenix	879	868	223	7	216		$17,424	$6,496	97	$6,301
Southwest Institute of Healing Arts	1,054	1,052	316	48	268	62%	$16,012	$2,134	76	$1,622
The Bryman School of Arizona	757	757	466	13	453	76%	$20,464	$7,979	67	$5,346
Universal Technical Institute of Arizona Inc	3,136	3,136	1,604	1,589	15	68%	$19,490	$7,299	73	$5,328
Universal Technical Institute-Motorcycle Mechanics Institute Division	2,842	2,842	1,705		1,705	71%	$21,981	$7,028	75	$5,271
TOTAL	18,169	18,145	11,657	2,704	8,953	65%	$19,773	$6,766	70%	$4,751

Public 4-Year Institutions

2011-12	Total Enrollment Fall 2011	FTE Enrollment Fall 2011	Bachelor Degrees 2010-11	Graduate Degrees 2010-11	6 Year Graduation Rate Fall 2011	Net Price 2010-11	Avg. Loan	% Taking Loan	Avg Loan Across All Undergrads
Arizona State University	72,254	64,595	12,194	4,896	57	$10,599	$7,336	49	$3,595
Dine College	2,021	1,569	5			$8,297			
Northern Arizona University	25,359	21,521	3,782	1,802	52	$13,131	$7,092	55	$3,901
University of Arizona	39,236	35,974	6,195	2,378	61	$12,185	$7,553	40	$3,021
TOTAL	138,870	123,659	22,176	9,076	57%	$11,472	$7,335	47%	$3,424

Private 4-Year Institutions 2011-12	Total Enrollment Fall 2011	FTE Enrollment Fall 2011	Bachelor Degrees 2010-11	Graduate Degrees 2010-11	6 Year Graduation Rate Fall 2011	Net Price 2010-11	Federal Undergrad Loan Aid 2010-11 Avg. Loan	% Taking Loan	Avg Loan Across All Undergrads
American Indian College of the Assemblies of God Inc	86	78	6		50	$16,246	$5,018	38	$1,907
Anthem College-Phoenix	2,663	2,663	55		21	$19,271	$8,592	86	$7,389
Argosy University-Phoenix	868	723	14	192		$20,374	$9,349	79	$7,386
Arizona Christian University	598	530	55		31	$21,749	$10,208	74	$7,554
Arizona School of Acupuncture and Oriental Medicine	51	51		15					
Brookline College-Phoenix	1,585	1,580	13		57	$21,293	$6,642	75	$4,982
Brown Mackie College-Phoenix	510	510	0			$22,181	$6,455	95	$6,132
Brown Mackie College-Tucson	726	726	10			$23,609	$6,970	88	$6,134
Carrington College-Phoenix	785	785	12			$19,308	$6,725	46	$3,094
Chamberlain College of Nursing-Arizona	406	321	69			$27,749	$9,818	90	$8,836
College America-Flagstaff	284	284	5			$19,861	$9,639	95	$9,157
CollegeAmerica-Phoenix	301	301				$21,024	$8,892	100	$8,892
Collins College	892	750	197		41	$24,988	$6,698	93	$6,229
DeVry University's Keller Graduate School of Management-Arizona	549	254		162					
DeVry University-Arizona	1,762	1,219	244		32	$23,949	$9,348	86	$8,039
Embry-Riddle Aeronautical University-Prescott	1,723	1,654	347	15	57	$33,720	$7,079	60	$4,247
Everest College-Phoenix	2,254	1,666	75		23	$25,869	$9,223	84	$7,747
Everest College-Phoenix	300	267	1			$22,139	$8,270	65	$5,376
Frank Lloyd Wright School of Architecture	24	24	3	4			$7,000	25	$1,750
Grand Canyon University	40,487	17,976	2,859	6,025	31	$16,776	$9,444	79	$7,461
International Baptist College	75	60	10	7	58	$20,051	$5,310	30	$1,593
ITT Technical Institute-Phoenix West	162	148	0						
ITT Technical Institute-Tempe	721	632	72		15	$21,706	$9,117	82	$7,476
ITT Technical Institute-Tucson	518	446	45		14	$21,268	$9,668	82	$7,928
ITT Technical Institute-Phoenix	463	413	0			$21,329	$8,767	86	$7,540
Le Cordon Bleu College of Culinary Arts-Scottsdale	1,560	1,560	191		51	$25,532	$7,541	73	$5,505
Midwestern University-Glendale	2,787	2,770	1	537					
National Paralegal College	837	821	100			$11,870	$7,963	67	
Northcentral University	9,662	5,648	104	478		$24,198	$8,827	8	$706
Ottawa University-Phoenix	975	387	231	189			$11,771	70	$8,240
Phoenix Institute of Herbal Medicine & Acupuncture	129	115		14					
Phoenix School of Law	969	801		126					
Phoenix Seminary	209	103		24					
Pima Medical Institute-Tucson	1,617	1,617	10			$14,544	$7,415	59	$4,375
Prescott College	1,134	893	184	86	29	$25,882	$11,540	74	$8,540
Southwest College of Naturopathic Medicine & Health Sciences	383	375		52					
Southwest University of Visual Arts-Tucson	258	188	34		70	$40,332	$11,422	81	$9,252
The Art Institute of Phoenix	1,190	1,082	193		51	$27,652	$9,693	90	$8,724
The Art Institute of Tucson	491	375	24		0	$27,598	$10,064	85	$8,554
Thunderbird School of Global Management	1,267	886		661					
University of Advancing Technology	1,052	1,050	192	8	29	$26,588	$8,161	67	$5,468
University of Phoenix-Phoenix-Hohokam Campus	6,262	6,262	849	709	17	$21,176	$9,968	65	$6,479
University of Phoenix-Southern Arizona Campus	2,316	2,316	376	225	23	$21,934	$9,961	71	$7,072
Western International University	3,239	3,239	332	230	2	$24,340	$10,216	43	$4,393
TOTAL	95,130	64,549	6,913	9,759	47%	$21,652	$8,964	79%	$7,039
Does NOT Include The Following Arizona Located Institutions:									
Argosy University-Phoenix Online Division	13,863	12,227	201	511		$36,407	$8,021	91	$7,299
Carrington College-Online									
University of Phoenix-Online Campus	307,871	307,871	21,638	19,822	6	$16,585	$8,787	65	$5,712

Appendix B

	ARIZONA BOARD of REGENTS
	ENTERPRISE METRICS
	Goal One: Educational Excellence & Access
1	Number of bachelor's degrees awarded
2	Number of master's degrees awarded
3	Number of Arizona community college students who transfer to a university
4	Number of Arizona community college transfer students awarded bachelor's degrees
5	Educational Quality
	a. Measure of Teaching Effectiveness: Student Learning
	b. Measure of Overall Effectiveness: Student Satisfaction
6	Actual cost of attendance as a percentage of Arizona median family income
7	Graduation rate (6 year)
8	Freshmen retention rate
9	Undergraduate enrollment (21 st day)
10	Total Enrollment (21st day)
11	4 yr graduation rate of community college transfers
12	College-going rate (from K-12)
	Goal Two: Research Excellence
13	Total research expenditures
14	Number of research/scholarship (PhD) doctoral degrees awarded
15	Number of invention disclosures transacted
16	Patents issued
17	Intellectual property income
	Goal Three: Workforce and Community
18	Combined statewide economic Impact of university system
19	Total income and expenditures related to service and engagement activities
20	Number of degrees awarded in high demand fields
21	Diversity of graduates
22	New companies started
23	Milken Institute State Science and Technology ranking
24	Adults with bachelor's degrees in Arizona
25	Number of professional practice doctoral degrees awarded
	Goal Four: Productivity
26	Number of bachelor's degrees awarded per 100 FTE students
27	Composite financial index (CFI)
28	Tuition at average of peer institutions
29	Online degrees and certificates awarded
30	Employment of graduates who stay in AZ
31	Total educational expenditures per degree awarded
32	College,online & Other enrollment
	February 2013

Appendix C

Arizona's Community College Districts and Colleges

District	Community College
Cochise County Community College District	Cochise College
Coconino County Community College District	Coconino Community College
Graham County Community College District	Eastern Arizona College
Maricopa County Community College District	Chandler-Gilbert Community College Estrella Mountain Community College GateWay Community College Glendale Community College Mesa Community College Paradise Valley Community College Phoenix College Rio Salado College Scottsdale Community College South Mountain Community College
Mohave County Community College District	Mohave Community College
Navajo County Community College District	Northland Pioneer College
Pima County Community College District	Pima Community College
Pinal County Community College District	Central Arizona College
Yavapai County Community College District	Yavapai College
Yuma/La Paz Counties Community College District	Arizona Western College

Appendix D

Community College Strategic Vision Metrics

Access Indicators

-FTSE enrollment
-Enrollment of underserved populations
-Percent of credit hours earned via alternative delivery methods and/or at alternative times and places
-High school capture rate
-Overall college-going rate (with the universities)
-Success after developmental math rate
-Success after developmental English/reading rate
-Cost of attendance as a percentage of Arizona median household income

Retention Indicators

-Developmental course success rate
-College-level course success rate
-Percent of learners successfully completing college-level math and/or English
-Percent of full-time learners completing 42 credits, and percent of part-time learners completing 24 credits, by
  the end of their second academic year
-Fall-to-next-term retention rate
-Fall-to-fall retention rate

Completion Indicators

-Percent of learners achieving their stated education or training goals
-Number of degrees and certificates awarded annually
-Graduation (degree/certificate completion) rate
-Percent of learners who complete an AGEC within 6 years
-Number of in-state university transfers
-Percent of transfers with an AGEC and/or degree at time of transfer
-In-state university transfer rate
-Overall transfer rate
-Percent of learners achieving a successful community college outcome (defined as earning a degree or certificate,
  transferring to another two- or four-year institution, continued enrollment, and/or leaving the institution after
  earning 30 or more credits)
-Percent of full-time transfers to Arizona public universities who earn a bachelor's degree within 4 years
-Percent of all transfers who earn a bachelor's degree within 4 years
-Percent of occupational program completers passing a licensure exam within one year
-Percent of occupational program completers either employed with a livable wage or enrolled in further education
-Percent of ABE/GED learners who enter employment
-Percent of ABE/GED completers enrolled in postsecondary education or training
-Percent of adults with associate or bachelor's degree

CHAPTER 2

Public Higher Education for the Public Good in Arizona: Characteristics and Challenges

By Blanca M. Torres-Olave, Center for the Study of Higher Education, The University of Arizona

ABSTRACT

In 2011 alone, students who graduated from Arizona's public universities between 1989-1990 and 2010-2011 earned nearly $11.9 billion in wages in Arizona and paid an estimated $861 million in state and local taxes. Through their diverse missions, public colleges and universities provide solutions to the considerable economic and social challenges facing the state, be it through their teaching, research, or service functions. The major challenges faced by these institutions include devising strategies to improve college affordability for Arizona residents, as well as ensuring sustainable pathways for the access and success of students of low-income and minority backgrounds.

INTRODUCTION

Public postsecondary institutions in the Arizona not only play key roles in human capital development and capacity building; they are also part and parcel of the state's social and cultural fabric. They are brokers of information and collaboration between state and federal agencies, Native nations, local school districts, businesses, and non-profit organizations; they are also significant purveyors of employment, and engines of technological development and innovation. Significantly, public institutions in Arizona are aware of the considerable economic and social challenges facing the state, and actively focus their services in response to these challenges. At the same time, the public good missions and academic quality of these institutions are faced with barriers to providing access to Arizona's changing population.

HIGHER EDUCATION IN ARIZONA: PROMINENT, BUT MISSING A MIDDLE TIER OF MASTERS GRANTING UNIVERSITIES

Public higher education in Arizona is part of a larger postsecondary system comprising public, private for-profit and private not-for-profit institutions. Postsecondary education in Arizona is distinguished by three characteristics: an unusually small private not-for-profit sector of institutions; a large for-profit sector; and a large but not fully differentiated public sector. **Table 1** shows the distribution of postsecondary institutions in the state in each of these sectors.

Table 1

Arizona Degree-granting Postsecondary Institutions, By Control Type

	Control Type	4-year	2-year
Public		3	20
Private	For-profit	31	18
	Not-for-profit	11	0
	Total	46	38

Source: National Center for Education Statistics, Digest of Education Statistics 2011

As mentioned above, the not-for-profit private higher education sector in Arizona is unusually small, both in terms of number of institutions and enrollments. While national average for enrollment in not-for-profit institutions is 20.1%, in Arizona it is only 1.8%. Moreover, Arizona's enrollments in the independent non-profit sector is also small relative to states with similar population, such as Indiana, Massachusetts, Tennessee, and Washington, all with populations of between 6 and 7 million residents. In each of those states there are nationally prominent private colleges and universities (e.g., University of Notre Dame, Harvard, MIT, Boston College, Vanderbilt University, Fisk University, Gonzaga, and Whitman), as well as numerous other important independent institutions. The proportion of higher education enrollments in the independent sector in these states is 20%, 55%, 25%, and 6.3% respectively (NCES, 2011, tables 219 and 222).

By contrast, Arizona has a large and prominent for-profit sector of higher education. That sector includes two and four year institutions, and it is dominated in terms of enrollments by two for-profit universities: the University of Phoenix, and Grand Canyon University. As is typical of the for-profit sector, these two institutions educate students in a relatively narrow range of fields, such as business, education, and nursing.

Arizona's public institutions consist of three major public universities and twenty single- and multi-campus community colleges, including two tribal colleges that operate with public and local funds. However, in contrast to most states, Arizona's public sector does not have a middle tier of masters granting, open access universities (such as the California State University system, which sits between the Universities of California system and the community colleges). That means Arizona's public universities carry the unusual dual responsibility of doing research and providing doctoral and professional education, as well as providing relatively broad access to Arizona residents at the undergraduate level. In most states, the

> Arizona's public sector lacks a middle tier of masters granting, open access universities.

leading public universities have a higher level of selectivity at the undergraduate level because there is a middle tier of open access public universities that do not grant doctoral degrees.

THE ROLE OF PUBLIC INSTITUTIONS FOR ARIZONA'S POSTSECONDARY ENROLLMENT PATTERNS

On a broad scale, the enrollment landscape at Arizona degree-granting institutions has changed considerably over the past decades. In 1970, Arizona higher education institutions had a total enrollment of 109,619 students, 98% of which attended public institutions. By 2010, enrollment in degree-granting postsecondary schools reached a total of 795,388, as shown in **Table 2** (NCES, 2012).

Table 2

Arizona Total Fall Enrollment at Degree-granting Institutions, By Control and Level of Institutions, 2010

		2-year	4-year	Total by sector
Private	**Non-profit**	0	8,817	8,817
	For-profit	16,132	403,463	419,595
Public		230,220	136,756	366,976
	Total enrollment			795,388

Source: National Center for Education Statistics, Digest of Education Statistics 2011

Although enrollment in private for-profit institutions has grown dramatically, it is important to contextualize these enrollment figures so as to reach a more accurate assessment of enrollment patterns in the state. The enrollment of 403,463 students at 4-year private for-profit schools shown in **Table 2** consisted largely of the 307,965 students in the online campus of the University of Phoenix, and the 37,440 at Grand Canyon University that the NCES includes in the Arizona statistics, even though students in this category may reside in different states (NCES, 2013). Excluding the online enrollments at those two campuses (96% of Grand Canyon University's enrollments for 2010-2011 were online)[1], total 4-year for-profit enrollment in Arizona was 94,001, or 11.8% of the state total postsecondary enrollment.

At the same time, the 2-year private for-profit category includes many institutions that offer specialized certificates below an associate's degrees, such as the Arizona Automotive Institute, the Refrigeration School, and the Scottsdale Culinary Institute. In other words, the figures for the University of Phoenix and Grand Canyon University online enrollments, along with non-degree enrollments the 2-year for-profit sector, contribute to inflating the number of degree-seeking enrollments in Arizona.

Excluding the online campuses and the 2-year for-profit institutions, enrollment in Arizona degree-granting institutions totaled 469,794 in 2010. About 49% of these enrollments were in public 2-year (230,220), 29% in public four-year institutions (136,756), 20% in 4-year private for-profit schools (94,001), and 1.8% (8,817) in private not-for-profit institutions.

---
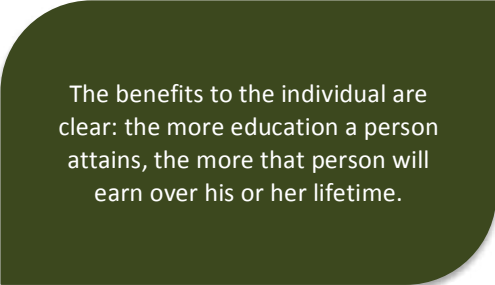
[1] As of June 30 2011, total enrollment and Grand Canyon University was 95.9% online and 4.1% attending classes at the

These figures present a more accurate picture of the degree-seeking enrollment distribution in Arizona, in which the importance of public institutions is made clear. Not only do public universities account for close to 80% of all enrollments, but Arizona is home to unique institutions, including the University of Arizona, one of the world's leading research universities and a member of the prestigious Association of American Universities; Arizona State University, one of the country's largest universities, which is seeking to define a new model for research universities based in part on expansion and mass student enrollment; Northern Arizona University, one of the largest regional universities in the country; and Maricopa County Community College—one of the largest and most prominent community college districts in the U.S.

It must be stressed that the importance of public postsecondary education in Arizona cannot be conveyed by enrollment figures alone. Arizona's public postsecondary education institutions create economic and social value benefitting in the state, the communities they serve, and the state's residents. The following section describes some of the main economic and social contributions that public institutions make to the state of Arizona.

ECONOMIC AND SOCIAL IMPACTS OF PUBLIC HIGHER EDUCATION IN ARIZONA

Economically, universities and the community colleges create values in several ways. They educate students who move into the Arizona workforce and pay taxes. They are also major employers, directly contributing to the tax base through their employees. Further, they conduct research that generates expenditure, and they attract students, visitors, and entrepreneurs. The significance of public higher education in regional development is such that a major international study by the Organization for Economic Cooperation and Development (OECD, 2012) recently explored this topic in the southern Arizona region. This chapter draws on that report and offers additional examples from other regions of Arizona.

> The benefits to the individual are clear: the more education a person attains, the more that person will earn over his or her lifetime.

In their role as purveyors of educational opportunities to Arizona residents—and in attracting students from other states—public institutions, which in provide the vast majority of Arizona's bachelor's and graduate degrees, serve as a catalyst for human capital development which results in significant individual and societal benefits. The benefits to the individual are clear: the more education a person attains, the more that person will earn over his or her lifetime. The Arizona Board of Regents (ABOR) highlighted the human capital benefits of a college education for Arizona workers in Chapter 1. In 2011, the median earnings in Arizona of an individual with a graduate degree were $57,249 and $46,485 for someone with a bachelor's degree. By contrast, individuals with some college but no degree had median earnings of $32,066, while high school graduates had median earnings of $24,995. In other words, an

Arizona bachelor's degree holder working in Arizona has median earnings 86% ($21,490) higher than a high school graduate, while the median earnings of graduate degree holders are 23% ($10,764) above those of an undergraduate degree recipient.

At the same time, the higher median earnings of degree holders in Arizona also have a cumulative and profound impact on the generation of state tax revenues. In 2011, students who graduated from Arizona's public universities between 1989-1990 and 2010-2011 earned nearly $11.9 billion in wages in Arizona and paid an estimated $861 million in state and local taxes. The annual average wage of these workers was $51,327, as compared $44,490 for all similar workers in Arizona. This is a difference of 15% ($6,837) per graduate (ABOR, 2012).

> Higher median earnings of degree holders in Arizona also have a cumulative and profound impact on the generation of state tax revenues.

THE INDIVIDUAL ECONOMIC IMPACT OF ARIZONA'S PUBLIC INSTITUTIONS

As demonstrated in Chapter 1, each of Arizona's three public universities has a tremendous impact on local economic development. For example, in 2004 the University of Arizona generated 41,272 jobs, $1.2 billion in earnings, and $2.3 billion in total dollar impact in Arizona. Some units on campus have an especially large impact on the region. The University of Arizona Health Services Center contributes more than $2.5 billion annually to the state's economy, and the University of Arizona Science and Technology Park (UASTP), founded in 1995, created 13,676 jobs in Arizona in 2007, 97% of which were in Pima County (Southern Arizona's Regional Steering Committee, 2009).

Likewise, Arizona State University (ASU) is a major employer and tax income generator. As a whole, ASU directly employs over 20,000 Arizonans, generating $961 million in wages annually. At the same time, 59,318 full- or part-time jobs in the region can be attributed to the direct and multiplier effects of ASU. Together, ASU employee and student spending inject over $1.8 billion into the local economy every year. It is also hard to overestimate ASU's contribution to research and development in Arizona: SkySong, ASU's Innovation Center, generates $113 million in economic impact annually, and over $100 million in venture capital has been invested in startup companies mentored by ASU Technopolis since 2013 (ASU Alumni Association, 2013).

Finally, Northern Arizona University (NAU) also has tangible positive effects on the Arizona economy. In FY 2010-2011, Northern Arizona University contributed nearly $1.5 billion to the state's economy, mainly through student, employee, and institutional spending, but also by attracting visitors, retirees and alumni. Significantly, one in every eight jobs in Coconino County is attributable to NAU's presence in the region. For every 100 people employed by NAU and other businesses and organizations as a result of NAU's operations, another 51 positions are generated throughout the state (Inside NAU, 2011).

Public community colleges also have a positive economic impact in the state. For example, Maricopa County Community College District is one the largest community college district in the United States, serving more than 270,000 students each year, and employing a staff of close to 10,000. The District is the largest provider of workforce training in Arizona; through its Center for Workforce Development, it serves as a central resource for information about the labor market, local and national economic and workforce trends, and workforce issues.

Other community college districts play equally important roles in their communities. Cochise College is the eighth largest employer in Cochise County, with 348 full-time and 464 part time employees. The college has a large impact the regional economy. In fiscal year 2009, college employees were paid a total of S18.1 million, which in turn created an additional 190 local jobs and S6.8 million in earnings, according to estimates by the college's Center for Economic Research (Southern Arizona's Regional Steering Committee, 2009).

Likewise, the average annual added income due to the activities of Central Arizona College (CAC) and its former students equals $246.6 million, or approximately 5.8% of the total Pinal County economy. An independent investment analysis estimated that CAC provides a benefit/cost ratio of 17.1, that is, every dollar of state and local tax money invested in the college yields a cumulative of $17.10 in benefits that accrue to all Arizona residents, in terms of added taxable income and avoided social costs (EMSI, 2012). The same benefit/cost ratio analysis for Yavapai College shows that every dollar that the state invests in YC generates $10.50 in the state economic activity (Yavapai College District Governing Board, 2011).

Public institutions have generated hundreds of programs and initiatives that range from the provision of health care, legal aid, and other services to individuals and communities in need; personal enrichment programs; preservation of autochthonous languages and traditions; neighborhood planning and policy advice; and cultural performances and facilities.

PUBLIC INSTITUTIONS IN THEIR COMMUNITIES: SERVING THROUGH UNIQUE MISSIONS

It is important to note that the contributions of Arizona's public postsecondary institutions to the state stretch far beyond economic benefits. Public institutions have a responsibility to extend their knowledge and services to local communities and regions, to address pressing social issues that affect the state's quality of life. Guided by their varied public-good missions, public institutions have generated hundreds of programs and initiatives that range from the provision of health care, legal aid, and other services to individuals and communities in need; personal enrichment programs; preservation of autochthonous languages and traditions; neighborhood planning and policy advice; and cultural performances and facilities.

Public universities and community colleges have different organizational mandates and structures, as well as varied areas of emphasis and mechanisms for contributing to the state's

economic and social development. The mission of community colleges, for instance, is firmly rooted in providing quality, affordable tertiary education opportunities for all Arizona residents while training a range of practitioners central to the vitality of the state (See "Training Arizona's First Responders").

Further, one of the strengths of Arizona's community colleges system is their receptivity to the learning needs of working youth and adults. At Pima Community College, for instance, 72% of the students enrolled on part-time courses. Only 44% are day students; the others study at night, during the weekend or through distance education modalities. This pattern is similar at other institutions: At both Coconino Community College and Cochise Community College, 75% of the students are enrolled part time.

At the same time, community colleges in Arizona are active in developing programs and initiatives to enhance the quality of life in the communities they serve. For example, both Pima Community College and Cochise College have developed family literacy projects which serve adults seeking GED equivalence diplomas as well as job skills classes. These programs also promote family learning by including activities through which parents and children write, read and play together. Similarly, Yavapai College is home to the Del E. Webb Family Enrichment Center, a child development center focused on promoting children's learning which also offers free parenting workshops. Likewise, Tohono O'odham Community College offers programs focusing on direct employment, apprenticeships, and transfer degrees. Its apprenticeship programs prepare students for a variety of building trades, have open enrollment, and are free of cost (OECD, 2012).

TRAINING ARIZONA'S FIRST RESPONDERS

Pima Community College is the top trainer of first responders in southern Arizona. From 2006 to 2010, Pima and its Public Safety and Emergency Services Institute granted a total of nearly 500 certificates or degrees to EMTs, paramedics, firefighters and police officers (PCC, 2011). Likewise, Coconino Community College (CCC) graduates fill vital occupations in healthcare and protective services. CCC graduates make up 11% of registered nurses, 11% of paramedics, 51% of firefighters, and 43% of detention officers working in Coconino County.

In Phoenix, the Maricopa Community College Homeland Security Consortium coordinates the efforts of the system's 10 campuses and 2 skill centers to develop a system of training programs catered to the changing needs of local and federal emergency management agencies. As part of this effort, MCC offers an associate of applied science (AAS) degree and certificate programs in occupational safety and health, water resource management, and security training, as well as nine associate degree and 24 certificate programs in law enforcement; three AAS degrees and four certificate programs in emergency medical services; and one AAS degree and three certificate programs in hazardous materials handling, among others (AACC, 2006).

Arizona's three major universities, in turn, also contribute to economic and social development by upholding the three major functions of public universities in the US: research, teaching, and

service. A prime example of the public benefit of public universities lies in the example of "land grant" universities in the U.S., which benefited from the Morrill Act of 1862 in granting land to the states to establish a university that would serve the state by expanding access and providing support to the state's through its practical arts (e.g., agriculture, engineering, science) without excluding classical studies as well.

Historically, land grant universities have been fundamental to the development of agriculture and the mining industry, among other realms of economic and social development, through extension and other services that the university has provided to the state's citizens and enterprises. The University of Arizona is the state's institution with that explicit land grant mission. Yet Arizona State University and Northern Arizona University also generate expertise directly responsive to the unique characteristics of the region, in part through a range of professional schools and programs preparing practitioners in the health professions, special education (and education more generally), engineering, law, and architecture, among other fields. In short, in various professions central to the vitality of the state economically, socially, and in terms of health, the state's universities are at the core of preparing these practitioners.

> A number of strategic industry clusters have been identified as growth sectors in Arizona, including bioindustry, solar and environmental technology, aerospace, information technology, optical sciences, advanced composites, and tourism.

Further, Arizona's public universities have programming relevant to cultural characteristics, geographical situations, economic realities and environmental settings.

Some of the strongest research units at Arizona's public universities can trace their origins to a regional geographic impetus like aridity or clear skies at the U of A, forestry at NAU, and solar power at ASU. Over time, these strengths have melded with economic impetuses from the growth of industrial niches. Indeed, a number of strategic industry clusters have been identified as growth sectors in Arizona, including bioindustry, solar and environmental technology, aerospace, information technology, optical sciences, advanced composites, and tourism (OECD, 2012).

PARTNERING WITH THE PUBLIC & PRIVATE SECTORS TO IMPROVE LIFE IN ARIZONA

Many of the regionally-focused initiatives mentioned above both shape and are shaped by public/private sector partnerships. All public institutions have explicitly stated their commitment to forming collaborative partnerships with businesses, public sector organizations, other HEIs and non-profit organizations. The U of A has developed customized research services offered to partners such as Pima County, Tucson Regional Economic Opportunities (TREO), and many other state, federal and local agencies and private sector partners.

At ASU, the concept of "social embeddedness" is a key component of the institution's eight design aspirations for a New American University model. The institution sees itself assuming major responsibility for the economic, social and cultural vitality of the communities that surround it. ASU has 505 community outreach programs in 175 locations, offered by 121 different units, totaling 767 outreach opportunities. The institution is working on initiatives to invigorate downtown Phoenix businesses, bring educational opportunities to working adults and opened up clinical and internship opportunities to aspiring journalists, nurses, teachers and social workers. It is also actively involved in partnerships with the city of Phoenix, the City of Chandler and multiple other governmental agencies. Finally, through its tech transfer activities and organizations the university plays a crucial role in growing the state economy by launching and accelerating new companies and promoting use inspired research, in collaboration with local communities, state government, and business partners (ASU News, 2012).

COMMUNITY COLLEGE PARTNERSHIPS FOR ARIZONA'S WELL-BEING

Community colleges are also important promoters of partnerships with public and private organizations. For example, Cochise College, in partnership with the Southern Arizona Community Foundation, organizes and administers the Center for Economic Research, which prepares yearly economic outlook reports for the population centers of the county, prepares economic impact reports in regards to development initiatives, and holds annual economic outlook forums in Bisbee, Douglas, Benson and Sierra Vista. Municipal governments, business and community leaders, and the public are invited to these forums to discuss regional economic realities and anticipated changes and opportunities (OECD, 2011).

Arizona community colleges are also at the vanguard of implementing both curricula and partnerships to increase environmental sustainability. In 2010, Arizona Western College (AWC) launched new workforce development programs in solar thermal and solar photovoltaic engineering and the AWC solar array project. This effort included the expansion of partnerships for local economic growth. AWC is also exploring funding opportunities to build an alternative energy technology center. In turn, Mohave Community College was awarded a solar energy grant to build a solar energy system on the college's Bullhead City Campus. The system is expected to provide about 5 percent of the campus electric power (Arizona Community College Presidents' Council, 2011).

In addition to maintaining numerous public-private partnerships with businesses, government, and other institutions (such as NAU-Yuma, NAU-Yavapai and 2NAU programs at community colleges) to increase college affordability and accessibility in Prescott Valley, NAU is also part of world-renowned collaborative efforts in sustainable energy research and implementation. The university partners with organizations such as the Southwest Renewable Energy Institute in performing sustainability outreach; other partners include the National Renewable Energy Laboratories, the US Department of Energy, the National Science Foundation, tribal organizations, Electric and Water Utilities, renewable energy project developers and manufacturers, resource assessment companies, and other industries with intense energy use, as well as other educational institutions (NAU, 2013). Like the 4-year institutions, Arizona's

community colleges actively seek partnerships to enhance economic development and quality of life in the state (see Community College Partnerships for Arizona's Well Being).

CHALLENGES FOR PUBLIC HIGHER EDUCATION IN ARIZONA

As described in the previous section, Arizona's public postsecondary education includes research universities with a strong research focus and a responsive community college sector. Both sectors make important contributions to the state's economic and social well-being. At the same time, these institutions face challenges in terms of providing access and support to Arizona's changing population.

LOW EDUCATIONAL ATTAINMENT

Chapter 1 highlighted Arizona's low educational attainment rates in comparison to the rest of the nation with over 46 percent of the 2011-2012 graduating class not enrolling in any form of higher education. An important factor underlying the low academic attainment in Arizona comes from the disparities in educational attainment between racial and ethnic groups. Since World War II, Arizona has had one of the fastest growing populations in the United States, including the fastest growing Hispanic population in the country (about 25% of the state population). The ethnically diverse population also includes a significant number of Native Americans, a population that in its size and importance is particularly prominent in Arizona.

Despite the importance of these groups in Arizona's demographic landscape, Hispanic and Native Americans lag behind Whites in education attainment at all levels. For example, in 2005, 34.1% of 18 year olds were of Hispanic origin, but only 26.9% of the high school graduates were Hispanic. High school graduation rates for Arizonan Native Americans and Hispanics in 2006 were 46% and 61% respectively, compared to 74% for white students (OECD, 2012). The representation of Hispanics decreases at each successive point in the educational pipeline: In 2005, Hispanics comprised 19.2% of first-time college freshmen, 20.9% of recipients of associate degrees, and 11.5% of recipients of bachelor's degrees.

The representation of Hispanic and American Indian students in postsecondary education varies across institutions, as shown in **Table 3**. Among community colleges, Hispanic enrollments range from a high of 57% at Arizona Western College to a low of 7% at Northland Pioneer College. In turn, enrollments of Native American students are highest at Northland Pioneer College (29%) and lowest at Cochise College (1%). Among four-year universities, students of Hispanic origins constitute between 17-22% of the total student population, while Native American student enrollments range from 1-4%.

Table 3

Percentage of Hispanic and Native American Students in Arizona Postsecondary Institutions

Level	Institution	Hispanic	Native American
4-year	Arizona State University	19	2
	Northern Arizona University	17	4
	University of Arizona	22	1
2-year	Cochise College	40	1
	Coconino Community College	11	22
	Eastern Arizona College	20	8
	Maricopa Community Colleges	21	3
	Mohave Community College	15	2
	Northland Pioneer College	7	29
	Pima Community College	32	2
	Central Arizona College	27	5
	Yavapai College	9	3
	Arizona Western College	57	2

Source: IPEDS 2013, Arizona Community College Presidents' Council (2011). Enrollment data for 4-year institutions are for fall 2011; data for 2-year institutions are for fall 2010.

This representation gap is also evident in the graduation rates at 4-year institutions. In 2009-10, the Arizona university system awarded 21,037 bachelor's degrees and 8,521 graduate degrees. Compared to ten years ago, the universities have increased the number of bachelor degrees awarded by 33% and the number of graduate degrees by 25%. However, graduation rates at the three institutions are much lower for underrepresented minorities than for White students. In 2010, the graduation rate for White students was 60.4%, closely followed by 61.2% for Asian students. In contrast, the graduation rate for Hispanics was 51%, 41.4% for Blacks, and 18.8% for American Indian students (CHE, 2012).
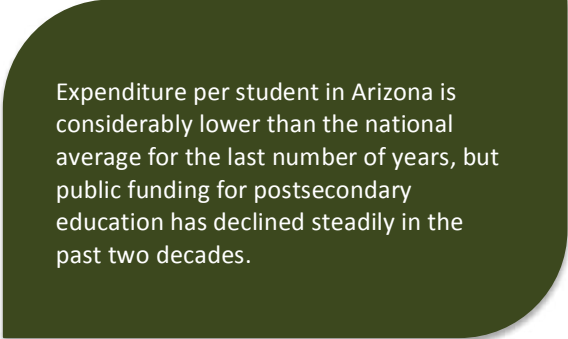
Arizona's ability to substantially expand its proportion of higher education graduates by 2020 will require significantly increasing the college success of its underserved populations, including students from low-income families, first-generation students, and minorities. With this in mind, in its Long-term Strategic Plan 2008-2020 the Arizona Board of Regents has identified the need for aggressive degree production strategies, including measures for helping more K-12 students to plan, prepare, and succeed in obtaining a bachelor's degree.

DETERIORATING LEVELS OF PUBLIC FUNDING TO SUPPORT COLLEGE AFFORDABILITY

Widening postsecondary access for Arizonans is not only about providing opportunities to enroll in a postsecondary education institution, but also about making sure that students do not face additional barriers to succeed beyond their own efforts and motivation to achieve good academic results. Expenditure per student in Arizona is considerably lower than the national

average for the last number of years, but public funding for postsecondary education has declined steadily in the past two decades.

The funding of postsecondary education in Arizona further deteriorated with the global financial and economic crisis. In 2010, state funds for higher education operating expenses totaled $814,457,600, 25% less than in 2009 (CHE, 2012). At the onset of the crisis, the state government of Arizona imposed a $145 million cut to state universities and the Arizona Board of Regents. Community colleges have been similarly affected, facing budget cuts of nearly $73 million. In response, institutions have implemented hiring freezes for state-funded positions; closed, merged or consolidated programs, departments and colleges; and cut state-funded campus jobs through reductions, position eliminations and not filling vacant positions. These conditions create challenges for the ability of the state's public institutions to maintain their academic quality and to fulfill their public good function.

> Expenditure per student in Arizona is considerably lower than the national average for the last number of years, but public funding for postsecondary education has declined steadily in the past two decades.

The diminishing level of public postsecondary funding may affect the ability of many Arizonans to afford a college education. Faced with drastic budget cuts, public institutions in the state have increased their tuition fees, with serious consequences for access. The National Center for Public Policy and Higher Education's *Measuring Up 2008 Report Card on Higher Education* gives Arizona a failing grade on key indicators of college affordability, noting an upward trend over time in the percentage of family income needed to pay for college expenses.

According to the report, the share of family income, even after financial aid, needed to pay for college has risen substantially. As **Figure 1** shows, in 2007-2008, the cost of attending community college in Arizona represented 21% of the average family income, in contrast to 17% in 1999-2000. Attendance at a public four-year institution in Arizona was equivalent to 24% of the average income, up from 20% in 1992.

To attend public two- and four-year colleges in Arizona, students and families pay less than the U.S. average but more than those in the best-performing states. Significantly, higher education in Arizona has become less affordable for low-income students and their families. Poor and working-class families must devote 31% of their income, even after aid, to pay for costs at two-year colleges (NCPPHE, 2008).

Figure 1

Percentage of Income Needed to Pay for Public Two- and Four-Year Colleges
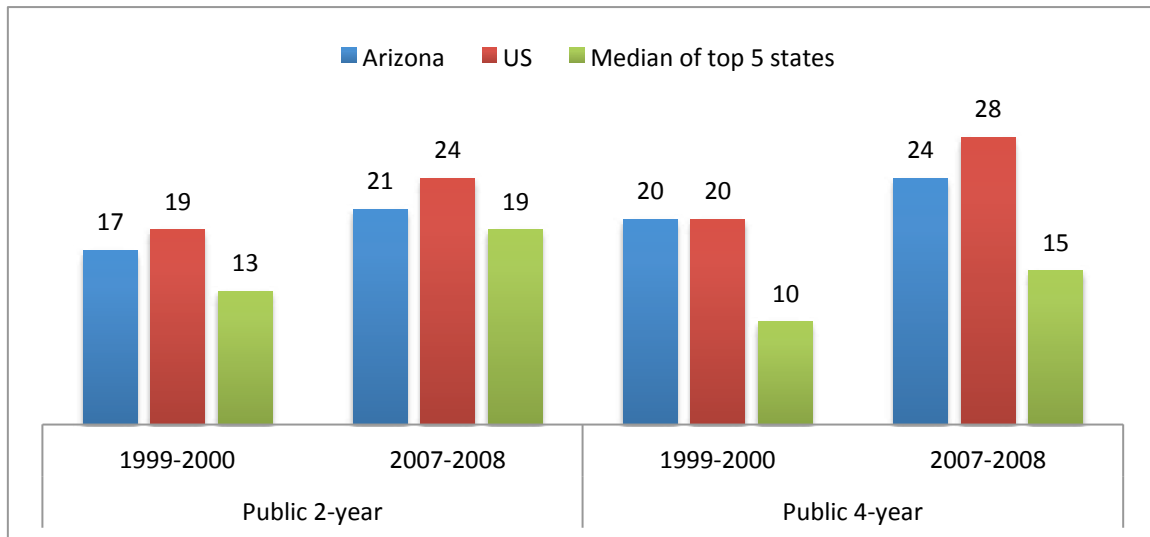
Legend: ■ Arizona ■ US ■ Median of top 5 states

	Public 2-year		Public 4-year	
	1999-2000	2007-2008	1999-2000	2007-2008
Arizona	17	21	20	24
US	19	24	20	28
Median of top 5 states	13	19	10	15

Source: National Center for Public Policy and Higher Education's Measuring Up 2008 Report Card on Higher Education

Compounding the affordability problem is the fact that Arizona provides very little state financial aid. In 2009, the state allocated only USD 26 per student on financial aid, compared to an average figure of USD 549 nation-wide (CHE, 2009). The State of Arizona is therefore spending a mere 4.7% of the national average for student aid.

The acute need for financial aid is evident in the proportion of students applying for Pell Grants. At Pima Community College, for example, the proportion of low-income students who apply for financial aid and are eligible for Pell Grants grew from 64 to 70% between 2006 and 2009, while the proportion of first generation students who applied went from 38 to 40% in the same period (OECD, 2011). For every dollar in Pell Grant aid to students, Arizona spends only three cents (NCPPHE, 2008).

CONCLUDING THOUGHTS

Public higher education is a valuable asset for the state of Arizona. It is not just that there are private benefits to a college education for the graduates, economically and otherwise. It is that there are public benefits that colleges and universities provide to the community, region, and state as a whole. The work of the state's public universities and community colleges directly enhances the state's economic and social vitality. That is true of these institutions' instructional work, at the undergraduate as well as graduate and professional levels, these graduates earn more and pay more taxes. They are the state's physicians, nurses, first responders, teachers, architects, businesspersons, engineers, and more, all of whom are at the core of a strong Arizona. More than that, the research, service, and outreach work of public colleges and

universities also yield great economic and social benefit to communities, the region, and the state. In each of these regards public institutions are generating extraordinary value.

Public higher education in Arizona bears a large share of the responsibility for educating the state's students, and it does so with a very small share of state support, among the lowest levels in the nation. Although the state has a large for-profit sector, that sector's work is specialized in a few fields, and in the largest provider in this realm by far, enrollments have been declining substantially in recent years. As for the not-for-profit sector of higher education, it is particularly small compared to other states, including states of comparable population.

The consequence of the two preceding points is that college affordability (in terms of cost even after institutional aid) has been declining in Arizona, including in its public colleges and universities. The challenge to institutions of how to meet increasing demand from students with decreasing state support has led them to increase tuition and fees, particularly in the four year public sector. The result is an affordability challenge.

The affordability challenge is partly linked to and particularly problematic in a state with a low average household income profile, as is the case with Arizona. It is also problematic in a state that has a growth demographic of a school population that is particularly lower income and that historically has been relatively underserved by the schools and by higher education. The next chapter explores those issues in more depth.

The public policy question before Arizona is whether as a state it will choose to take on the goal identified by the Arizona Board of Regents, by community colleges, by national bodies like the Lumina Foundation, and by the National Governor's Association (as evidenced in the plans of many states, across the political spectrum). That goal is to expand the proportion of the state's population with a college education, which is well below the national average, as a necessary step to enhance the vitality and future of the state economically and socially. If policy makers choose to accept that goal, public colleges and universities will be central players in providing solutions and paths to achieving it, given their prominence in the state.

Questions to Consider

- What is the unique role of public higher education for the state?
- How can higher education become more affordable for low-income students?

REFERENCES

ABOR (Arizona Board of Regents) (2012). *University System Quick Facts*.
http://www.azregents.edu/universitysystemquickfacts/default.aspx.

American Association of Community Colleges. (2006). *First Responders: Community Colleges on the Front Line of Security*. Retrieved online March 3, 2013 from http://www.aacc.nche.edu/Publications/Reports/Documents/firstresponders.pdf.

Arizona Board of Regents. (2012). *Annual Report on Wages Earned by Arizona University System Graduates*. Retrieved March 5, 2013 from https://azregents.asu.edu/academicaffairs/Academic%20Affairs%20Agenda%20Books/2012-12-05-Item-6C-2012-Annual-Report-on-Wages-Earned-by-Gradautes.pdf.

Arizona Community College Presidents' Council (2011). *Annual Report FY 2010-2011*, Vol. I. Retrieved March 4, 2013 from http://www.centralaz.edu/Documents/ipr/AnnualReport2010_11complete.pdf.

ASU Alumni Association. (2013). *ASU Facts*. Retrieved March 5, 2013 from http://sundeviladvocates.org/index.php/asu-facts

ASU News. (April 27, 2012). *Social embeddedness a key part of ASU's identity*. Retrieved March 5, 2013 from https://asunews.asu.edu/20120427_social_embeddedness.

CHE (The Chronicle of Higher Education) (2009). *The Almanac of Higher Education 2009-10,* The Chronicle of Higher Education, Washington, D.C.

CHE (The Chronicle of Higher Education) (2012CHE).*The Almanac of Higher Education 2009-10,* The Chronicle of Higher Education, Washington, D.C.

Coconino Community College. (2010). *Economic Impact*. Retrieved March 5, 2012 from http://www.coconino.edu/research/Documents/Economic-Impact-Both-Pages-Revised.pdf.

Economic Modeling Specialists, Inc. (2012). *The Economuc Contribution of Central Arizona College*. Executive Summary. Retrieved March 4, 2013 from http://www.centralaz.edu/Documents/ipr/institutional_planning/facts/CentralAZ_ES_1011_Finalv1.pdf.

Fain, P. (February 26, 2013). Possible Probation for Phoenix. *Inside Higher Ed*. retrieved online March 3rd, 2013 from http://www.insidehighered.com/news/2013/02/26/university-phoenix-faces-possible-probation-accreditor.

Fain, P. (November 11, 2011). More Selective For-Profits. *Inside Higher Ed*. retrieved online March 3rd, 2013 from http://www.insidehighered.com/news/2011/11/11/enrollments-tumble-profit-colleges.

Gonzales, A. (August 4, 2011). Income, enrollment rises at Grand Canyon University. *Phoenix Business Journal*. Retrieved March 5, 2013 from http://www.bizjournals.com/phoenix/news/2011/08/04/income-enrollment-rises-at-grand.html.

Inside NAU. (January 21, 2011). *NAU economic impact reaches $1.5 billion*. Retrieved MArch 4, 2013 from http://www4.nau.edu/insidenau/bumps/2011/1_21_11/econ.html.

Lewin, T. (October 17, 2012). University of Phoenix to shutter 115 locations. *The New York Times*. Retrieved March 3rd, 2013 from http://www.nytimes.com/2012/10/18/education/university-of-phoenix-to-close-115-locations.html.

NCES (National Center for Education Statistics) (2012). *Digest of Education Statistics 2011*. U.S. Department of Education.

NCES (National Center for Education Statistics) (2013). *National Center for Education Statistics, Integrated Postsecondary Education Data System* (IPEDS). Available online at http://nces.ed.gov/ipeds/.

NCHEMS (National Center for Tertiary education Management Systems) (2007). *A Feasibility and Demand Study for the State of Arizona*, NCHEMS, Boulder.

NCPPHE (National Center for Public Policy and Tertiary education) (2008). *Measuring Up 2008: The State Report Card on Tertiary education*, report prepared by NCPPHE, San Jose. http://measuringup2008.highereducation.org/print/state_reports/short/AZ.pdf.

Northern Arizona University. (2013). *Institute for Sustainable Energy Solutions*. About ISES. Retrieved March 6, 2013 from http://nau.edu/CEFNS/Centers-Institutes/Sustainable-Energy-Solutions/About/.

OECD/Southern Arizona's Regional Steering Committee (2009). The Southern Arizona region, United States: Self-evaluation report. OECD Reviews of Higher Education in Regional and City Development, IMHE. Available online at http://www.oecd.org/dataoecd/19/11/44269085.pdf.

Pima Community College. (December 12, 2011). *PCC Celebrates New EMT Training Facility* Dec. 16. Retrieved online March 3, 2013 from http://www.pima.edu/press-room/news-releases/2011/201112-emt.html.

U.S. Census (2012). *Fact Finder*. Selected Social Characteristics in the United States, 2007-2011 American Community Survey 5-Year Estimates. Available online at http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_11_5YR_DP02.

Yavapai College District Governing Board (2011). *Regular Board Meeting Agenda Summary*. Retrieved March 5, 2013 from https://www.yc.edu/v4content/governing-board/sub/2011/11/Agenda%20full%2011811.pdf.

CHAPTER 3

Arizona's Intersecting Demographic, Educational, and Economic Futures[2]

By Jeffrey F. Milem, W. Patrick Bryan, Diana Sesate and Stephanie Montaño, Center for the Study of Higher Education, The University of Arizona

ABSTRACT

The future of Arizona's economic health depends on the state's ability to increase its educational attainment level, particularly with respect to its growth populations. Based upon on-going demographic changes, it is clear that Arizona will become a majority minority state within the next three decades.

INTRODUCTION

In 2004, students of color became the majority in Arizona schools and their representation is increasing at a steady and rapid rate. Hispanics are by far the largest minority group in Arizona schools. Drop-out rates, English Language Learners, Gifted, and Special Education demographics highlight different educational experiences and outcomes between Arizona's White and Asian Pacific American students and its American Indian, Hispanic, and Black students which is further reflected in AIMS pass rates and university (ABOR) eligibility rates. Racial/ethnic stratification is also seen in Arizona's higher education enrollments and graduation rates, even as enrollments have increased across all sectors between 1991 and 2010.

Consequently, there are significant differences by racial/ethnic background regarding who receives degrees in Arizona. Furthermore, as the level of the degree increases, stratification by racial/ethnic background increases dramatically. Focused efforts to improve the educational experiences and outcomes for all students in the state must be implemented, with a special focus on the "new majority" in Arizona's schools.

> The future of Arizona's economic health depends on the state's ability to increase its educational attainment level, particularly with respect to its growth populations.

---

[2] Note: The data summarized in this report were drawn from analyses done for AMEPAC's forthcoming Status Report on Minorities in Education. For more information about the report, please visit the AMEPAC website at http://www.azhighered.gov/AMEPAC_Home.html

ECONOMIC POSSIBILITIES

In 2012, the Morrison Institute for Public Policy described the important connection between education and the workforce, and issued an urgent warning that "Arizona is at risk of becoming a second-tier state, educationally and economically" (Morrison Institute for Public Policy, 2012, p. 5). This warning was based on demographic projections and the predicted economic effects of maintaining current educational and public policies and practices. These projections are supported by other trend analyses of demographics and education in Arizona, which indicate a major racial and ethnic gap in education with regard to access and attainment—a gap that widens as educational attainment levels increase (Milem, Bryan, Sesate, & Montaño, in press). Coupling these trends with the shift in demographics toward a majority-minority population in Arizona intensifies the challenges of education, particularly public higher education, to be an effective driver of economic growth.

Arizona has several growth populations that are salient both educationally and economically, including part-time students, adult learners, veterans, and Latinos. Arizona's Latino population comprises the majority of Arizona's minority population growth (Morrison Institute for Public Policy, 2012; Milem et al., in press). Consequently, the gaps in educational outcomes between Arizona's Latinos, Blacks, and Native Americans and those of Whites and Asians require remedy. In this respect, sustaining Arizona's educational status quo will undermine the state's economic future by framing its growth populations as dispensable. However, Arizona does not have to be destined to be a second-tier state, economically, educationally, or otherwise. Public policy can greatly influence educational responses to growth populations that position Arizona for economic prosperity by purposefully leveraging the state's shifting demographics. Thus, the different choices available to Arizona in shaping its economic future all hinge on whether the state embraces its growth populations in ways that enhance their educational opportunities and experiences and support them to become assets for the future of the state.

The choices Arizona may make in developing its economic future correspond to a continuum of possibilities. On one end of this continuum, Arizona can resign itself to repeating past and current actions that devalue education and the state's growth populations, which will further jeopardize Arizona's economic future. On the other end, Arizona can choose to implement educational policies that signal a commitment to building an economically healthy Arizona. To what extent does/will public policy in Arizona reflect an understanding that an educated workforce is a prerequisite for economic health?

Within the next five years, over 60 percent of jobs in Arizona will require some form of education beyond high school (Carnevale, Smith & Strohl, 2010). Accordingly, while educational attainment is dependent on all levels of education, higher education in particular plays an increasingly salient role as a gatekeeper of Arizona's economic future. There is some evidence that Arizona recognizes the economic value of higher education with its stated goal of increasing the number of bachelor's degrees awarded by 2020 to at least 30,000 annually (Arizona Board of Regents, n.d.; Arizona Ready, 2013). Yet, the 6-year graduation rate from 2009-2011 at ABOR institutions has remained relatively flat (Arizona Ready, 2013). Thus, while

such a goal is a response to the assertion that "if past trends continue, Arizona will fall short of the national average by about 220,000 college graduates" (Arizona Board of Regents, n.d., p.13), challenges remain.

What does an economically healthy state look like? There are several indicators of a state's economic health, all of which are affected by educational attainment. Common indicators include industry growth and unemployment levels. They assume that strong economies have strong businesses dependent upon a skilled workforce. In the knowledge economy of today and tomorrow, a skilled workforce is synonymous with an educated workforce. "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" (Arizona Board of Regents, n.d., p. 29). As the level of educational attainment increases, so do individual and collective economic and social benefits, such as higher median and lifetime earnings and higher quality of life (Arizona Board of Regents, n.d.).

In a knowledge economy, higher levels of educational attainment fetch higher wages and benefits, which translate into higher median incomes, a stronger tax base, improved consumer spending ability, and lower poverty levels (Morrison Institute for Public Policy, 2012; Arizona Board of Regents, n.d.). It also affects other societal welfare outputs, namely improved public services (like education) and decreased reliance on public benefits (like government assistance programs) (Morrison Institute for Public Policy, 2012; Arizona Board of Regents, n.d.). Consequently, states concerned with gaining, maintaining, and expanding a competitive economic advantage by developing a healthy economy understand the importance of acting now to maximize future educational attainment levels for all residents of the state. Although maximizing educational attainment is complex, at its base, it requires an understanding of the context in which such an objective is framed so that public policy may align accordingly.

This chapter details trends in demographics and education in Arizona, which shape this context for the state of Arizona. Selected data from the pre-K through 12 and the higher education sectors are highlighted to provide information about some of the significant educational challenges and opportunities that face our state. These are not comprehensive analyses of all of the relevant data, but rather are intended to be "snapshots" that provide insight about key educational and public policy challenges that face Arizona.

ARIZONA DEMOGRAPHICS[3]

According to the U.S. Census Bureau, in 2010 Arizona had a total population of 6,413,737 residents, of which 49.7 percent were male and

> Based upon on-going demographic changes, it is clear that Arizona will become a majority minority state within the next three decades.

---

[3] Data for this section were from the U.S. Census Bureau's American Community Survey 5-year (2006-2010) dataset which also includes data from the 2010 Census.

50.3 percent were female. Nearly 6 in 10 (58 percent) Arizonans identified as White, 30 percent as Hispanic, 4 percent as Black/African American, 4 percent as American Indian or Alaskan Native, 3 percent as Asian/Pacific Islander and 1 percent were Multiracial or from other races. Of those who identified as Hispanic, 70 percent were native-born and 30 percent were foreign-born.

While Arizona has a smaller proportion of White, Black and Asian/Pacific Islanders when compared to the rest of the nation, it has nearly twice the proportion of Hispanics and four times the proportion of American Indians. As a result of these changing and dynamic demographics, Arizona is likely to become a majority minority state within the next three decades.

Arizona's population is increasingly more Hispanic in the younger age categories, and over 80 percent White in the 65 and older category. This can be seen in the K-12 data as well, as Hispanics were the largest group in Kindergarten, first and second grades in 2010. This disparity creates an interesting and challenging dynamic for the state as the older, voting population is predominantly White while the younger generation of Arizonans is mostly people of color.

There are also varied patterns of educational attainment by racial/ethnic background among Arizonans. More than 6 in 10 American Indians and Hispanics have obtained only a high school diploma or less while all other groups are only about 30 percent. Just over one quarter of Arizonans over the age of 25 have obtained a bachelor's degree or higher, about 1 in 12 have completed an associate's degree, one quarter have completed at least some college, one quarter have a high school diploma or equivalent, and about 1 in 7 have less than a high school diploma. Nearly half of Asian/Pacific Islanders have obtained at least a bachelor's degree, while about 1 of 3 Whites, about 1 of 5 Black/African Americans, 1 of 10 Hispanics, and 1 in 13 American Indians have at least a bachelor's degree.

The 2010 median household income for all Arizonans was $50,448, somewhat lower than the U.S. median household income of $51,914. During the same year, nearly 1 in every 6Arizonans were classified as being below the poverty level, which was somewhat higher than the poverty rate for the entire United States when disaggregated by race/ethnicity, we see that more than 1 in 3 American Indians in Arizona lived at or below the poverty level, followed by Hispanics (1 in 4), Black/African Americans (just over 1 in 5), Asians (1 in 8) and Whites not of Hispanic origin (just less than 1 in 10). The poverty rate for Arizona women was slightly higher than it was for men.

> In 2004, students of color became the majority in Arizona schools and their representation is increasing at a steady and rapid rate. Hispanics are by far the largest minority group in Arizona schools.

PRE-K—12 ENROLLMENT TRENDS

Over the past decade and one half in Arizona, there has been a dramatic transformation in the enrollment of students from different

racial/ethnic backgrounds in Arizona Pre-K through 12 schools. In 2004 students of color became the majority in Arizona schools and their representation has steadily increased since that time (see **Figure 1**). While nearly 57 percent of students enrolled in Arizona schools were White in 1997, their representation had decreased to 43 percent in 2012. The large majority of students of color in Arizona schools are Hispanics. Their proportional representation increased from 30.1 percent in 1997 to 43.6 percent in 2012. In fact, Hispanics surpassed Whites as the largest group enrolled in Pre-K through 12 classrooms in 2012.

Figure 1

**Arizona PK-12 Enrollment Trend 1997-2012
(By Race/Ethnicity)**
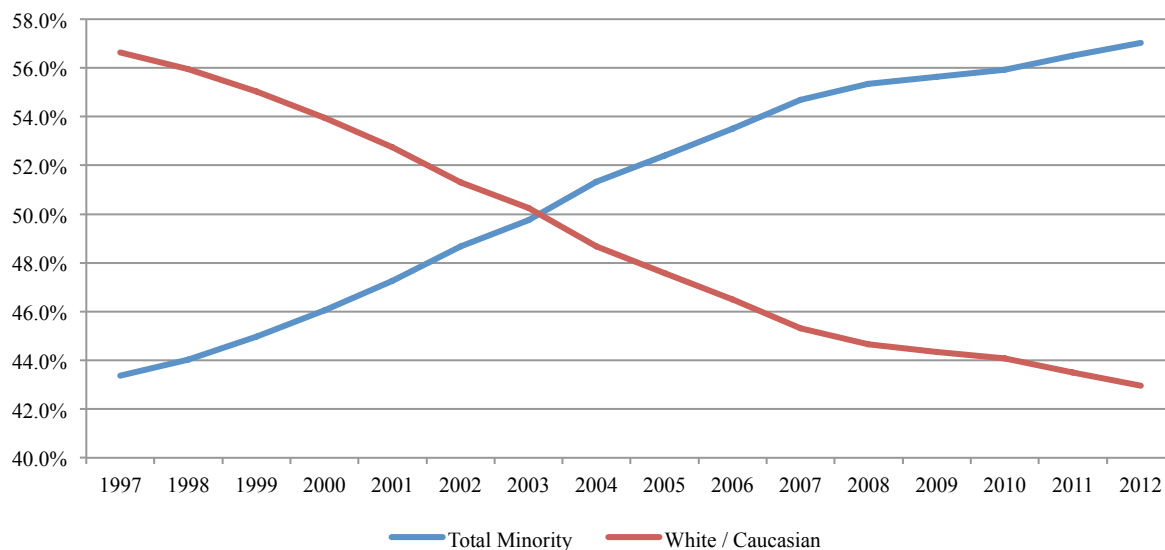
Source: AMEPA, (2009; Arizona Department of Education, 2012

Between 2004 and 2012, Pre K-12 enrollments in the state of Arizona increased by about 9.7 percent from 972,521 to 1,066,738. Enrollments decreased for Whites and American Indians during this timeframe. While the numbers of Asian Pacific American and Black students in Arizona schools are much lower compared to Whites and Hispanics, they showed high percentage gains in the number of students enrolled between 2004 and 2012. Hispanics enrollments increased by nearly 100,000 students between 2004 (368,804) and 2012 (465,084), an increase of 26.1 percent.

DROPOUTS

Between 2004 and 2010, the number of dropouts of students from all racial/ethnic backgrounds in Arizona schools declined from 21,750 in 2007 to 13,891 in 2010. However, between 2011 and 2012, we see a dramatic increase in the number of dropouts (from 13,894 to 18,669). Moreover, when we consider the proportion of dropouts from different racial/ethnic groups, there are signs for concern. The proportion of students who dropped out within each
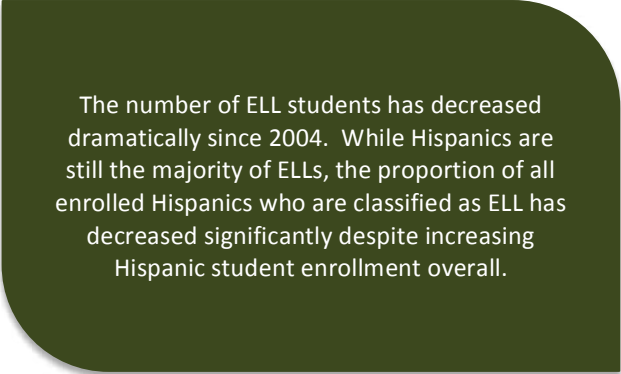
racial/ethnic group decreased (compared to the enrollment of all students within their racial/ethnic group) between 2007 and 2011. However, with the dramatic increase in dropouts between 2011 and 2012, there was a large jump in the proportion of dropouts for each group. The proportion of dropouts was highest for American Indians followed by Hispanics, Blacks, Whites, and Asian Pacific Americans.

ENGLISH LANGUAGE LEARNERS (ELL)

English Language Learners (ELLs), in Arizona, are defined as students who do not speak English as their primary language, and are not able to engage in regular classroom work in English (A.R.S.§ 15-751). As we might expect, Hispanics made up the majority of ELL students in Arizona. However, between 2004 and 2012, the number of ELLs in Arizona decreased dramatically from 162,136 to 75,970. The majority of this decrease was accounted for by a substantial decrease in the number of ELLs who were Hispanic or American Indian. In 2004, 37 percent of Hispanic students were ELL but this had decreased to 14 percent in 2012.

Understanding the proportion of Arizona students who are classified as ELL is critical to understanding Arizona's future because the ELL student experience is very different from that of a typical student. ELL students spend the majority of their day working on English language skills, which means they sacrifice time for subjects like mathematics, science and social studies. This reduction in instruction time may also affect a

The number of ELL students has decreased dramatically since 2004. While Hispanics are still the majority of ELLs, the proportion of all enrolled Hispanics who are classified as ELL has decreased significantly despite increasing Hispanic student enrollment overall.

student's future opportunities to advance to the next grade level and meet requirements like passing the AIMS test or being eligible to attend an Arizona university. The numbers reported here are promising, given that the proportion of students who need English language assistance is decreasing despite increasing Hispanic student enrollment in the K-12 system.

GIFTED STUDENTS

Gifted students, in Arizona, are defined as students who have superior intellect or academic ability (A.R.S.§ 15-779). Between 2004 and 2012, the number of students in Arizona who were designated as gifted increased from 30,263 to 39,544. The number of Asian Pacific American, Black, Hispanic, and White students who were designated as gifted increased in this time period while the number of American Indian students who were designated as gifted declined. The proportion of Hispanic students who were gifted rose slowly between 2004 and 2012 but most of this growth is a function of the big growth in the Hispanic population in Arizona schools. The proportion of Black students remained relatively steady during this time period. While the

proportion of Asian Pacific American students who were in gifted programs increased between 2004 and 2012, the proportion of American Indian students decreased.

Perhaps the best way to get a sense of the relative equity of enrollments in gifted programs is to compare trends in the proportion of students within each racial/ethnic group who are in these programs. The data from 2012 reveal that about 1 in 10 Asian Pacific Americans and 1 in 20 Whites were enrolled in gifted programs; while only 1 in 40 Hispanics, 1 in 50 Blacks, and 1 in 100 American Indians participated in these programs.

SPECIAL EDUCATION STUDENTS

In Arizona, to participate in special education, a student must have a qualifying disability and require special education service to benefit from their educational program (A.R.S.§ 15-761). The number of Arizona students enrolled in special education classes increased by 16.1 percent from 105,014 in 2004 to 121,971 in 2012. About 1 in 8 American Indian and Black students were enrolled in special education classes in 2012. About 1 in 11 White and Hispanic students were enrolled in special education in 2012. Finally, only about 1 in 18 Asian Pacific American students were enrolled in special education courses.

AIMS TEST SCORES

All Arizona public school students in grades 3 through 8 and in grade 10 are required to take Arizona's Instrument to Measure Standards (AIMS) tests, but the state is transitioning to the Partnership for Assessment of Readiness for College and Careers (PARCC) within the next few years (Arizona Department of Education). The transition to PARCC from AIMS may signal Arizona's attempt to be more competitive in education nationally as PARCC is a national consortium of K-12 schools with more rigorous assessment standards intended to align with implementation of Common Core State Standards; however, there are concerns that this transition may further widen racial/ethnic and socioeconomic achievement gaps (Arizona School Board Association, n.d.; PARCC, 2013). While PARCC focuses on mathematics and English language arts/literacy (PARCC, 2013), AIMS tests assess students in four content areas: writing, reading, mathematics, and science. The AIMS reading and mathematics tests are administered in all grades. The writing test is administered in grades 5, 6, 7, and 10. The science test is administered in grades 4, 8, and 10. In order to graduate from an Arizona public high school, a student must meet the AIMS high school graduation requirement. The most common way to meet this requirement is to pass the writing, reading, and mathematics content areas of the AIMS high school test. **Table 1** provides information on AIMS pass rates by racial/ethnic background between 2005 and 2011.

Table 1

AIMS Passing Rates: 2005-2011

AIMS Mathematics Passing Rates 2005-2011

	2005	2006	2007	2008	2009	2010	2011
Asian	79.7%	82.0%	83.4%	83.7%	83.5%	76.6%	78.0%
American Indian	37.1%	40.3%	44.1%	44.1%	44.5%	32.7%	34.3%
Black	47.4%	49.2%	51.4%	52.8%	53.5%	42.7%	44.0%
Hispanic	47.0%	50.5%	52.9%	55.2%	57.1%	45.8%	47.6%
White	73.0%	75.7%	77.4%	77.9%	78.5%	69.6%	69.8%
Unknown Race	33.4%	39.3%	33.6%	47.3%	45.6%	38.1%	48.0%
Arizona	58.9%	61.6%	63.7%	64.8%	65.9%	55.6%	56.0%

AIMS Reading Passing Rates 2005-2011

	2005	2006	2007	2008	2009	2010	2011
Asian	77.7%	79.3%	80.8%	81.9%	82.8%	82.8%	85.8%
American Indian	39.2%	42.3%	45.8%	46.7%	48.6%	51.2%	56.2%
Black	53.2%	55.1%	56.4%	59.3%	61.1%	63.7%	67.1%
Hispanic	46.0%	49.0%	51.6%	55.3%	59.0%	63.0%	67.9%
White	77.0%	79.1%	80.4%	81.5%	82.6%	84.3%	86.0%
Unknown Race	42.4%	48.1%	48.4%	55.9%	56.3%	57.5%	66.1%
Arizona	60.6%	62.9%	64.9%	67.0%	69.2%	71.8%	74.5%

AIMS Writing Passing Rates 2005-2011

	2005	2006	2007	2008	2009	2010	2011
Asian	79.5%	80.9%	84.4%	80.2%	85.5%	81.9%	75.2%
American Indian	53.8%	58.1%	57.5%	50.2%	59.4%	53.5%	37.4%
Black	60.9%	64.3%	67.3%	59.9%	69.5%	63.2%	48.6%
Hispanic	55.3%	60.3%	63.6%	57.1%	68.1%	62.1%	47.9%
White	75.1%	78.4%	81.0%	74.8%	83.5%	79.9%	69.9%
Unknown Race	47.3%	60.7%	49.8%	52.9%	56.3%	51.9%	47.4%
Arizona	65.1%	68.9%	71.7%	65.1%	74.8%	69.7%	56.5%

AIMS Science Passing Rates 2008-2011

	2008	2009	2010	2011
Asian	65.3%	70.1%	71.7%	76.2%
American Indian	22.7%	26.4%	29.1%	33.1%
Black	35.3%	38.5%	43.0%	45.8%
Hispanic	31.6%	36.5%	40.4%	45.0%
White	63.7%	67.6%	69.7%	73.9%
Unknown Race	33.2%	38.0%	38.9%	45.0%
Arizona	46.9%	51.0%	54.0%	57.2%

Source: Arizona Department of Education (2012)

Asian Pacific American and White students show the highest proportions of students passing the AIMS mathematics test. Less than half of Hispanic, Black, and American Indian students received passing grades on the AIMS mathematics test during this 7-year period.

The trend data for the AIMS reading test shows an upward trend in pass rates for students from all racial/ethnic groups between 2005 and 2011. Whites and Asian Pacific Americans had the highest proportions of passing during this 7-year period. While Blacks, Hispanics, and American

Indians all showed significant progress in pass rates between 2005 and 2011, their pass rates were still much lower than those of Whites and Asians.

The 7-year data for AIMS science tests show an upward trend in pass rates for students from all racial/ethnic groups. The proportion of Asian Pacific American and White students increased by nearly 10 percentage points between 2005 and 2011. American Indian, Black, and Hispanic students also showed about a 10-point gain in passing rates during this time period. The data show a downward trend in AIMS writing test scores for students from all racial/ethnic groups. Asian Pacific Americans, Whites, Blacks, Hispanics, and American Indians were all less likely to pass the AIMS writing test in 2011 than they were in 2005. Moreover, the decrease in the proportion of pass rates for Blacks, Hispanics, and American Indians was greater than that for Asian Pacific Americans and Whites.

The AIMS is an important benchmark for the K-12 system as it is used to assess student performance on state standards. All students are required to pass the AIMS in order to graduate with a high school diploma, and poor AIMS performance may impact the courses a student takes during high school—which may negatively affect a their chances to enroll in a four-year university, and put them at greater risk for remediation at the college level. In this respect, the structural consequences associated with initial poor performance on AIMS serve as a barrier to long-term student success.

UNIVERSITY ELIGIBILITY

In order to enroll in one of the State's three universities (The University of Arizona, Arizona State University or Northern Arizona University), a student must complete 16 core courses at outlined by the Arizona Board of Regents (ABOR). These "sweet 16" courses include 4 years of math, 4 years of English, 3 years of laboratory science, 2 years of social science, 2 years of foreign language and 1 year of fine art. Students can be admitted to a state university missing not more than two of these courses, however they cannot be deficient two courses in the same subject area, nor can they be deficient in both math and science (one course in each subject). The data provided in this section are from the 2009 Arizona High School Eligibility Study (ABOR 2011) and describe how well students in Arizona are doing when assessed in these 16 courses.

Two key findings are apparent from the data in presented in **Table 2**. First, university eligibility rates for students from across the state are quite low. Second, students in urban areas of Arizona are more likely than other students in the state to meet the ABOR eligibility requirements. Even with this significant advantage, only half of high school graduates from Pima and Maricopa counties are eligible for admission to one of the state's public universities.

Table 2

Arizona University Eligibility (Class of 2009)

COUNTY	Arizona	Maricopa	Pima	All Other Counties
ELIGIBILITY	46.7	50.1	50.8	37.1

Source: Arizona Board of Regents (2011)

Figure 2 summarizes the proportion of Arizona students who met the ABOR eligibility requirements in six different years (1989, 1996, 1998, 2002, 2006, and 2009) by racial/ethnic background. The Board of Regent's addition of 5 high school units in 1996, which increased the ABOR eligibility requirements from 11 to 16 units, is likely to account for the drops in eligibility for all racial/ethnic groups in 1998. Beginning in 2006 we can see an upward trend in the eligibility rates for Black and American Indian students, which is a positive sign considering that they have the lowest rates of eligibility among students from different racial/ethnic backgrounds in the state.

Figure 2

Class of 2009 Arizona University Eligibility
(By Race and Year)
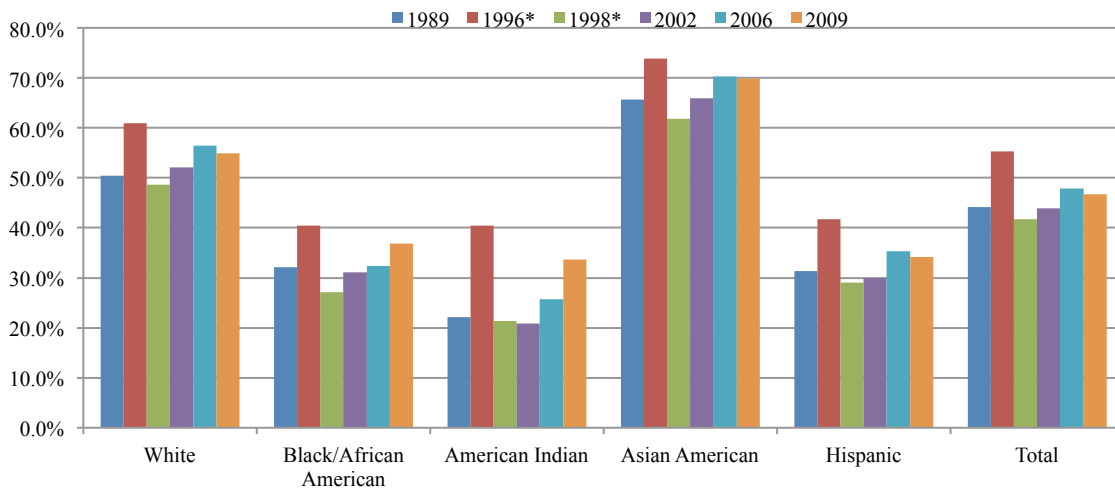
* Effective for fall of 1998, the Board of Regents added 5 high school units for a new total of 16 curricular requirements. This increase in standards resulted in a dramatic reduction in the eligibility rate for the 1998 high school graduates.

Source: Arizona Board of Regents (2011)

Students demonstrate the highest levels of proficiency in social science and the arts. Conversely, the majority of students in Arizona do not demonstrate the necessary proficiency in mathematics, where only 42 percent of students completed the required four years of

coursework. Just over 6 in 10 Arizona high school graduates fulfill the science and language requirements necessary for ABOR eligibility. The fact that many districts do not require any foreign language for students to meet their graduation requirements may account for the 28 percent of Arizona high school graduates who did not meet this requirement.

Students from all racial/ethnic groups demonstrate the lowest levels of completion regarding the mathematics requirements. This may be due, in part, to the fact that some districts require only three years of mathematics to fulfill their graduation requirements (state standards have increased this to 4 years beginning with the class of 2013). In addition, even for districts that require four years of math to meet graduation requirements, the courses that meet district graduation requirements may not be the same as those required by ABOR for mathematics (i.e. Algebra I, II, Geometry, Pre-Calculus or more advanced). In contrast, the social science/social studies requirements for many districts in Arizona are higher than what is required for university eligibility.

Understanding college eligibility is important to understanding Arizona's education system as it is the key bridge between its secondary and postsecondary institutions. According to the ABOR report, only 1 out of 2 students is eligible to enter an Arizona university. While not every student needs to attend college, every student should have the opportunity to choose what they will do after high school, and right now only half of our students have the opportunity to choose to attend a 4-year institution.

COLLEGE READINESS BENCHMARK SCORES

Another indicator of how prepared students are for college is evident in ACT's College Readiness Benchmark Scores. For each subject-area, ACT determines a minimum benchmark score needed that indicates students have a 50 percent chance of obtaining a B or higher or a 75 percent chance of obtaining a C of higher in a corresponding college course. In 2011, the benchmark scores for each subject-area were as follows: English 18, Mathematics 22, Reading 21, and Science 24.

Figure 3

2011 Arizona ACT College Readiness Benchmark Scores in Mathematics (Percentage by Race/Ethnicity)

Race/Ethnicity	Percent Not Ready	Percent Ready
White	-69	31
Hispanic	-93	7
Black/African American	-93	7
Asian American	-65	35
American Indian/Alaskan Native	-97	3
Native Hawaiian	-86	14
Two or More Races	-84	16
All Students	-82	18
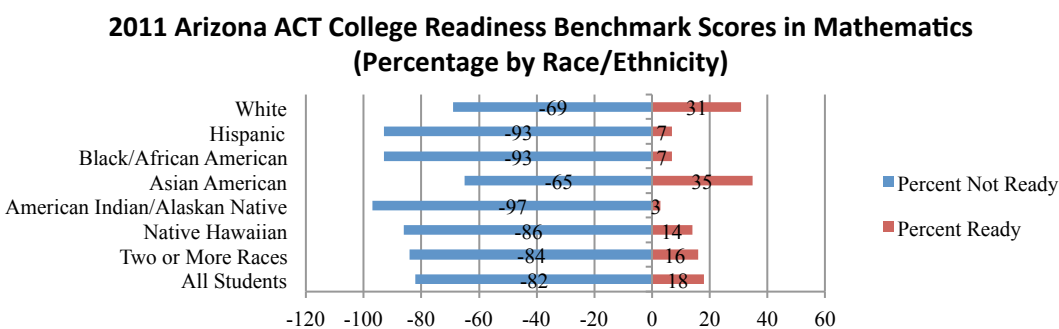
Source: ACT (2011)

Figure 3 shows the percentage of Arizona students who met all four ACT college readiness benchmarks (English, Mathematics, Reading, and Science) in 2011 disaggregated by racial/ethnic background. These data indicate that more than 9 in 10 American Indian, Black, and Hispanic students and more than 6 in 10 White and Asian Pacific American students fail to meet the benchmark scores in all four subjects. The disparity between Hispanic, Black, and American Indian students and Asian American and White students is evident across all four benchmarks. However, disparities are most pronounced in the Mathematics and Science readiness benchmarks.

Overall, approximately 5 in 10 Arizona students met the ACT English college readiness benchmark in 2011. When disaggregated by racial/ethnic background, about 4 in 10 Black, about 1 in 3 Hispanic and approximately 1 in 5 American Indian students met the English college readiness benchmark. Meanwhile, over 7 in 10 Asian American and White students met the English college readiness benchmark.

Approximately 4 in 10 of Arizona students met the ACT Reading college readiness benchmark in 2011. About one quarter of Black and Hispanic students and less than one fifth of American Indian students met the Reading college readiness benchmark while about 6 in 10 Asian American and White students met the Reading college readiness benchmark.

In 2011, fewer than 4 in 10 of all Arizona students met the ACT Mathematics college readiness benchmark. Approximately 1 in 5 Black and Hispanic students and about 1 in 8 American Indian students met the Mathematics college readiness benchmark. Approximately 6 in 10 Asian American and White students met the Mathematics college readiness benchmark. With mathematics being a great divider of postsecondary access particularly for Arizona's growth populations, focusing on mathematics success is one way to improve college readiness. Efforts to do this at Arizona's public universities can be seen in early academic outreach efforts such as UA's Algebra Academy, ASU's Club STEM, and NAU's Math Circle aim to do. However, early academic outreach efforts are often insufficient and/or unstable due to their limited capacity (they are able to serve only a small portion of students who would benefit from participation in these programs) and unstable funding.

Only about 1 in 5 of all Arizona students met the ACT Science college readiness benchmark in 2011. When disaggregated by racial/ethnic background, 1 in 10 Black, 1 in 12 Hispanic and 1 in 20 American Indian students met the Science college readiness benchmark. Only about 4 in 10 Asian American and about 1 in 3 White students met the Science college readiness benchmark.

The data on ABOR eligibility and ACT Readiness Benchmarks indicate that Arizona high school students are not being adequately prepared for success in college. Less than half of Arizona high school graduates meet ABOR eligibility requirements for admission to

Higher education enrollments in Arizona have increased across all sectors between 1991 and 2010. When enrollments are disaggregated by sector and race/ethnicity, stratification trends are revealed in the distribution of students from different racial/ethnic groups who enroll.

one of the state's public universities. Moreover, only about 4 of 10 White and Asian Pacific American high school graduates meets ACT's minimum benchmarks in the four subject areas and fewer than 1 in 10 Hispanic, Black, and Native Americans meets these benchmarks.

POSTSECONDARY ENROLLMENTS BY SECTOR AND RACIAL/ETHNIC BACKGROUND

By 2010, postsecondary institutions in Arizona had increased enrollments to a combined total of 455,088 students (undergraduate, graduate and professional).[4]

Figure 4 shows the proportion of Arizona student enrollments in higher education by sector. Just over half of undergraduate students in Arizona were enrolled in public two-year colleges, followed by public four-year institutions (1 in 4), private, for-profit four-year institutions (1 in 10), private for-profit two-year institutions (1 in 20), and private, not for-profit colleges (1 in 100). White students had the largest representation at each type of institution (at least 4 in 10), with Hispanics and American Indians comprising a larger proportion of enrollments at private, for-profit two-year colleges (1 in 4 and 1 in 20, respectively) and Asian Pacific Islanders most represented (1 in 20) at state public universities.

Figure 4

**All Arizona Undergraduate Students
by Sector (2010)**
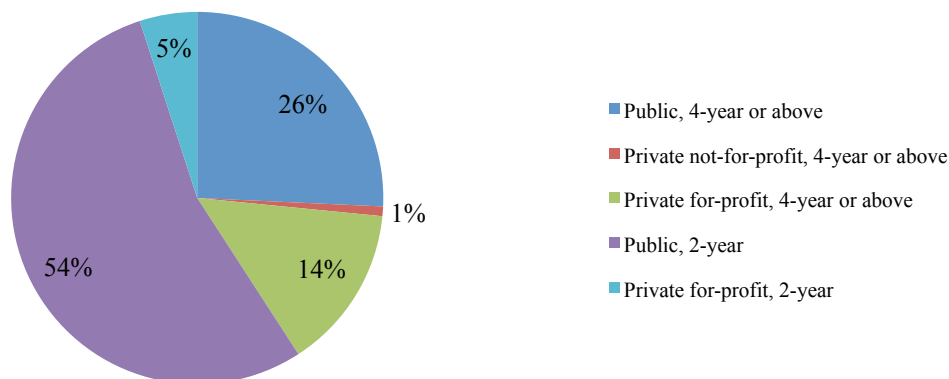
■ Public, 4-year or above
■ Private not-for-profit, 4-year or above
■ Private for-profit, 4-year or above
■ Public, 2-year
■ Private for-profit, 2-year

Source: IPEDS, 2010
Note: *These data do not include University of Phoenix online students residing in Arizona, therefore online students who are Arizona residents are not counted. Students who attended a University of Phoenix campus location in Arizona are included. Also, the data do include both Grand Canyon University online and on campus students; therefore students who are not Arizona residents are included in these data.*

---

[4] Note: Data from the for-profit 4-year institutions in Arizona present us with challenges in reporting enrollments and degrees completed. Enrollment data do not include University of Phoenix online students residing in Arizona, therefore some Arizona online students are not counted. Students attending a University of Phoenix campus location in Arizona are included. However, data do include Grand Canyon University students online and on ground, therefore students who are not Arizona residents are counted.

Looking within race (see **Figure 5**), most of all American Indian, Hispanic, Asian American, International and White students are enrolled at one of the state's public institutions; however, a significant proportion (1 in 4) of Black students are enrolled at private, for-profit institutions. Over half of all American Indian, Asian American, African American and Hispanic students are enrolled at public two-year institutions in Arizona. Our data indicate that Blacks are much more likely to be enrolled in private, for-profit four-year institutions, and Hispanics in public two-year institutions. It should also be noted that community college transfers to Arizona universities are increasing, with 9,784 students transferring in 2010.

Figure 5
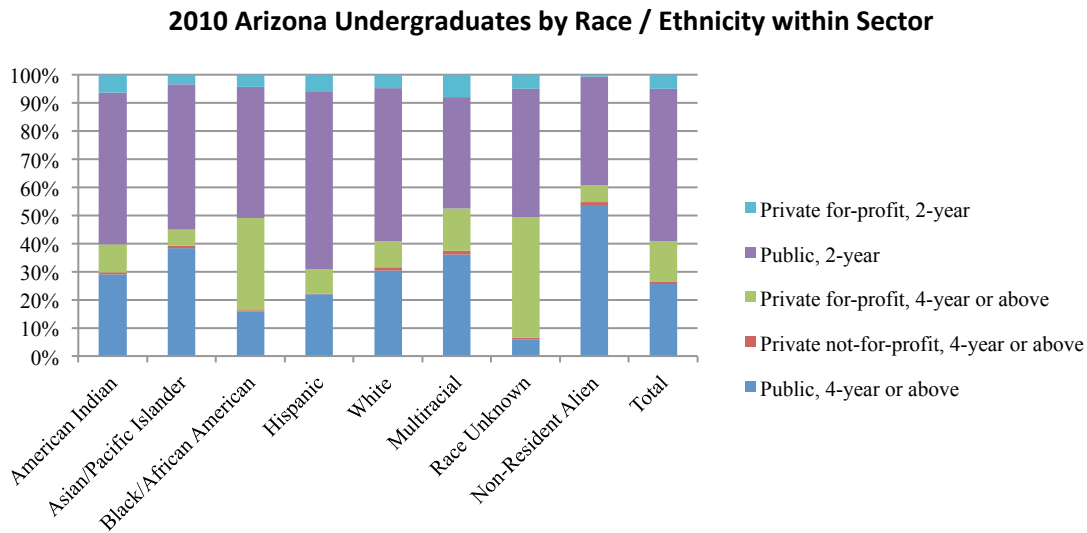
2010 Arizona Undergraduates by Race / Ethnicity within Sector

Source: IPEDS, 2010

Note: *These data do not include University of Phoenix online students residing in Arizona, therefore online students who are Arizona residents are not counted. Students who attended a University of Phoenix campus location in Arizona are included. Also, the data do include both Grand Canyon University online and on campus students; therefore students who are not Arizona residents are included in these data.*

More than half of all graduate and professional students in Arizona are enrolled at one of the public universities in the state, followed by private, for-profit institutions (4 in 10) and private, not for-profit institutions (1 in 10). Institutions tend to draw a significant portion of their graduate students from other countries, with International students comprising over 1 in 10 students at public and private, not for-profit institutions. The proportion of White and International students is concentrated mostly in public institutions (over 6 in 10 and about 8 in 10, respectively). While Hispanics and American Indians have a higher proportion of enrollments at the public universities (7 in 10 and 8 in 10, respectively), Asian Americans have a higher proportion of enrollments at private, not for-profits institutions (about 1 in 10), and about 1 in 4 Blacks are enrolled at private, for-profit institutions.

Arizona's three public universities, Arizona State University (ASU), the University of Arizona (UA), and Northern Arizona University (NAU) have all seen slight increases in their six-year graduation rates from 2002 to 2011 (see **Table 3**). In 2011, the six-year graduation rate for ASU was 58 percent, for UA it was 61 percent, and for NAU it was 50 percent. Looking at six-year graduation rates by race/ethnicity, significant gaps in completion are evident among different student populations.

Table 3

Arizona University 6-Year Graduation Rates 2002-2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Arizona State University	52%	52%	55%	55%	56%	56%	56%	56%	59%	58%
The University of Arizona	55%	55%	57%	58%	59%	56%	57%	58%	60%	61%
Northern Arizona University	45%	48%	48%	47%	46%	46%	50%	48%	48%	50%

Source: IPEDS, 2011

At ASU, Asian Pacific Americans consistently have the highest graduation rate within their cohort with over 6 in 10 graduating within six years. For Whites and Hispanics, the rate has remained relatively flat with about half graduating within six years, and for American Indians it has remained at about 1 in 4. Meanwhile, the six-year graduation rate for Blacks has decreased to less than 4 in 10.

Similar to ASU, Asian Pacific Americans at UA consistently have the highest six-year graduation rate within their cohort with about two thirds graduating within six years. The six-year graduation rate increased for Whites to over 6 in 10, for Blacks to just under half, and for Hispanics to just under 6 in 10. Meanwhile, the six-year graduation rate decreased slightly for American Indians to just more than 1 in 4.

> There is a large gap between the highest and lowest graduation rates when disaggregated by race at Arizona's three public universities, with Asian American and White students having higher graduation rates than students of color.

At NAU, Whites had the highest six-year graduation rate at just over half. The six-year graduation rate decreased for both Asian Pacific Americans and Blacks to about one third. Meanwhile, it increased for Hispanics to just over 4 in 10, and remained relatively flat for American Indians at about 1 in 5.

While the data we highlighted earlier show that more than half of Arizona high school grads are not eligible to enroll at Arizona's universities, this problem is exacerbated by the fact that we lose a significant number of students who do enroll in our universities. This loss is amplified among students who are underrepresented in these institutions. The six-year graduation rates of Blacks, Hispanics, and Native Americans are much lower than those of their White and Asian Pacific American peers. However, outreach efforts such as UA's New Start, MESA and College Academy for Parents; ASU's Hispanic Mother-Daughter Program and Upward Bound, and NAU's Educational Talent Search and Upward Bound underscore that engagement between students, higher education members (e.g., faculty, staff), and communities can have a positive impact on access and success for Arizona's growth populations.

DEGREE PRODUCTION BY SECTOR AND RACIAL/ETHNIC BACKGROUND[5]

In 2010, Arizona institutions awarded 16,803 associate's degrees. About 8 in 10 of these degrees were awarded by public community colleges in the state an d about 1 in 10 were awarded by private, for-profit colleges. About 6 in 10 of the associate's degrees awarded went to White students while 2 in 10 went to Hispanics, 1 in 20 to Blacks, 1 in 25 to American Indians, and 1 in 30 to Asian Pacific Americans.

In that same year, 26,692 bachelor's degrees were awarded in Arizona. About 8 in 10 of these degrees came from the three Arizona public universities, while 1 in 6 came from private, for-profit, four-year colleges, and 1 in 25 degrees came from private, not-for-profit four-year colleges in Arizona. More than 6 in 10 bachelor's degrees were awarded to White students in 2010, while about 1 in 7 were awarded to Hispanics, 1 in 25 to Asian Pacific Americans, 1 in 30 to Blacks, and only about 1 in 50 to American Indians. Arizona's bachelor degree production has been steadily rising, as the percentage of Arizonans age 25 and older who hold a bachelor's degree increased to 26.6 percent (up from 25.9 percent the year before). This brings Arizona closer to the national average of 28.5 percent of adults 25 and over who hold bachelor's degrees (ABOR 2012).

There are significant differences by racial/ethnic background regarding who receives degrees in Arizona. In addition, as the level of the degree increases, stratification by racial/ethnic background increases dramatically.

Arizona institutions awarded 15,169 master's degrees in 2010. Just less than half of these degrees were awarded by Arizona's public universities (45.8%). A similar proportion of master's degrees were awarded by the private, for-profit sector (46.6%). The remainder of master's degrees was awarded by the private, not-for-profit sector. It is only possible to provide

---

[5] Note: Degree completion data do not include University of Phoenix online students residing in Arizona, therefore some Arizona online graduates are not counted. Students who graduated from a University of Phoenix campus location in Arizona are included. However, the data do include Grand Canyon University online and on campus students, therefore students who are not Arizona residents are included in these data.

information about the racial/ethnic background of master's recipients at the state's public universities because the private, for-profit sector does not report this information for a large portion of their students. At Arizona's public universities, over 6 in 10 master's degrees were awarded to White students and 1 in 8 was awarded to international students. Less than 1 in 13 master's degrees went to Hispanics, less than 1 in 35 went to Asian Pacific Americans and to Blacks, while about 1 in 70 master's degrees were awarded to American Indian students.

More than 8 in 10 of the 1,172 doctoral degrees awarded in Arizona in 2010 came from the public universities in the state while just more than 1 in 8 doctoral degrees came from the private, for-profit sector. Among the doctoral degrees granted by Arizona's public universities, over half of the doctoral degrees were awarded to Whites and more than 1 in 4 to International Students while only 1 in 15 went to Hispanics, 1 in 25 to Asian Pacific Americans, 1 in 50 to Blacks, and about 1 in 70 to American Indians.

Finally, in 2010, 1,043 professional degrees were awarded in the fields of law, allopathic and osteopathic medicine, and pharmacy at Arizona institutions. More than two thirds of these degrees were awarded to Whites, about 1 in 10 to Asian Pacific Americans, 1 in 12 to Hispanics, and about 1 in 40 to Blacks and American Indians.

CONCLUDING THOUGHTS AND KEY TAKEAWAYS

The demographic projections for our state indicate that Arizona will become a minority majority state in the next 20-30 years. Data on enrollments in Arizona's schools show that this has already happened as students of color have been the majority in Arizona's schools since 2004 and they continue to grow in representation. However, demographic data also reveal that these groups have lower levels of educational attainment than do the White and Asian Pacific American populations. Our analyses reveal important concerns regarding the educational experiences and outcomes for Hispanic, American Indian and Black students in Arizona schools. For example, these students are more likely to be in special education programs and much less likely to be in gifted programs. They are more likely than White and Asian Pacific American students to leave school before graduating. More than half of Arizona high school graduates do not meet ABOR requirements for admission to one of the state's universities. Moreover, 8 in 10 Arizona high school graduates do not meet ACT's minimum college readiness benchmarks. This indicates that the need for developmental or remedial coursework is great. Since these courses are offered almost exclusively at community colleges in Arizona, at this time, the primary (or only path) for many young Arizonans to higher education is through the state's community colleges.

The enrollments of American Indians, Blacks and Hispanics in Arizona's colleges and universities are significantly lower than their representation among high school graduates. Moreover, stratification increases as we look further along the educational pipeline. Substantially fewer of these students are enrolled in graduate and professional school than are enrolled in undergraduate programs.

In order to meet the goals set by ABOR and by the leadership of the state, public policy could "disrupt the usual" (Smith, 2009) by developing, enacting, and funding efforts which address these key issues. Focused efforts to improve the educational experiences and outcomes for all students in the state must be implemented, with a special focus on the "new majority" in Arizona's schools. This will no doubt take concentrated and sustained work on behalf of numerous stakeholders. To address the need for increased college participation and completion in the short term, we should focus on other parts of our population—returning veterans, adult students, and students who started college but did not finish—who, with support and encouragement, can be drawn back into our educational institutions to further their educational pursuits.

Questions to Consider

- Given the reported college student trends (increasing minority populations and lower rates of college participation among these groups), what will the future of Arizona look like?
- In what areas should Arizona invest given these reported trends?

REFERENCES

ACT. (2011). *ACT Profile Report—State: Arizona Graduating Class of 2011.* Iowa City, IA: ACT.

Arizona Board of Regents. (n.d.). *2020 Vision: The Arizona University System Long-Term Strategic Plan 2008-2020.* Phoenix: Arizona Board of Regents. Retrieved from: https://azregents.asu.edu/rrc/DocumentLibrary/2020-Vision.pdf.

Arizona Board of Regents. (2012). Percentage of Adults with Bachelor's Degrees in Arizona Continues to Climb. [Press Release]. Retrieved from: http://azregents.asu.edu/legislativeaffairs/newsreleases/Percentage%20of%20Adults%20with%20Bachelors%20Degrees%20in%20Arizona%20Continues%20to%20Climb.pdf.

Arizona Department of Education. (2012). Arizona Enrollments 2004-2012 [Data File].

Arizona Department of Education. (2012). Arizona Dropouts 2007-2012 [Data File].

Arizona Department of Education. (2012). Arizona English Language Learners 2004-2012 [Data File].

Arizona Department of Education. (2012). Arizona Gifted Participation 2004-2012 [Data File].

Arizona Department of Education. (2012). Arizona Special Education Participation 2004-2012 [Data File].

Arizona Department of Education. (2012). AIMS Math Scores 2005-2011 [Data File].

Arizona Department of Education. (2012). AIMS Reading Scores 2005-2011 [Data File].

Arizona Department of Education. (2012). AIMS Science Scores 2005-2011 [Data File].

Arizona Department of Education. (2012). AIMS Writing Scores 2005-2011 [Data File].

Arizona Department of Education. (2012). *PARCC Assessment Home Page.* Retrieved from: http://www.azed.gov/standards-development-assessment/parcc-assessment/.

Arizona Ready. (2013, January 28). *Are You Arizona ready?* Retrieved from Arizona Ready: http://www.arizonaready.com.

Arizona School Board Association. (n.d). *Are you ready for the common core state standards?* Retrieved from: http://www.azsba.org/docs/ASBA_Are_You_Ready_for_the_Common_Core1.pdf.

Carneval, A. P., Smith, N., & Strohl, J. (2010). *Help Wanted: Projections of Jobs and Education Requirements through 2018.* Georgetown University, Center on Education and the Workforce. Washington, D.C.: Georgetown University. Retrieved from http://cew.georgetown.edu/jobs2018/.

College Board. (2001). *2001 College Bound Seniors: A Profile of SAT Test Takers.* New York: College Board. Retrieved from: http://research.collegeboard.org/programs/sat/data/archived/cb-seniors-2001.

College Board. (2002). *2002 College Bound Seniors: A Profile of SAT Test Takers.* New York: College Board. Retrieved from: http://research.collegeboard.org/programs/sat/data/archived/cb-seniors-2002.

College Board. (2003). *2003 College Bound Seniors: A Profile of SAT Test Takers.* New York: College Board. Retrieved from: http://research.collegeboard.org/programs/sat/data/archived/cb-seniors-2003.

College Board. (2004). *2004 College Bound Seniors: A Profile of SAT Test Takers.* New York: College Board. Retrieved from: http://research.collegeboard.org/programs/sat/data/archived/cb-seniors-2004.

College Board. (2005). *2005 College Bound Seniors: State Profile Report for 2005.* New York: College Board. Retrieved from: http://research.collegeboard.org/programs/sat/data/archived/cb-seniors-2005.

College Board. (2006). *2006 College Bound Seniors: State Profile Report for 2006.* New York: College Board. Retrieved from: http://research.collegeboard.org/programs/sat/data/archived/cb-seniors-200.

College Board. (2007). *2007 College Bound Seniors: State Profile Report for 2007.* New York: College Board. Retrieved from: http://research.collegeboard.org/programs/sat/data/archived/cb-seniors-2007.

College Board. (2008). *2008 College Bound Seniors State Profile Report for 2008.* New York: College Board. Retrieved from: http://research.collegeboard.org/programs/sat/data/archived/cb-seniors-2008.

College Board. (2009). *2009 College Bound Seniors: State Profile Report for 2009.* New York: College Board. Retrieved from: http://research.collegeboard.org/programs/sat/data/archived/cb-seniors-2009.

College Board. (2010). *2010 College Bound Seniors: State Profile Report for 2010.* New York: College Board. Retrieved from: http://research.collegeboard.org/programs/sat/data/archived/cb-seniors-2010.

College Board. (2011). *2011 College Bound Seniors: State Profile Report for 2011.* New York: College Board. Retrieved from: http://research.collegeboard.org/programs/sat/data/archived/cb-seniors-2011.

Kroc, R. and Anderson, D. (2011). *2009 Arizona High School Eligibility Study* (Arizona Board of Regents Meeting February 17-18, 2011). Arizona Board of Regents.

Milem, J.F., Bryan, W.P., Sesate, D., Montaño, S. (in press). *2013 Arizona Minority Student Progress Report.* Phoenix: Arizona Minority Education Policy Analysis Center.

Morel-Seytoux, Sylvie. (2009). *Minority Student Progress Report 2009: A Snapshot of Arizona's Educational Achievement*. Phoenix: Arizona Minority Education Policy Analysis Center. Retrieved from: http://www.azhighered.gov/AMEPAC/09%20Minority%20Report%20with%20cover%20040110.pdf.

Morrison Institute for Public Policy. (2012). *Dropped? Latino Education and Arizona's Economic Future.* Tempe: Arizona Board of Regents.

PARCC. (2013). *Partnership for Assessment of Readiness for College and Careers.* Retreived from http://www.parcconline.org/

Smith, D. G. (2009). *Achieving Diversity's Promise for Higher Education: Making It Work.* Baltimore, MD: Johns Hopkins University Press.

U.S. Census Bureau (2010). *B15002: Sex by Educational Attainment for the Population 25 Years and Over - Universe: Population 25 years and over* [Data File]. 2006-2010 American Community Survey. Retrieved from: http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml.

U.S. Census Bureau (2010). *DP03: SELECTED ECONOMIC CHARACTERISTICS* [Data File]. 2006-2010 American Community Survey. Retrieved from http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml.

U.S. Census Bureau (2010). *DP05: ACS Demographic and Housing Estimates* [Data File]. 2006 2010 American Community Survey. Retrieved from http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml.

U.S. Department of Education, National Center for Education Statistics. (1991-2010). IPEDS Enrollment Survey [Data File]. Retrieved from http://nces.ed.gov/forum/datamodel/elebrowser/datasets.aspx.

U.S. Department of Education, National Center for Education Statistics. (1991-2010). IPEDS Enrollment Survey [Data File]. Retrieved from http://nces.ed.gov/forum/datamodel/elebrowser/datasets.aspx.

U.S. Department of Education, National Center for Education Statistics. (2010). IPEDS Institutional Survey [Data File]. Retrieved from http://nces.ed.gov/forum/datamodel/elebrowser/datasets.aspx.

CHAPTER 4

Educating Students for Life in a Locally and Globally Diverse Future

By Jenny J. Lee, Center for the Study of Higher Education, The University of Arizona

ABSTRACT

As society is more globalized than ever before, higher education is responsible for preparing its students for the 21st century as a way to ensure economic competitiveness for the state and the nation. Employers in the US and globally reportedly value intercultural skills and yet find that college graduates are unprepared to engage globally. Meanwhile the US, and Arizona especially, remain largely US-centric and risk isolation from an internationalized, interconnected world and economy. This chapter details the current challenges and offers a range of strategies to educate Arizona college students for life in a locally and globally diverse future.

INTERNATIONALIZATION AS AN ECONOMIC AND NATIONAL STRATEGY

Internationalization has become increasingly central in national and, in turn, higher education mission and strategies. It has also become evident that the US may not necessarily maintain its position as the global economic, military, and knowledge powerhouse it has occupied over the past decades. With increasing economic growth, development, and partnerships among other countries, there has been arguably growing concerns regarding US financial debts, national security, educational rankings, and other measures of global competitiveness. As society is more globalized than ever before, higher education plays a major responsibility in preparing its students for the 21st century.

> It is no longer enough to solely focus on ensuring that students have essential reading, writing, mathematic and science skills.

In 2012, the US Department of Education issued its first-ever international strategy, emphasizing the need to develop "a globally competent citizenry" as a way for the country to remain economically competitive. The report stated:
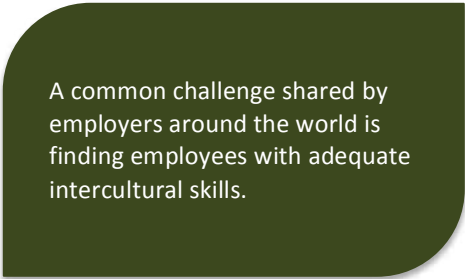
> The international strategy for 2012–16 affirms the Department's commitment to preparing today's youth, and our country more broadly, for a globalized world, and to engaging with the international community to improve education…*It is no longer*

enough to solely focus on ensuring that students have essential reading, writing, mathematic and science skills. Our hyper-connected world also requires the ability to think critically and creatively to solve complex problems, the skills and *disposition to engage globally*, well-honed communication skills, and advanced mathematics, science and technical skills. Such competencies will prepare students, and our nation, for a world in which the following are the reality [*emphases added*] (US Department of Education, 2012, p. 2).

Secretary of Education Anne Duncan stated, "In a knowledge economy, education is the new currency by which nations maintain economic competitiveness and global prosperity. Education today is inseparable from the development of human capital" (US Dept. of Education, 2012, p. 15).

GLOBAL COMPETENCIES AND SKILLS

A common challenge shared by employers around the world is finding employees with adequate intercultural skills.

Such globalized human capital is needed throughout the world. The British Council (2013) recently released their results from an international survey of major employers in nine countries[6] and concluded:

A common challenge shared by employers around the world is finding employees with adequate intercultural skills. Given that the operating environments of all organisations is increasingly global, it comes as no surprise that employers need employees who can understand and adapt to different cultural contexts" (p. 19).

Figure 1 shows that 88% of the surveyed US employers perceive intercultural skills[7] as "very" or "fairly" important, while the demand of such skills was the same or even higher in other countries (with the exception of China).

When asked how education can improve graduates' intercultural skills, employers suggested improving students' communication, foreign language ability, experiences and partnerships overseas, leadership, international topical knowledge, and increasing the enrollment of international students as the top responses (See **Figure 2**).

---

[6] The survey was completed by Human Resource managers at 367 large private, public and NGO/charity sector employers in nine countries: Brazil, China, India, Indonesia, Jordan, South Africa, the United Arab Emirates, the UK, and the US.

[7] Employers in the study frequently considered "intercultural skills" as "'the ability to understand different cultural contexts and viewpoints," "accepting different cultural contexts and viewpoints," and "openness to new ideas and ways of thinking" (British Council, 2013, p. 9).

Figure 1

The Importance Of Intercultural Skills To Organisations
(By Country, Ranked By Very Important)
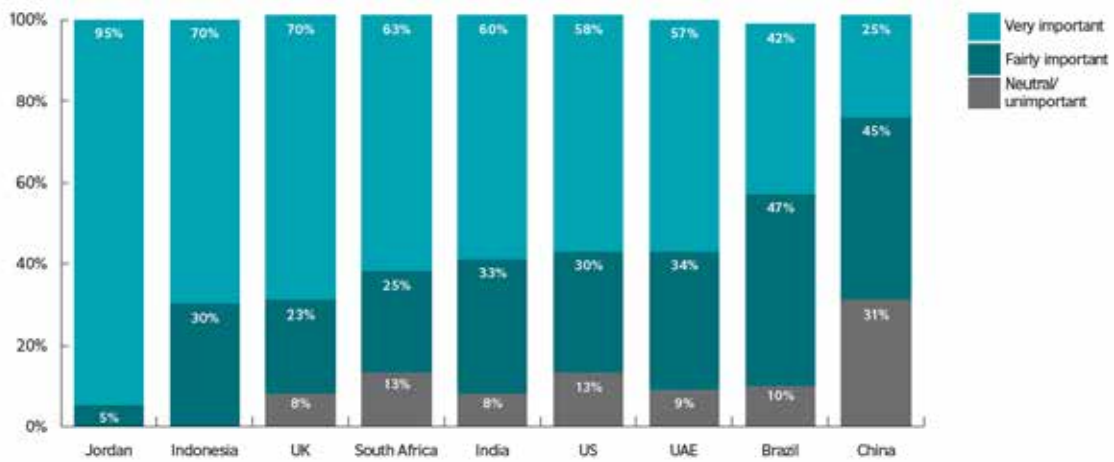
Source: Telephone/face-to-face surveys of public sector, private sector and NGO employers responsible for employment decisions.
Base: Brazil (n=43), China (n=40), India (n=40), Indonesia (n=40), Jordan (n=40), South Africa (n=40), UAE (n=44), UK (n=40), US (n=40)
Note: Because of rounding and/or exclusion of 'don't know' responses, percentages may not add up to 100%.

Source: British Council, 2013

Figure 2

Contributions That Education Can Make To Improve Intercultural Skills As Seen By Employers
(Top Eight Suggestions From Employers)
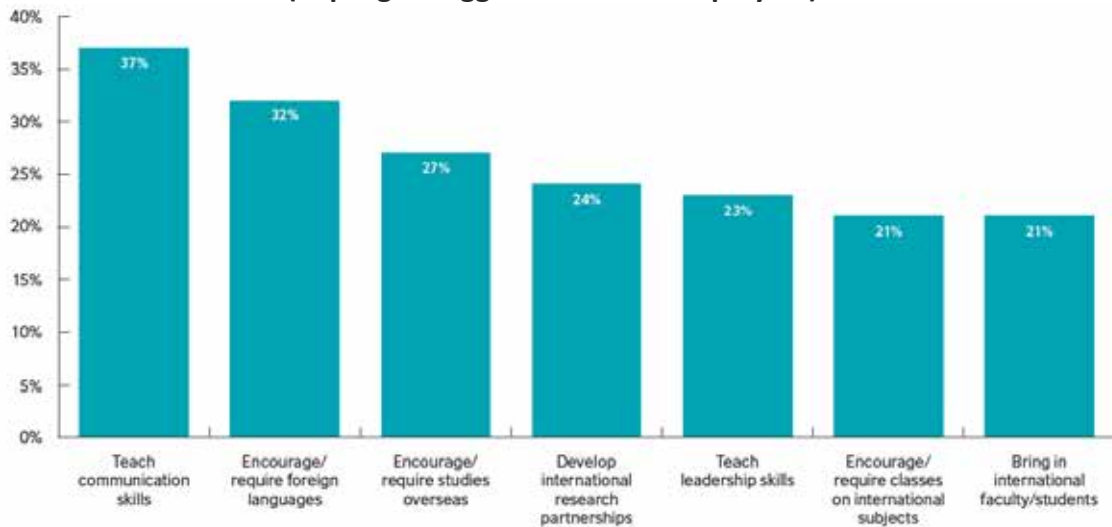
Source: Telephone/face-to-face surveys of public sector, private sector and NGO employers responsible for employment decisions. Base: Global (n=367)

Source: British Council, 2013

IS THE US FALLING BEHIND?

Despite such internationalization goals and strategies, our country's educational system

remains largely US-centric. As an indicator of the lack of international interest among today's college students compared to the rest of the world, there are currently 764,495 international students in the US whereas 320,001 US students study abroad (IIE, 2012) (See **Figure 3**). Recent trends suggest a further widening of this gap, with the number of international students in the US increasing 6.5% from the previous year while US students abroad increasing a modest 1.3%.

Moreover, the length of stay between these two groups differs dramatically. International students in the US tend to seek terminal degrees (4 years) while most US students study abroad short-term (summer or 8 weeks or less) (IIE, 2012). While such an imbalance may be largely indicative of the perceived value of a US education, these numbers also suggest that many parts of the world may be producing more internationalized and globally aware students compared to the US.

Figure 3

International Exchange Imbalance, 2010/2011
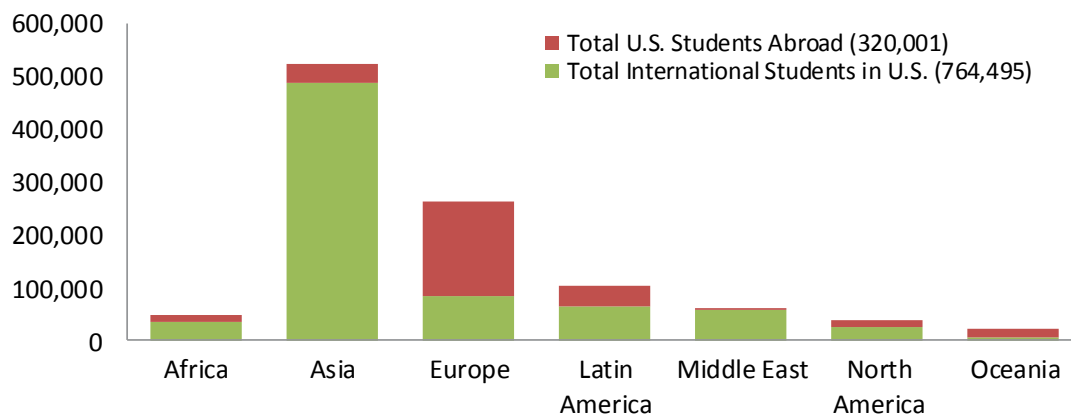
Source: IIE, 2011

Furthermore, most US students tend to study abroad in Western Europe and English-speaking countries (IIE, 2012). This tendency is likely related to US college students' preference for traveling to and studying in similar Western environments and being largely monolingual.

The ability to speak multiple languages is critical for not only economic prosperity but also national security. US Secretary of Education Arne Duncan said, "To prosper economically and to improve relations with other countries, Americans need to read, speak and understand other languages." Unfortunately, as Secretary of Education Duncan also indicated, only 18% of Americans reported speaking a language other than English compared to 53% of Europeans (and increasing numbers in other parts of the world) (US Department of Education, 2010). Likewise, the former Central Intelligence Agency Director Leon Panetta urged schools and universities to reach beyond reading, writing, and arithmetic to "the fourth R": the reality of the world we live in. Director Panetta emphasized language skills as critical to success in an interconnected world and fundamental to US competitiveness and security. He said, "Language

is the window through which we come to know other peoples and cultures. Mastery of a second language allows you to capture the nuances that are essential to true understanding...This is not about learning something that is helpful or simply nice to have. It is crucial to CIA's mission" (CIA, 2010).

Despite such calls for action, extensive federal and state cuts to public higher education have resulted in the elimination or reduction of foreign language programs and courses (Berman, 2011). The severe lack of international experiences, including education, among today's college students is concerning given the increasing interconnectedness of global economies and politics more than ever before. In short, the US has not kept pace.

CASE OF ARIZONA

In the case of Arizona, the state is not immune or excluded from these national priorities towards internationalization. In failing to keep pace, the state falls at risk of isolating itself from the larger global society.

While internationalization is typically viewed as international engagement with distant countries, internationalization more commonly involves countries within its own continent. Nations throughout the world are increasingly recognizing the value of international regional development and cross-border collaboration as an effective strategy towards internationalization. The most prominent examples of regional cooperation include the development of the European Union and the North American Free Trade Agreement although regional cooperation within higher education also exists, such as Campus Asia[8] and the ERASMUS Programme[9].

Association for American Colleges and Universities (2007) findings on selected liberal education outcomes:

Less than 13 percent of college students achieve basic competence in a language other than English

Less than 34 percent of college students earn credit for an international studies class; of those who do, only 13 percent take more than four classes

Less than 10 percent of college students participate in study abroad programs

Between 5 and 10 percent of college students achieve basic competence in a language other than English, take more than four international studies classes, and participate in study abroad programs

Source: Adelamn, 2004

---

[8] Campus Asia is a coordination of university systems between Japan, Korea, and China for the purposes of student exchange among the three countries.
[9] Erasmus Programme (*EuRopean Community Action Scheme for the Mobility of University Students*) is a European Union student exchange program.

Arizona's location along the Mexico border makes the state especially well poised to become a leading state of internationalization. While considerable public attention is placed on "newsworthy" issues such as border control and drug trafficking, there are unrecognized potential and untapped benefits given Arizona's geographic location. Based on a statewide study conducted in 2008, it was estimated that twenty-four million visitors come to Arizona from Mexico annually and that Mexican visitors spend over 7 million dollars in Arizona each day, contributing to over 23 thousand jobs (Pavlakovich-Kochi & Charney, 2008). The Mexican economy is set to grow 3.9% (while the US is 1.7%) (World Bank, 2013) and Mexican factories are slowly replacing Chinese products in the US, thanks in part to regional trade agreements as well as China's rising labor costs. While border security remains a contested issue in thinking about Arizona's relationship with Mexico, there are also a plethora of research and educational opportunities that have the potential to attract multi-national companies and yield lucrative partnerships and job opportunities to the state. While all of Arizona's major universities are engaged in immigration research and teaching, there remains a general lack of public awareness and interest in supporting such efforts. Some forms of Internationalization, when it comes to Mexico, remain highly contested as demonstrated by ongoing challenges to bilingual education. Moreover, as explained in Chapter 3, many Arizona districts do not require high school students to take a foreign language.

> **What is the value of international students?**
>
> - **Build bridges** between the United States and other countries.
> - **Bring global perspectives** into U.S. classrooms.
> - **Demand courses in the sciences and engineering**, which makes it possible for U.S. colleges and universities to offer those courses to U.S. students.
> - **Support programming and services on campus for all students** by paying out-of-state tuition, funded largely by non-U.S. sources.
> - **Support local businesses and communities** with their spending on rent, transportation, and other expenses.

INTERNATIONAL STUDENTS IN ARIZONA HIGHER EDUCATION

A major source of internationalization is international students[10] who study in the state. In Arizona, there are 12,738 international students (NAFSA, 2012). These students contributed $321,448,000 to the state economy in the 2011-2012 academic year. As shown in **Table 1**, international students not only contribute to university budgets by paying full tuition and fees, they (and their dependents) also provide substantial revenue to local businesses in housing, transportation, and other living expenses.

---

[10] International students are also referred to as "foreign students."

Table 1

Net Contribution to State Economy by Foreign Students (2011-12)

Contribution from Tuition and Fees to State Economy	$226,777,000
Contribution from Living Expenses	$209,655,000
Total Contribution by Foreign Students	$436,432,000
Less U.S. Support of 27.7%	-$120,912,000
Plus Dependents' Living Expenses	$5,928,000
Net Contribution to State Economy by Foreign Students and their Families	**$321,448,000**

Source: IIE, 2013

Table 2

Arizona institutions with the highest numbers of international students

Institution	City	Total
Arizona State University	Tempe	5,616
University of Arizona	Tucson	3,368
Northern Arizona University	Flagstaff	948
Thunderbird School of Global Management	Glendale	618
Mesa Community College	Mesa	208

Source: IIE, 2013

International students comprise approximately 3.5%-4% of undergraduate enrollment in the state and nationally. The leading institutions in international student enrollment are Arizona State University, the University of Arizona and Northern Arizona University (see **Table 2**).

International students contributed more than $321 million to Arizona's economy during the 2011-2012 academic year.

However, Thunderbird School of Global Management is a noteworthy exception. Although the institution ranks fourth in the total of international students, it is arguably a global institution. Consistently ranked as the #1 "International" full-time MBA program in the world by US News and World Report and many other global rankings, Thunderbird School of Global Management attracts students from 77 countries,

resulting in a 56% international student population (Thunderbird School of Global Management, 2013).

Among the students who study in the state, the leading countries of origin (**Table 3**) include China, India, Saudi Arabia, South Korea, and Mexico.

Table 3

Leading Places of Origin for International Students in Arizona

RANK	PLACE OF ORGIN	% OF TOTAL
1	China	27.8
2	India	15.6
3	Saudi Arabia	9.2
4	South Korea	6.6
5	Mexico	4.7

Source: IIE, 2013

Yet similar to the national imbalance, there are far more international students in the state than Arizona students abroad. More concerning, the total number of Arizona students abroad has declined 17 percent from 4,185 in 2010/2011 to 3,481 in 2011/2012. Meanwhile, the country has experienced an increase of 1.7 percent study abroad participation over the past year (IIE, 2013).

INTERNATIONALIZATION STRATEGY AND CHALLENGES

The Framework for the US Department of Education Internationalization Strategy reflects the value and necessity of integrated and coordinated programs that support increasing all students' global competencies, learning from other countries, and engaging in educational diplomacy towards the mutually reinforcing goals of strengthening US education and advancing the country's international priorities (**Figure 4**).

The total number of Arizona students abroad has *declined* 17 percent from 4,185 in 2010/2011 to 3,481 in 2011/2012. Meanwhile, the rest of the country *increased* 1.7 percent in study abroad participation over the past year.

Figure 4

Framework for the U.S. Department of Education International Strategy
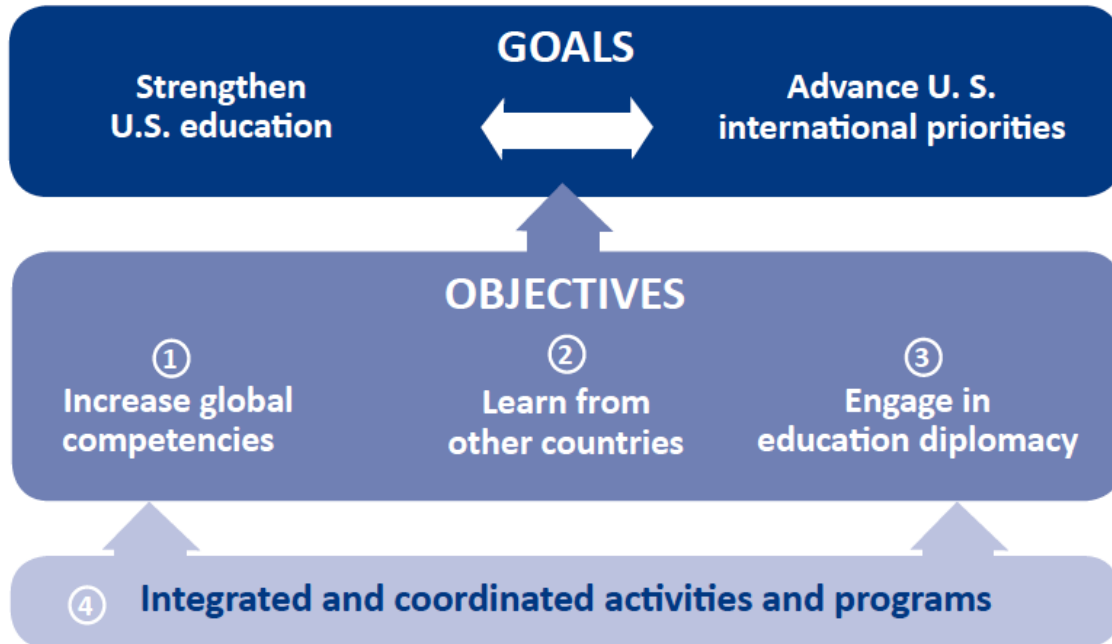
Source: US Department of Education (2012). Succeeding Globally Through International Education and Engagement.

The following sections provide some key areas to further address these objectives and goals.

Study Abroad. As described earlier, the most evident way to obtain a global education is studying abroad. Study abroad programs allow students to take classes in other countries while fulfilling there their graduation requirements. In exchange programs, the educational tuition remains unchanged so that students can continue to pay their home institution at the same rate. Some of the many researched outcomes of studying abroad include continued foreign language use and increases in intercultural communication skills, academic attainment, intercultural and personal development (Dwyer, 2004; Williams, 2005). Most importantly, research suggests such impacts can be sustained over a period as long as 50 years (Dwyer, 2004).

English-speaking countries, such as the United Kingdom and Australia, tend to be popular destinations, resulting in little gain in students' global and cultural awareness compared to studying in a non-English-speaking country.

Despite these benefits, most students, particularly racial minority and low-income students, tend not to pursue study abroad opportunities (Obst, Bhandari, & Witherell, 2007; Salisbury, Umbach, Paulsen & Pascarella, 2008). These reasons are partly financial, given that students are often

expected to pay for transportation and housing that may cost more than what they may have been accustomed to paying back home. Lack of knowledge is another factor as some may not be familiar with the benefits of such opportunities. Related, students may also lack the confidence to study in another country and to be removed from their familiar support networks.   Many who choose to participate make their decision based on family or friends' already residing at the host destination (Lee, 2008).

Another concern is where students choose to study. Language abilities and first-world comforts tend to be major determinants (OECD, 2011). English-speaking countries, such as the United Kingdom and Australia, tend to be highly sought after, resulting in little gain in students' global and cultural awareness compared to studying in a non-English-speaking country.

International Students. A key and affordable way for all US students to increase their international knowledge and awareness is by befriending international students currently studying in the US. Most come from non-English speaking and non-Western countries, mostly from China, India, and South Korea (IIE, 2012). These international students desire to develop relationships with US domestic students but are often left disappointed in the lack reciprocation from US students (Redden, 2013). Lack of cultural familiarity and negative stereotypes have been reported as among the primary reasons for not being able to form intimate friendships (Lee & Rice, 2007). Meanwhile, international student affairs offices tend to be understaffed and lack the resources to further promote many social exchange activities. Quite often, interest in developing relationships with international students is not simply neutral, but sometimes hostile. Lee and Rice (2007) uncovered verbal assaults, sexual harassment, and even physical attacks against international students in Arizona. Other news reports have depicted racist cartoons in student newspapers about Chinese students in particular (Redden, 2012). There have also been accounts of professors being among the perpetrators of international student discrimination but are often left unreported about of fear of creating greater troubles and deportation (Lee & Rice, 2007). Such incidents are especially troublesome considering these reports are occurring in sites of education, suggesting that colleges and universities are inadequately fostering appreciation for international people, diverse values, and global perspectives.

> International students have reported considerable discrimination in and outside the classroom as well as from the local community.

International Versus Diverse Students. Among the challenges in internationalizing colleges and universities is how "diversity" is understood. This issue is not simply a conceptual debate but also practical one. Higher education institutions tend to structure international affairs as separate from diversity offices. Despite the larger diversity umbrella, US minority students receive very different programming and support compared to international students. Hispanic, African, and Asian student support services and cultural centers tend to largely draw in US students from a particular ethnic heritage (African-American, Asian-American) while international students from Africa, Asia, and Latin America have reported not feeling welcome

or included from their peers or the larger institution (Lee & Rice, 2007). Quite often, international students prefer to socialize with other international students in different countries than domestic students who share the same racial background (Schmitt, Spears, & Branscombe, 2003). Tensions sometimes exist but are often left untreated. In short, internationalization is not simply a matter of integrating White Americans with international students. Conscientious efforts would be required to encourage US-international student friendships rather than assuming that such peer relationships are already taking place. A recent internationalization OECD report warned, "Institutions that are not serving their students well both academically and socially risk failing to achieve their missions and incurring damage to their reputations" (Hérnard, Diamond, & Roseveare, 2012, p. 25)

> Conscientious efforts would be required to encourage US-international student friendships rather than assuming that such peer relationships are already taking place.

Curriculum. The curriculum and in-class teachings are considered the foundations of higher learning. Students can enroll in a range of international classes such as foreign languages, cultural history, and international disciplinary perspectives across the university. While opportunities to gain international knowledge might exist, not all students take advantage of such diverse course offerings. Diverse international perspectives tend to be marginalized as optional, elective courses (Yosso, 2002). With little demand, low-enrollment courses and programs are often the first cut as university budgets decrease.

In addition to course requirements and offerings, the backgrounds of the faculty also play a major role in the particular materials presented and how the content is delivered. Even a required introduction course can have an international dimension, especially considering the instructor's background and international experiences. Furthermore, international students can offer diverse perspectives in the classroom (NAFSA, 2013).

Online courses can also serve as a vehicle in internationalization. With greater technological and social network advancements, students can take advantage of increasing opportunities to take courses offered in other countries while residing in their home countries. (For more details on the rise of online education, see Chapter 7.)

Classroom Approaches. As a way to provide additional classroom strategies and more specificity to "global competencies," the Global Competence Task Force, led by the Council of Chief State School Officers and the Asia Society produced a set of global competencies as 21st century skills applied to the world (see **Figure 5**) (US Department of Education, 2012). The underlying theme across the competencies involves an appreciation and understanding of diverse cultures and applying basic skills to diverse environments and people.

Figure 5

Global Competencies: 21st Century Skills Applied to the World

- Identify an issue, generate questions, and explain its significance.
- Use variety of languages, sources and media to identify and weigh relevant evidence.
- Analyze, integrate, and synthesize evidence to construct coherent responses.
- Develop argument based on compelling evidence and draws defensible conclusions.

Investigate the World
Students investigate the world beyond their immediate environment.

Recognize Perspectives
Students recognize their own and others' perspectives.

- Recognize and express their own perspective and identify influences on that perspective.
- Examine others' perspectives and identify what influenced them.
- Explain the impact of cultural interactions.
- Articulate how differential access to knowledge, technology, and resources affects quality of life and perspectives.

Understand the World through Disciplinary and Interdisciplinary Study

Take Action
Students translate their ideas into appropriate actions to improve conditions.

Communicate Ideas
Students communicate their ideas effectively with diverse audiences.

- Identify and create opportunities for personal or collaborative action to improve conditions.
- Assess options and plan actions based on evidence and potential for impact.
- Act, personally or collaboratively, in creative and ethical ways to contribute to improvement, and assess impact of actions taken.
- Reflect on capacity to advocate for and contribute to improvement.

- Recognize and express how diverse audiences perceive meaning and how that affects communication.
- Listen to and communicate effectively with diverse people.
- Select and use appropriate technology and media to communicate with diverse audiences.
- Reflect on how effective communication affects understanding and collaboration in an interdependent world.

Source: The Global Competence Task Force, formed and led by the Council of Chief State School Officers' EdSteps Initiative and the Asia Society Partnership for Global Learning.

CONCLUSION

Internationalization is key to a 21st century education and workforce, both for the state and the nation. Some areas for internationalization include study abroad, learning from current international students and scholars, the curriculum, and classroom approaches[11]. While some Arizona students study abroad, all students can readily internationalize given easy access to current international students in Arizona's colleges and universities, the border, and local

---

[11] For higher education institutions interested in additional strategies in internationalizing their campus, please refer to the following guide: Hérnard, F., Diamond, L., & Roseveare, D. (2012). Approaches for Internationalisation and Their Implications for Strategic Management and Institutional Practice: A Guide for Higher Education Institutions. Paris: OECD Higher Education Programme.
Available at: http://www.oecd.org/edu/imhe/Approaches%20to%20internationalisation%20-%20final%20-%20web.pdf

immigrant populations. How these strategies are enacted in the coming years and the state of internationalization in Arizona remains to be determined.

> ### Questions to Consider
>
> - How can Arizona higher education best prepare its students for the global economy?
> - How can Arizona higher education take advantage of its borderland location to further internationalize?

REFERENCES

Adelman, C. (2004). "Global Preparedness" of PRE-9/11 College Graduates: What the US Longitudinal Studies Say. *Tertiary Education and Management*, *10*(3), 243–260.

Association for American Colleges and Universities. (2007). *College Learning for the New Global Century: A Report from the National Leadership Council for Liberal Education and America's Promise.* Washington DC: AAC&U.

Berman, 2011. The Real Language Crisis. *Academe*, 97(5). http://www.aaup.org/article/real-language-crisis#.UTq82Rme7d4

British Council (2013). *Culture at Work: The value of intercultural skills in the workplace*. Retrieved from http://www.britishcouncil.org/sites/default/files/documents/culture-at-work-research.pdf.

Central Intelligence Agency (2010). Press Release. https://www.cia.gov/news-information/press-releases-statements/press-release-2010/foreign-language-summit.html.

Dwyer, M. (2004). More is better: The impact of study abroad program duration. *Frontiers: The Interdisciplinary Journal of Study Abroad*, *10*, 151-163.

Hérnard, F., Diamond, L., & Roseveare, D. (2012). *Approaches for Internationalisation and Their Implications for Strategic Management and Institutional Practice: A Guide for Higher Education Institutions.* Paris: OECD Higher Education Programme.

Institute of International Education (IIE) (2013). *Fact Sheets by State*. Washington DC: Institute of International Education. Retrieved from: http://www.iie.org/en/Research-and-Publications/Open-Doors/Data/Fact-Sheets-by-US-State

Institute of International Education (2012). *Open Doors 2012 Fast Facts*. Washington DC: Institute of International Education. Retrieved from: http://www.iie.org/en/Research-and-Publications/Open-Doors.

Institute of International Education (2011). *Open Doors 2011: Report on International Educational Exchange.* Retrieved from: http://www.iie.org/en/Research-and-Publications/Open-Doors

Lee, J.J. (2008). Beyond borders: international student pathways to the U.S. *Journal of Studies in International Education, 12*(3), 308-327.

Lee, J.J. & Rice, C. (2007). Welcome to America? International student perceptions of discrimination and neo-racism. *Higher Education, 53*(3), 381-409.

NAFSA (2013). *What Is the Value of International Students to Your State in 2012?* Retrieved from: http://www.nafsa.org/Explore_International_Education/Impact/Data_And_Statistics/What_Is_the_Value_of_International_Students_to_Your_State_in_2012_/.

Obst, D., Bhandari, R., & Witherell, S. (2007). *Meeting America's Global Education Challenge: Current Trends in US Study Abroad & the Impact of Strategic Diversity Initiatives.* IIE Study Abroad White Paper Series, Issue 1.

Organisation for Economic Co-operation and Development (OECD) (2011). *Education at a Glance 2011: OECD Indicators.* Organisation for Economic Co-operation and Development. Retrieved from www.oecd.org/edu/eag2011.

Pavlakovich-Kochi, V. & Charney, A.H. (2008). *Mexican Visitors to Arizona: Visitor Characteristics and Economic Impacts, 2007-08*. Phoenix, AZ: Arizona Office of Tourism.

Redden, E. (2013). International educators consider the challenges in integrating students from abroad. *Inside Higher Ed*. Retrieved from http://www.insidehighered.com/news/2013/03/04/international-educators-consider-challenges-integrating-students-abroad.

Redden, E. (2012). Tensions simmer between American and international students. *Inside Higher Ed.* Retrieved from: http://www.insidehighered.com/news/2012/10/16/tensions-simmer-between-american-and-international-students#.UH1Uu14RJMI.facebook

Salisbury, M., Umbach, P.D., Paulsen, M.B., & Pascarella, E.T. (2008). Going global: Understanding the choice process of the intent to study abroad. *Research in Higher Education*, *50*(2), 119-143.

Schmitt, M. T., Spears, R., & Branscombe, N. R. (2003). Constructing a minority group identity out of shared rejection: the case of international students. *European Journal of Social Psychology, 33,* 1-12.

Thunderbird School of Global Management. (2013). *Facts at a Glance: Global Leadership for Global Impact.* Retrieved from: http://media.thunderbird.edu/sites/default/files/pdfs/fact_sheet.pdf.

US Department of Education (2012). *Succeeding Globally Through International Education and Engagement.* Retrieved from: http://www2.ed.gov/about/inits/ed/internationaled/international-strategy-2012-16.html.

US Department of Education. (2010). Education and the Language Gap: Secretary Arne Duncan's Remarks at the Foreign Language Summit on December 8, 2010 Retrieved from: http://www.ed.gov/news/speeches/education-and-language-gap-secretary-arne-duncans-remarks-foreign-language-summit.

Williams, T. R. (2005). Exploring the Impact of Study Abroad on Students' Intercultural Communication Skills: Adaptability and Sensitivity. *Journal of Studies in International Education*, *9*(4), 356–371.

World Bank (2013). GDP Growth by Country. Retrieved from: http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG.

Yosso, T. J. (2002). Toward a Critical Race Curriculum. *Equity & Excellence in Education*, *35*(2), 93–107.

CHAPTER 5

Incentivizing Optimal Performance in Community Colleges for Arizona's Future

By Rufus Glasper and Debra Thompson, Maricopa Community College District

ABSTRACT

It is important that when considering the question "Is higher education ready for Arizona's future?" that we understand that nearly half (49%) of undergraduate students in the state are enrolled in public two-year colleges, compared to the 29% enrolled in public four-year institutions, as noted in Chapter 2. This chapter adds to the conversation by looking at funding models for the state's community colleges, inviting a discourse about levels of funding, and describes an initiative funded by the Lumina Foundation in which the Maricopa Community Colleges are developing a performance-based funding model, which will serve as a state and national model for community college funding.

BACKGROUND

Throughout the United States, states are changing the formulas and mechanisms by which they appropriate monies to colleges and universities. The changes stem from a nationwide trend of state policymakers seeking to increase accountability and improve educational outcomes by linking public monies to institutional performance, as part of a broader societal debate over the investment in higher education as primarily a public, or private good. "In the late twentieth century the underlying rationale for the public funding of higher education in the United States broke down"(St. John & Parsons, 2004, p. 1) as the historically accepted outcomes of postsecondary education—economic development and social equity—have been increasingly questioned and "public funding per student reached a decade-long low in 2010" (Desrochers, & Kirshstein, 2012, p. 1). Higher education has continued to do more with less, and in 2010 the cost per degree completion declined across most types of institutions (Desrochers, & Kirshstein, 2012).

> The inability of state funding to keep up with college and university operating costs and a downward trend in state tax appropriations support the need for systemic reform.

"Although limited fiscal capacity caused by economic downturns and growing demands made on state budgets undoubtedly factored into attenuated state support for higher education over the past three decades, that capacity was itself affected by an emergent public reluctance to raise and appropriate ever larger sums to government entities" (Palmer, 2013, p. 178). The inability of state funding to keep up with college and university operating costs and a downward trend in state tax appropriations support the need for systemic reform. It is this debate, in part, that helps frame the backdrop for the discourse at the Arizona Town Hall.

> The price of a college or university education has been increasing in concert with declining public support for higher education. Yet, institutions have been able to increase efficiencies as overall cost per degree/completion has declined.

COLLEGE AFFORDABILITY

The price of a college or university education has been increasing in concert with declining public support for higher education, yet institutions have been able to increase efficiencies as we have recently (2010) seen a decline in overall cost per degree/completion. The *Delta Cost Project* reports that community colleges were the only type of institution where the "cost per completion was lower in 2010 than at the beginning of the decade" (Desrochers, & Kirshstein, 2012, p. 9). For an overview of national costs per total number of degrees and completions by institutional type see "College Spending in a Turbulent Decade: Findings From the Delta Cost Project" (http://www.deltacostproject.org/pdfs/Delta-Cost-College-Spending-In-A-Turbulent-Decade.pdf).

Figure 1 provides an overview of the average in-state tuition and fees at public two-year and four-year institutions, as well as a 5-year percent change, adjusted for inflation. Arizona had the highest percent change (78%) in public university tuition and fees between 2007-08 and 2012-13, and California had the highest increase in public two-year institutions. The full report, "Trends in College Pricing," is available (http://trends.collegeboard.org/college-pricing).

Net tuition has been rising and the difference between state appropriations and tuition has been declining as students increasingly pay more of the costs of their education, which feeds the "public versus private good" debate. The average net price paid by full-time students at public four-year and two-year colleges, as well as private non-profit four-year students increased in fiscal years 2012 and 2013. Net price is an important concept because in general, students do not pay the full price of their postsecondary education. "In public and nonprofit private colleges and universities, revenues from student tuition and fees do not cover the full cost of educating students (i.e., E&R costs); the difference comes from a general

Figure 1. Average In-State Tuition and Fees at Public Four-Year and Two-Year Institutions by State 2012-2013 and 5-Year Percentage Change in Inflation-Adjusted Tuition and Fees, 2007-08 to 2012-13.
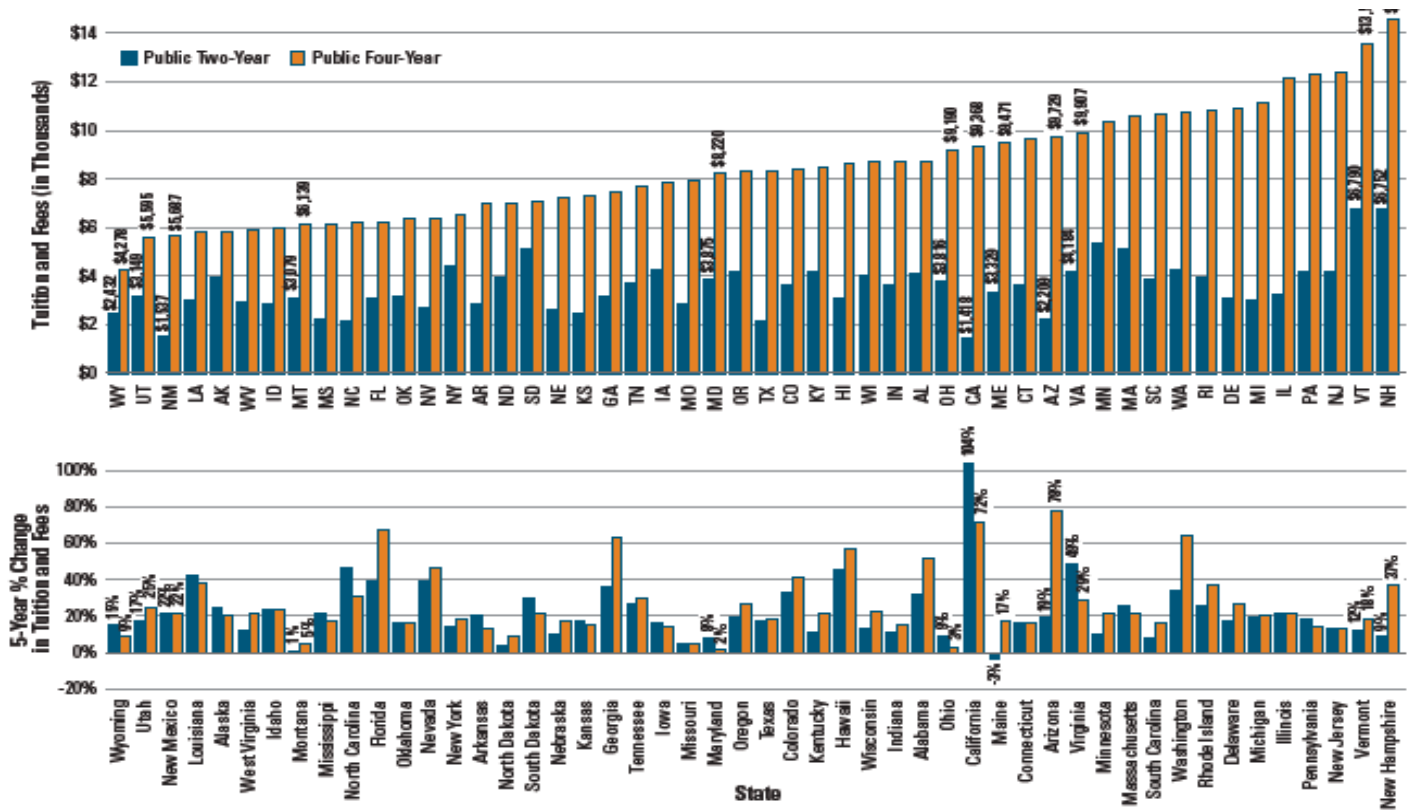
SOURCE: The College Board, *Annual Survey of Colleges.*

institutional subsidy. In public institutions, the subsidy share of cost is largely underwritten by state and local appropriations" (Hurlburt & Kirshstein, 2010, p. 1). In fact,

> In 2012-13, full-time undergraduates at public four-year institutions receive an estimated average of $5,750 in grant aid from all sources and federal tax benefits to help them pay the average $8,665 published tuition and fees. The students pay an average net price of just over $2,900 (College Board, 2012a, p. 4).

For community college students, while costs have been increasing, the relative cost of attending (using 2012-13 data) is only 36% of the average cost of published tuition and fees at public four-year institutions. Research indicates that "on average, two-year public college students receive enough financial aid to cover their tuition payments – with some funds left over to apply to other expenses" (College Board, 2012a, p. 7).

Community colleges, faced with the largest cuts across the higher education sector in 2010 (by approximately $1,000 per student) did better than all other types of public institutions at

limiting new monies coming in from net tuition (Desrochers & Kirshstein, 2012). Further, "fewer than half of associate degree and certificate recipients at public two-year colleges graduated with education debt in 2007-08" (College Board, 2012b).

HIGHER EDUCATION FUNDING IN THE STATE OF ARIZONA

The Arizona Constitution requires its Legislature to provide an education system that includes postsecondary institutions, and "the university and all other state educational institutions shall be open to students of both sexes, and the instruction furnished shall be as nearly free as possible" (Article XI, §6). That said, nationally, forty-seven (94% of) state legislatures give more state support for higher education per capita than Arizona.

Table 1

State Support for Higher Education, FY 2013, Select States. State Monies Only [c] ($)				
	FY13 Total	Per $1,000 personal income [a]	Per Capita [b]	Per Capita Rank
Wyoming	384,199,290	13.68	666.54	1st
Alaska	365,195,297	10.77	499.28	2nd
North Dakota	343,805,783	9.87	491.41	3rd
North Carolina	4,092,304,288	11.44	419.63	4th
New Mexico	799,405,505	10.93	383.31	5th
Arizona	840,320,500	3.57	128.23	48th

Source: Grapevine Project (2013). a)Based on personal income data for the 3rd quarter of 2012, retrieved from the Bureau of Economic Analysis, U.S. Department of Commerce, http://www.bea.gov/itable/index_regional.cfm; b) Based on July 2012 population estimates retrieved from the U.S. Census Bureau, http://www.census.gov/popest/data/state/totals/2012/index.html. c) Includes both tax and nontax monies.

Arizona State University, the University of Arizona, Northern Arizona University, and the state's public community colleges all receive funding from a combination of sources (**Table 1**), including the state general fund, tuition and fee revenues, grant and aid funding, and various student fees. In addition, community colleges are recipients of locally determined property taxes which are established by their elected governing boards, subject to constitutional and statutory limits.   This paper provides background on funding of community colleges, now and potentially in the future.

COMMUNITY COLLEGE FUNDING

Community colleges, nationally, are the only public institutions "at which average total operating revenues per FTE [full-time equivalent] student declined in 2010 and also were lower than a decade earlier" (Arizona's community colleges are political subdivisions of the State of Arizona). They are not state agencies nor are they county agencies, but have their own legal

status as political subdivisions of the State of Arizona. As such, they are governed by elected governing boards. Statutorily, community colleges have a separate legal standing from the state's public universities and funding in the state of Arizona is separate from funding for the universities.

Figure 2

Arizona Community Colleges FY 2013 Revenues

Secondary Taxes, $96.20
State Aid, $35.50
Bond Proceeds, $400.90
Equalization Aid, $27.50
Restricted Grants, $451.40
Tuition & Fees, $422.00
Other, $124.30
Primary Taxes, $652.10

Note: Amounts in Millions of Dollars
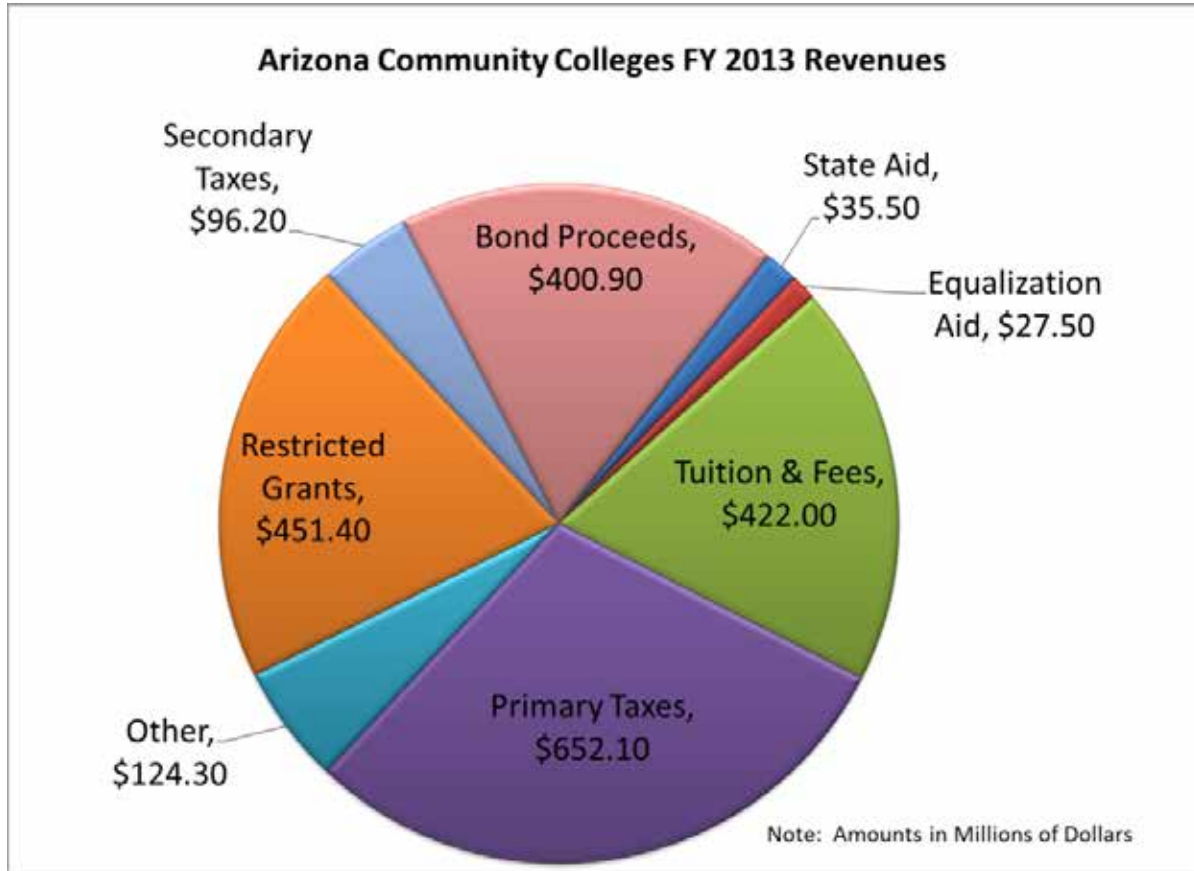
Source: *FY 2014 State Aid Request for all Districts*

As of Fiscal Year 20 12-2013, the two primary sources of funding for community college operations are property taxes and tuition. Property taxes have long been the single resource that supports community college operations. Levy limits govern the level of taxation, pursuant to the State Constitution. In essence the levy limit on existing property only can increase by 2% per year, though districts can and do receive additional taxes from new construction. To increase the levy limit above the current level (less taxes from new construction), a notice must be published in a local newspaper in a manner specified by state statute. This "Truth in Taxation" requirement, as it is known, also requires district governing boards to take a roll call vote of the proposal and results of the vote to be transmitted to the Property Tax Oversight Commission, as prescribed in statute. [See Appendix A for FY Adopted All Funds Budgeted Revenue by District.]

As noted earlier, tuition and fees, per the Constitution, should be set to make education as nearly free as possible. Details on what this means or how to make this determination are not specified. Instead, individual districts annually balance, in their decision making process on the budget, the relative benefits of what can be funded with a tuition increase versus the potential of losing students because of their inability to afford tuition. In effect, the district governing boards must be convinced that it is in the best interest of students to pay more for their education because of the ability to fund new or enhanced programs, services and initiatives.

State funding for Arizona's community colleges varies significantly from district to district in part due to their size, ranging from 277 FTSE (full-time student equivalents) for Santa Cruz to 84,544 for Maricopa Community Colleges according to the State Auditor's report (Davenport, 2011). Full-time student equivalents are the result of a series of calculations involving credit hours and headcount to yield an equivalent number of students attending college on a full-time basis (See ARS §15-1466.01 "*Calculation of full-time equivalent student enrollment*" for more details). The number of students (by FTSE calculation) attending Arizona's community colleges increased by more than 52% percent between FY 2001 and FY 2013, while "funding per student has decreased from $1,376 in FY 2001 to $435 per student in FY 2013."

State appropriated funding for community colleges is computed under three separate formulas established in statute. Notwithstanding the statutory formulas, due to the loss of significant revenues during the recent recession, the state dramatically reduced funding for community colleges between FY08-9 and FY11-12: from a total of $164.6 million in FY07-8 (prior to reductions) to $68.6 million in FY11-12.

Three types of state aid are operating aid, equalization aid, and capital outlay aid (although funding for capital outlay had been suspended between FY08-9 and FY12-13). It is recommended by the Governor, but not the Joint Legislative Budget Committee, for reinstatement in FY 14 at 50% for all districts except for Maricopa and Pima. Appendix B provides an overview of FY total state aid appropriations.

The operational and capital formulas are based on enrollment, although enrollment based formulas have not been fully funded in recent years. The operational formula is based on the increase or decrease in FTSE over the last two audited years of data and capital aid is based entirely on the last year's audited FTSE. What this means is the funding in any given year is based on enrollment changes or enrollment from two years prior to the current year. [See **Figure 3** for trend data of State General Fund Appropriations per FTSE.]

Figure 3

Arizona Community Colleges
General Fund Appropriations per FTSE*

* FTSE (Full Time Student Equivalent) is based on the actual audited count 2 years prior to the funded amount.

Source: Arizona Community Colleges General Fund Appropriations "http://www.azleg.gov/jlbc/accgfapp04-13.pdf
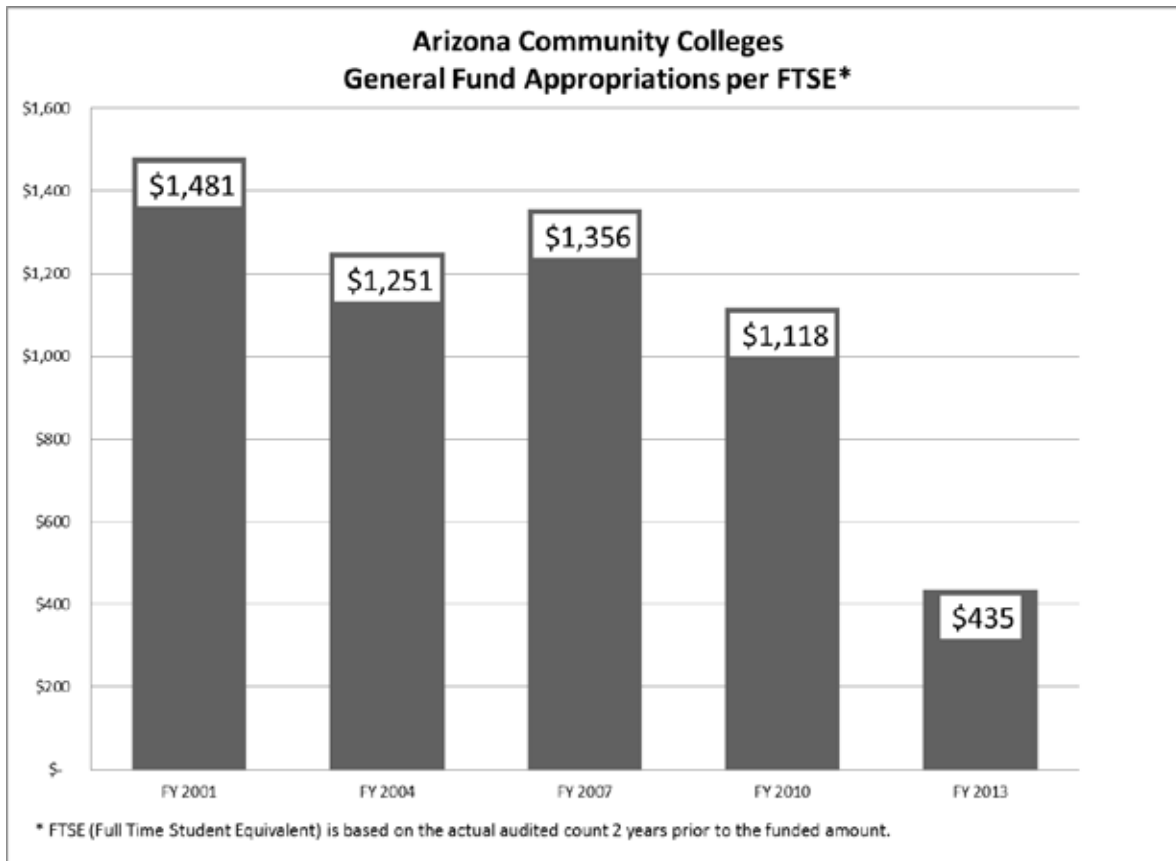
The other variable in the formulas is the rate. Operational aid for all districts is calculated using the last total operational aid appropriation to all districts divided by the total audited FTSE for that year (with a 50% rate for dual enrollment FTSE). Capital aid is $160 per FTSE for districts with more than 5,000 FTSE and $210 per FTSE for districts with less than 5,000 FTSE. Although statute provides for an inflationary adjustment, it has rarely been applied.

Equalization aid is established pursuant to statute but applies on a limited basis to organized districts with assessed valuations below a specified threshold in order to ensure a minimum level of funding. Currently three districts receive equalization support from the state.

COMMUNITY COLLEGES & PERFORMANCE-BASED FUNDING

We live in an age of accountability, and not surprisingly we find that among public and private postsecondary institutions, community colleges have the lowest cost per completion (Desrochers & Kirshstein, 2012). Community colleges enroll the most students nationally, and spend the least compared to other postsecondary sectors (see Figure 22, Desrochers & Wellman, 2011) yet we continue to quantify returns on the public's investment.

In the remainder of this chapter we focus on performance funding for community colleges for two reasons: first, because the Arizona Board of Regents (ABOR) has already established a new funding formula for the state's public universities; and second, because the Lumina Foundation has provided a grant (Getting AHEAD) to the Maricopa County Community Colleges to build a funding model in conjunction with Arizona's other community colleges that is appropriate for community colleges across the state of Arizona, with the intent to expand the model nationally as appropriate. The Lumina project coincides with the development by the Arizona Community College Presidents' Council (ACCPC) of statewide metrics in a Strategic Vision document. Arizona's community colleges have implemented rigorous accountability measures tied to 30 key indicators related to access, retention, and completion (Kisker & Gragg, 2013). The nine organized community college districts in the state will be impacted by a new performance-based funding model and the planning calls for the performance metrics to be tied to the Strategic Vision metrics. The process will also engage the colleges in discussions related to adaptability and relevance of the resulting model to their institutions, missions, and students.

> National research suggests that prioritizing community colleges' multiple missions may be the most appropriate response to fiscal realities.

Whereas existing funding models have historically allocated monies to institutions largely on enrollment-based formulas, on "inputs" (e.g., number of entering students and total number of students), the national movement focuses policies, initiatives, and funding on college success models. This is consistent with national research which suggests that prioritization of the community college's multiple missions may be the appropriate response to the fiscal realities. "At the state level, efforts to align funding formulas with clearly identified priorities may do much to enhance efficiencies in the use of scarce resources available while at the same time clarifying what community colleges are accountable for as educational ends" (Palmer, 2013, p. 180).

PERFORMANCE FUNDING ISSUES

In developing a performance-based funding model for community colleges it is important to incentivize outcomes that serve the state, not just individual institutions. The two do not always go hand in hand. For example, an individual college might increase its graduation rate and other outcomes by turning away from the growth population of first generation and lower income students who will likely graduate at somewhat lower rates but who are important to educate to strengthen the state's economy and tax base. It is also important to develop incentives that support cross-segmental cooperation to deal with issues related to the large numbers of students needing remediation, the importance of articulation, and the swirling students.
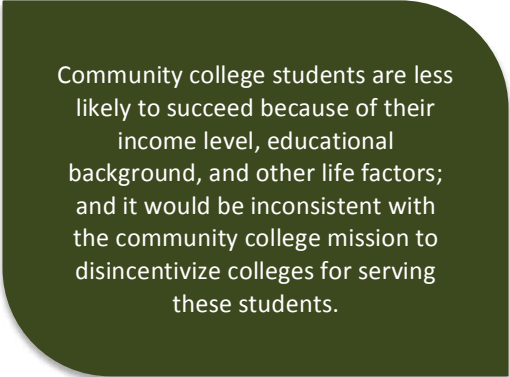
Graduation rates are perhaps the most obvious and simple outcome to measure. Indeed, nationally this is the most common accountability measure that states are emphasizing. One important example of this is evident in the National Governors Association's Complete to

Compete initiative, a nationwide push by governors of both parties to increase graduation rates in colleges and universities. However, even as there is an ongoing, bi-partisan push to improve educational outcomes, and to allocate state resources based on that performance, there is at the same time a growing recognition of the limits of a simple graduation rate approach. Some states, such as Tennessee, have constructed models for allocating resources that are sensitive to the historical mission and student bodies of the institutions. A funding formula would be counterproductive if based on graduation rates for institutions with student populations that vary dramatically by academic ability and income, both of which are related to time to graduation.

Moreover, there is recognition nationally that simple graduation rates are particularly inappropriate for community colleges, as they are for many access-oriented colleges and universities. There are several reasons underlying this recognition. There are dimensions of success other than graduation. Many students who transfer never "graduate" from a community college in the sense of getting an associate's degree. Many students are not seeking a degree, but rather a certificate or a course to advance in their careers. The model needs to incentivize outcomes that are appropriate to the mission and student bodies of community colleges. Community college students are less likely to succeed because of their income level, educational background, and other life factors (including the specific educational needs of the large number of returning students); and it would be inconsistent with the community college mission to disincentivize colleges for serving these students. The fiscal structural implications to the state of an increasingly uneducated population significantly hinder long-term workforce and economic development initiatives and benefits.

> Community college students are less likely to succeed because of their income level, educational background, and other life factors; and it would be inconsistent with the community college mission to disincentivize colleges for serving these students.

Planning for performance-based funding necessitates changes in institutional planning processes as well as the intersection of state-level incentives with the incentives within the institutions. The University of Arizona, for example, has implemented Responsibility Centered Management (RCM). RCM couples authority and financial responsibility—two areas that are typically decentralized within higher education. RCM increases accountability by linking planning more directly with financial responsibility. The Maricopa Community Colleges are implementing Dickeson's model of program prioritization (1999) which suggests processes for setting priorities among academic programs, centers, and campuses competing for increasingly scarce resources. The Maricopa District will be including non-academic programs as well, integrating the prioritization project with ongoing, evaluative institutional program review processes already in place.

LOOKING AHEAD

Higher education has historically been utilized as a "balance wheel" in state higher education funding. When we take the long view of state support for higher education, we see that during periods of economic prosperity higher education may receive a large portion of state funding, and in addition, during economic hardships, states cut a disproportionate amount of higher education funding (Hovey, 1999). The cyclical nature of state support for higher education has now been so consistently wavelike as to be considered a predictable pattern. As an example, recent reports in the Chronicle of Higher Education suggest "After falling nearly 11 percent since the 2008 fiscal year, state appropriations for higher education are on the rise in most states" (Kelderman, 2013). What does this mean for Arizona's public community colleges?

> The deeply rooted and longstanding history of tenuous state support for higher education suggests that the fiscal health of community colleges will depend more on state and institutional adaptations to the fiscal environment than on advocacy for incremental subsidies-subsidies that, absent tax increases, can only come at the expense of other equally important public agencies seeking their own share of limited state resources (Palmer, 2013, p. 180).

For our community colleges, a shared vision of increased accountability, applied metrics, a commitment to the dual missions of access and completion, increasing entrepreneurial development, and the opportunity to develop performance-based funding opportunities help define a future of success for Arizona's current and future community college students.

Questions to Consider

- How do we effectively incentivize optimal performance and outcomes in an open-access institution?
- Where are opportunities for improved collaboration across sectors, supporting a P-20 environment?
- As new funding models are implemented, by what process can they best be evaluated as to their effects and effectiveness and then readjusted and fine-tuned accordingly?

REFERENCES

Arizona Constitution, *Education*. Article XI, §6.

College Board (2010). *Education pays*. Retrieved from:
        http://trends.collegeboard.org/education-pays

College Board (2012a). *Trends in college pricing 2012*. Retrieved from:
       http://trends.collegeboard.org/sites/default/files/college-pricing-2012-full-report-
       121203.pdf

College Board (2012b). *Trends in student aid. Distribution of Total Undergraduate Debt by*
       Sector and Type of Degree or Certificate, 2007-08. Retrieved from:
       http://trends.collegeboard.org/student-aid/figures-tables/distribution-total-
       undergraduate-debt-sector-and-type-degree-or-certificate-2007-08.

Davenport, D. (2011). *Full-Time equivalent student enrollment report Arizona county community*
       college districts and colleges of qualifying Indian tribes. Retrieved from:
       http://www.azauditor.gov/Reports/Community_Colleges/CC_SystemWide/FTSE/AZ_CC
       CD_Colleges_of_Qualifying_Tribes_6-30-11_FTSE.pdf

Desrochers, D. M., & Wellman, J. V. (2011). *Trends in college spending 1999-2009: Where does*
       the money come from? Where does it go? What does it buy? A report of the Delta Cost
       Project. Retrieved from:
       http://www.deltacostproject.org/resources/pdf/Trends2011_Final_090711.pdf

Desrochers, D. M., & Kirshstein, R. J. (2012). *College spending in a turbulent decade: Findings*
       from the Delta Cost Project. Washington, D.C.: American Institutes for Research.
       Retrieved from: http://www.deltacostproject.org/pdfs/Delta-Cost-College-Spending-In-
       A-Turbulent-Decade.pdf

Dickeson, R. (1999). *Prioritizing academic programs and services: Reallocating resources to*
       achieve strategic balance. San Francisco: Jossey-Bass.

Grapevine Project (2013). *Table 5. State support for higher education in fiscal year 2012-13, by*
       state, per $1,000 in personal income and per capita. Center for the Study of Education
       Policy, University of Illinois. Retrieved from:
       http://grapevine.illinoisstate.edu/tables/index.htm

Hovey, H. A. (1999). *State spending for higher education in the next decade. The battle to*
       sustain current support. The National Center for Public Policy and Higher Education.
       Retrieved from: http://www.highereducation.org/reports/hovey/hovey.pdf

Hurlburt, S. & Kirshstein, R. J. (2010). *Spending, subsidies, and tuition: Why are prices going up?*
       What are tuitions going to pay for? A report of the Delta Cost Project. Retrieved from:
       http://www.deltacostproject.org/resources/pdf/Delta-Subsidy-Trends-Production.pdf

Kelderman, E. (2013, January 21). State spending on higher education rebounds in most states
       after years of decline. *The Chronicle of Higher Education*. Retrieved from:
       http://chronicle.com/article/State-Spending-on-Higher/136745/

Kisker, C. B., & Gragg, J. T. (2013). Arizona. Submitted for publication in Friedel, J., Katsinas, S., & Killacky, J. (Eds.). *Fifty State Systems of Community Colleges* (4th ed.).

Palmer, J. (2013). State fiscal support for community colleges. In J. S. Levin, & S. T. Kater (Eds.). *Understanding Community Colleges* (pp. 171-183). New York: Routledge.

St. John, E. P., & Parsons, M. D. (Eds.). (2004). *Public funding of higher education: Changing contexts and new rationales.* Baltimore: The Johns Hopkins University Press.

Appendix A

FY 2013 Adopted All Funds Budgeted Revenue by District

District	State Aid (1)	Equalization	Tuition & Fees	Primary Taxes	Other	Restricted Grants	Secondary Taxes	Bond Proceeds	Budgeted Fund Balance (2)	FY 2013 Adopted Budget
Cochise	5,784,600	5,614,700	8,487,200	17,993,200	4,047,700	16,500,000			4,905,000	63,332,400
Coconino	1,847,900	-	7,542,388	6,772,795	912,021	7,806,761	1,850,466		1,263,566	27,995,897
Gila	410,000	-	-	3,654,828	475,000	116,000			446,000	5,101,828
Graham	2,373,200	16,867,300	7,364,064	5,040,050	8,471,881	12,000,000			11,493,797	63,610,292
Maricopa	8,315,700	-	287,898,318	396,192,808	82,506,346	247,768,852	76,200,590	380,752,627	90,076,539	1,569,711,780
Mohave	1,785,600	-	12,101,422	19,621,621	361,137	14,903,019	-	-	12,254,829	61,027,628
Navajo	1,689,700	5,370,100	5,300,000	13,167,562	2,275,000	5,400,000			8,585,000	41,787,362
Pima	7,353,500	-	55,763,000	92,721,000	5,958,000	89,643,000	2,098,000		45,384,000	298,920,500
Pinal	2,107,800	-	13,168,000	32,604,404	12,743,796	24,000,000	5,807,458	20,000,000	48,764,000	159,195,458
Santa Cruz	63,500	-		258,279	500	75,550				397,829
Yavapai	957,600	-	10,636,000	40,232,000	3,354,000	13,230,000	5,192,000	200,000	3,808,000	77,609,600
Yuma/La Paz	2,802,600	-	13,754,061	23,869,498	3,203,450	20,000,000	5,074,447		5,645,199	74,349,255
Total	35,491,700	27,852,100	422,014,453	652,128,045	124,308,831	451,443,182	96,222,961	400,952,627	232,625,930	2,443,039,829

Moreover, during this same time state policymakers have been increasingly trying to promote greater productivity with public monies. As a university dean phrased it in a meeting of faculty discussing higher education issues with Jim Rogers, a big businessman and major donor to the University of Arizona, "the state is essentially a minority stakeholder in the enterprise [of higher education], but it is increasingly trying to call the shots." That framing of the situation resonated with a leading businessman, Rogers, who served from 2004 to 2009 as President of the Nevada Board of Regents. The "minority stakeholder" reference applies particularly to Arizona's community colleges, which as noted in an earlier chapter are distinctive in having such a small share of their revenues and of their operating budgets coming from state appropriations (they rank forty-ninth in the country in this regard). It is important for public policymakers to understand the multiple and changing balance of college and university revenue sources as they try to strategically allocate state monies in ways that incentivize greater institutional productivity. Such information is particularly important in the case of community colleges, which have budgets in which the share of state appropriations is extremely small.

A second important pattern is that states are constructing new accountability systems that focus on the productivity of individual institutions or of separate higher education systems—for example in their graduation rates. Yet one of the major responsibilities of governing bodies is to ensure coordination and cooperation among institutions, as well as to encourage institutions to stay focused on their mission. States are facing challenges that require coordination and cooperation among institutions and systems. One such challenge is increasing the access and success of students. Fully addressing that challenge, however, necessarily involves considering student flows among more than one institution. Roughly one-third of students in the U.S. transfer at least once within five years (Hossler et al, 2012). Somewhat surprisingly, community colleges were the most frequent transfer destinations for students who started at four-year colleges and universities, evidence of what has been called "reverse transfer." Over one-fourth of students who transferred (27 percent) did so out of the state. Further, among students who graduate, there is also evidence of much student movement among institutions. More than one-fifth of students (22.4 percent) who graduated within six years did so at a different institution than where they started (Shapiro et al., 2012).

> Roughly one-third of students in the U.S. transfer at least once within five years. Somewhat surprisingly, community colleges were the most frequent transfer destinations for students who started at four-year colleges and universities, evidence of what has been called "reverse transfer."

In short, being strategic means thinking beyond individual institutions to the broader statewide system. An effective strategy for facilitating student success involves strengthening relations among institutions and systems. Similarly, graduation rates are more accurately calculated if they include more than one institution, and the movement of students among institutions. Therein lies a strategic challenge for Arizona policymakers in constructing accountability measures. In what ways can measures and mechanisms be developed that capture and

Appendix A (continued)
FY 2013 Adopted All Funds Budgeted Revenue by District

District	Total State Aid	State Aid (1)	Equalization
Cochise	11,399,300	5,784,600	5,614,700
Coconino	1,847,900	1,847,900	-
Gila	410,000	410,000	-
Graham	19,240,500	2,373,200	16,867,300
Maricopa	8,315,700	8,315,700	-
Mohave	1,785,600	1,785,600	-
Navajo	7,059,800	1,689,700	5,370,100
Pima	7,353,500	7,353,500	-
Pinal	2,107,800	2,107,800	-
Santa Cruz	63,500	63,500	-
Yavapai	957,600	957,600	-
Yuma/La Paz	2,802,600	2,802,600	-
Total	63,343,800	35,491,700	27,852,100

CHAPTER 6

Strategically Governing Higher Education for Arizona's Future

By Gary Rhoades, Center for the Study of Higher Education, The University of Arizona

ABSTRACT

The chapter describes the formal governance structures in Arizona higher education. It identifies three sets of empirical trends and accompanying strategic questions in key areas of responsibility for governing bodies. After placing these in the context of the 2000 Arizona Town Hall recommendations about higher education and governance, the chapter then explores strategic management of (a) enrollments and costs, (b) system-wide coordination and synergies, and (c) resource allocation and mission priorities.

FORMAL GOVERNANCE STRUCTURES IN ARIZONA HIGHER EDUCATION

Public higher education in Arizona has different governance structures for the university and community college sectors. The state's public universities are overseen by a statewide, "consolidated governing board," the Arizona Board of Regents (ABOR). Of the twelve members on the Board, eight are appointed to eight-year terms by the governor with the consent of the senate, two students are appointed to one-year terms by the governor with the consent of the senate, and two are voting ex officio members serving by virtue of their offices—the governor and the state superintendent of instruction.

Nationally, twenty-four states have such boards, whereas twenty-four others have "coordinating" boards (Michigan has no statewide entity and Pennsylvania has a state agency with limited authority for higher education). Coordinating boards vary in their levels of advisory and regulatory authorities, but they do not have the managing functions of governing boards. Typical of governing boards, ABOR has legal authority over a wide range of functions including: personnel (e.g., hiring the university presidents); strategic planning, coordination, and mission; budget review and approval; student financial aid; academic program review and accountability. An important strength of a governing board is that it provides mechanisms for managing the work of institutions within the system so as to reduce duplication of effort and increase accountability. Those purposes are among the principal reasons historically that state level boards were created. A potential disadvantage of governing boards is that they can treat very different institutions similarly, in terms of various measures and regulations. That can

make it more difficult for institutions to fulfill their distinctive missions and to pursue their distinctive opportunities and strategic niches.

Although ABOR is a "consolidated governing board," it does not have authority over the state's community colleges. In that respect Arizona is like fourteen of the twenty-four other states with governing boards that do not oversee both two- and four-year sectors of public higher education. However, what sets Arizona apart from those fourteen other states is that it does not have a separate governing board for community colleges (in 2003, Arizona's State Board of Directors for Community Colleges was abolished by the state legislature). Instead, each community college district and institution in the state has its own governing body. The advantage of this arrangement is that it provides flexibility for institutions to serve the particular needs of their local communities. The disadvantage is that it makes it more difficult to address statewide issues such as college readiness and remediation, to coordinate cooperation among the community colleges, and to facilitate their articulation with the state's universities.

The independent sector of not-for-profit colleges and universities does not have a state level organization. By contrast, forty-three other states do have state level organizations of independent colleges (ECS, 2013). The absence of a state-level organization reflects the comparatively quite small size of Arizona's independent sector of colleges.

THREE PATTERNS TO CONSIDER IN STRATEGIC GOVERNANCE

Three interesting patterns merit consideration in regard to strategically governing higher education in Arizona. Each of these patterns relates to an important domain of responsibility for higher education governing bodies. Each offers important insights and raises important strategic questions for policymakers.

The first pattern is that over time, colleges and universities have generated an increasing share of their revenues from sources other than state appropriations. Those other sources include not just tuition and fees, but also research grants and contracts (mostly from federal sources) as well as gifts (from fund raising). For instance, the most recent ABOR data indicates that state general fund appropriations account for just 17 percent of the all funds operating budget for the state's three public universities, compared to 29 percent for gifts, grants, and contracts, and 35 percent for tuition and fees (ABOR, 2012). That is part of a long-term trend in Arizona and nationally. The share of public university budgets that come from tuition and fees surpassed that of state appropriations in 2008 (Desrochers et al., 2010). There is an inverse relationship between state appropriations and fees: as one goes down the other goes up. Such a relationship presents a challenge for policymakers seeking to strategically manage enrollments and tuition.

> It is important for public policymakers to understand the multiple and changing balance of college and university revenue sources as they try to strategically allocate state monies in ways that incentivize greater institutional productivity.

promote productivity outcomes that involve the work of more than one institution or system? As it was phrased by an October 2012 panel of the author and two leading national consultants in state higher education governance, our accountability models will benefit from keeping the big picture in mind, from focusing on "systemness," on optimizing coordination among parts of the system. Most states are framing accountability in ways that do not consider or incentivize behaviors that address statewide challenges in transfer and articulation, remediation, and college readiness, among other issues. The challenge is to coordinate and incentivize intersecting behaviors among different parts of the educational system, from p-12 to community colleges, to four-year institutions.

A third pattern for policymakers to consider in regard to governance is that increased government regulation in the name of accountability can lead to increased expenditure of time and resources by campuses in responding to that regulation. National and state data point to the increased growth in colleges and universities of non-instructional personnel and costs. Institutional leaders explain that a significant part of this growth can be attributed to campuses having to deal with government regulation, to measure, monitor, and report on college and universities' productivity. The author framed it in this way in an August 22, 2010 Fox and Friends Weekend segment, discussing the Texas higher education system's new accountability measures. The problem is that while such measures sound like a good to idea in the abstract, implementing them in practice often involves requiring universities to devote more resources to personnel who are measuring and reporting on productivity and less to those producing credit hours, graduates, research grants, and education. The question, "Do we really need more campus administrators to respond to government regulation?" resonated with the moderator. The strategic questions for policymakers governing higher education is how to optimally balance administrative costs in institutions' budgets and to how to incentivize institutions to emphasize their core functions and missions.

The above three patterns and sets of strategic considerations frame the body of this chapter. They overlay and build on the foundation of the May 2000 Arizona Town Hall report.

THE MAY 2000 TOWN HALL RECOMMENDATIONS ON GOVERNANCE

The three sets of patterns and strategic governance considerations set forth above map nicely onto the May background papers and recommendations of the seventy-sixth Arizona Town Hall, "Higher Education in Arizona for the 21st Century" (Besnette, 2000). In regard to the first pattern, the May 2000 background chapter, "Accountability," recognized the increased pressure for greater accountability: "The last two decades of the twentieth century have witnessed a surge in the demand for accountability from higher education providers of all types." (p.178) The consensual recommendations of that report stated "that accountability measures of higher education already exist," and that institutions were already doing a lot of reporting. Nevertheless the recommendations also called for more "outcome based" accountability measures, broad based measures of graduates' participation in work and community, and for a recognition that "the success of an educational system may not always be measurable in all things." (p.xvii)

So, too, the background chapter, "Financing," reported the declining share of state funding, not just in colleges and universities' budgets, but also in the state budgets. In the 1990s, in terms of funding per $1,000 of income, Arizona "was among those states having reduced their rate of support the most." (p.140) Similarly, "Arizona's appropriation in FY2000 was only 56.9% of its FY 1979 appropriation, fifth from the bottom among the 50 states." (p.140) That pattern of state disinvestment in higher education has continued in the 2000s, as detailed in earlier chapters of this report. The consensual recommendation of the 2000 report was based on a dual premise of the need to (a) expand higher education attainment, and to that end (b) to make higher education more affordable by re-investing state monies into the system: "Arizona must be willing to demonstrate its commitment to the higher education system by focusing a greater share of financial support on that system." (p.xix) Embedded in that 2000 recommendation is a recognition of the relationship between state monies and tuition. Therein lies an ongoing strategic challenge to policymakers governing higher education.

The 2000 Arizona Town Hall report also provides some foundation and guidance regarding the second set of patterns and strategic considerations discussed above. Its recommendations call for a new model of accountability. It characterized the pre-existing, enrollment based model of funding higher education in Arizona, which prevailed nationally as well, as "an obsolete paradigm." (p.xxi) The two public systems in Arizona are indeed moving beyond that old model, focusing far more explicitly on outcomes. Moreover, system targets are being identified, as shall be seen below in the metrics dashboard of ABOR. Yet the accountability measures are applied to individual institutions. The metrics do not speak to systemic cooperation in facilitating flows of students within and between systems. Further, each of the public systems has developed its own metrics, independent of one another, suggesting a continuing need for coordination.

> The overall strategic question for Arizona higher education remains: How can greater collaboration among various institutions and systems in addressing state needs be realized within the current governance structures?

In describing the governance structure of Arizona higher education, the 2000 Town Hall report spoke to the value of more statewide coordination in planning. It did not recommend an overhaul of the then two part structure (ABOR and a State Board of Directors for Community Colleges). Instead it called for improvements:

> Improvements include allowing private institution participation and achieving greater representation by underserved populations in the governance system. There is also a substantial need for immediate collaboration and cooperation among these entities, [ABOR, community college directors, and state board of education] including strong linkages with local governing boards and with the Legislature. (p. xix)

Since 2000, however, there has been a significant change in the formal governance structure of community colleges, and there has also been an apparent effort to effect greater coordination

among universities within ABOR. Within a year of the 2000 report, the Legislature cut the budget of the State Board of Directors for Community Colleges and eliminated some of its functions. Effective July 1, 2003 the Legislature eliminated the board altogether. For the university system, the appointment in 2010 of Tom Anderes as President (a new title, the previous one being Executive Director), signaled an apparent effort to more fully manage the three public universities in a common direction. With the departure of Mr. Anderes in 2013, and his replacement as of February 4, 2013 by Eileen Klein as ABOR president, it remains to be seen to what extent such strategic direction will be continued and realized. The overall strategic question, then, for Arizona higher education remains: how can greater collaboration among various institutions and systems in addressing state needs be realized within the current governance structures?

Finally, with regard to the third pattern and strategic consideration of administrative costs being triggered by accountability the 2000 Arizona Town Hall report provides limited guidance. The 2000 background paper on "Recent Changes," spoke to "program changes to meet the needs of new students, employers, and industries. It began to address prioritization of academic programs, which is one of the main functions of system governing bodies. Another key responsibility of governing bodies, being actively pursued in many states, is to assess and increase the efficiency of business and administrative services. This chapter considers national and state data to frame and pose the strategic questions, "What is the optimal balance between resources allocated to administrative and production activities (i.e., teaching, research, and service), to ensure greater productivity in institutions' core activities?"

Each of the above considerations and questions are fundamentally important for the governing bodies of public higher education. The empirical patterns that underlie them are not new and they are not simply products of the recent, great recession, as the 2000 Arizona Town Hall report helps make clear. Rather, they are long standing, enduring strategic challenges that present governance bodies with choices of whether and how to address issues and make changes that will profoundly shape Arizona's future.

STRATEGICALLY MANAGING ENROLLMENTS AND TUITION, SYSTEM-WIDE

Two of the principal functions of governance are to manage enrollment and to manage tuition costs. This section explores strategic enrollment management practices, which combine a focus on enrollment and tuition policies. Strategic enrollment management by colleges and universities has been a prominent feature of American higher education for two decades. It has been a far more recent and less prominent management practice in public higher education systems of universities and/or community colleges. It has been largely lacking as a statewide policy practice.

Strategic enrollment management. In its ideal form, strategic enrollment management in colleges and universities aims to optimize the desired size and increased quality of the entering class, the net tuition revenue generated by the entering class (the tuition paid minus the

institutional financial aid allocated), and the diversity of the student populations (e.g., by socio-economic status, gender, ethnicity, and age). Much the same ideal applies to higher education systems.

The empirical reality of strategic enrollment management is that in practice institutions and systems have generally been successful in maximizing one or two of the goals, but not all three. For example, many have worked to maximize net tuition revenue by increasing the number of students who are able to pay higher tuition and require less financial aid. A common practice is to provide "tuition discounts" to out of state students whose higher tuition rate increases the institution's revenue. For example, Arizona's universities attract many California residents in this way, because out-of-state tuition in Arizona, combined with a tuition discount is competitive with the in-state cost of attending a University of California. However, succeeding in this regard does not serve to advance Arizona universities' goal of increasing the ethnic diversity of their study body.

In the last decade strategic enrollment management has become a particularly important part of strategic management in public institutions. With declining per-student state appropriations, colleges and universities have sought to counterbalance that decrease with an increase in their net tuition revenues, and they are managing their enrollment policies accordingly. In that context, institutional aid and admissions practices becomes more weighted towards attracting students who require less need-based financial aid, and who can afford to pay higher tuition as well as pay for various fees and fee-based college and university services

> With declining per-student state appropriations, colleges and universities have sought to counterbalance that decrease with an increase in their net tuition revenues, and they are managing their enrollment policies accordingly.

(McPherson and Shapiro, 1998). There is a greater incentive to attract out of state students and international students, not just in universities, but also in community colleges. Moreover, there is a greater incentive to increase tuition far above indexes like the consumer price index, and to establish a range of fees. The five- year percentage change in inflation-adjusted tuition and fees, from 2007-8 to 2012-13 in Arizona was 78 percent for public universities, the highest in the nation; for community colleges the increase was 19 percent, the twenty-first highest in the country (College Board, 2012). The relationship between those numbers and the at-the-bottom state rankings in state funding noted earlier should be clear: there is an inverse relationship between state appropriations and tuition—as the former goes down in per student terms the latter goes up.

Another state level pressure has contributed to a greater emphasis on strategic enrollment management. The push to realize significant, short-term gains in productivity, measured by graduation rate has led institutions to increase their productivity by changing the mix of their student population. *That generally involves focusing recruitment efforts on the students most able to pay the most, the least likely to need financial aid, and the most likely to graduate*.

122

The combined influence of the above incentives from state policy are leading colleges and universities away from the growth populations of prospective students. That is true nationally and is particularly true in Arizona, where the growth populations, as demonstrated in Chapter three of this report, are lower income and students of color. Those populations have historically been underserved by higher education. Much the same can be said of "non-traditional" or "new traditional" students such as returning veterans. State policy is not encouraging institutions to increase the recruitment and success of these students.

Strategic management of enrollments in states. It should be clear from the preceding section that what is strategic for individual universities and colleges by way of enrollment management is not necessarily strategic for the state. The complicated governance role in the current context involves balancing the promotion of increased institutional productivity with the promotion of progress towards important state interests.

In regard to higher education enrollment, states have multiple interests. One such interest is affordability. That is particularly true in Arizona, with its Constitutional provision (Article 11, Section 6) that "the instruction furnished shall be as nearly free as possible." A second state interest is to keep talent in the state and to attract talent from outside the state. A third interest that is significant for a strong knowledge based economy and society is to increase the proportion of residents with college education. As emphasized in the 2000 Arizona Town Hall recommendations, that involves an interest in "achieving greater participation in higher education" for traditional aged students as well as in expanding access to postsecondary education for adult literacy, re-education, and workforce training. A key Arizona constituency in the latter realm is returning veterans.

The compelling state interests in higher education are a matter of the public as well as the private benefits that attach to a higher education. Keeping higher education affordable in a low-income state such as Arizona is an important mechanism for expanding the middle class. The state interest in that outcome is not just fairness, but also the corresponding expansion of the tax base and reduction in the costs to the state of health care and corrections (as well as other social costs), which as noted in earlier chapters of this report are inversely related to educational

> The compelling state interests in higher education are a matter of public as well as private benefits.

level. Particularly in a state with a high proportion of retirees, there is a compelling common interest in expanding the college attainment and income level of the future (and present) workforce.

Similarly, in order to foster economic development there is a compelling state interest in retaining talent in the state, as well as in attracting talent to the state. The latter is true not only at the undergraduate but also and particularly at the graduate school level. For example, a report by ABOR (2011a) provides important data on the economic contributions to the state of public university graduates who stay in state. The premium for a bachelor's education is

significant: an median salary of $46,091 versus $25,607 for those with high school diplomas. For those with graduate degrees, the median salary is $60,051. The report goes on to calculate from 1990-2010 the income of graduates who had employment in Arizona: 7.2 and 3.9 billion dollars in wages for those with bachelors and those with graduate degrees respectively. The estimated tax revenues from those earnings are about $283 million and $135 million respectively. The report then provides data on the largest instructional areas (most graduates) from 2006-2010, with their median wages, and the same calculation for those with graduate degrees. Although at the undergraduate level, the largest instructional area is business and the highest earnings are for engineering and health professions, at the graduate level the largest instructional area is education, by far (the highest incomes at that level are in business). The data underscore the economic value of graduate and undergraduate education, and of public education, which has a high yield for institutions and for the state.

Many states are utilizing state financial aid for students pursuing higher education as a policy mechanism to strategically leverage outcomes that serve state interests. In these states there is a recognition that up front investments can yield impressive returns for the state. Such returns can be measured not just economically, but in terms of the growth in college attainment and keeping high quality high school students (e.g., National Merit Scholars) in state.

A recent study of the issue nationally revealed that two of the principal mechanisms for expanding college attainment and retaining the state's high quality students (that is, of reducing the number of talented high school students going to college outside the state) are state appropriations to higher education and state merit aid instruments (Toutkoushian and Hillman, 2012). Higher allocations of state monies to higher education yield higher educational attainment. Moreover, targeted merit aid policies designed to encourage high quality high school students to pursue their college education in state were a policy instrument that yielded valuable dividends. Similarly, targeted need-based financial aid programs have been found to be successful in expanding access and success for low income students (Harris and Goldrick-Raab, 2012).

In each of the above regards, Arizona's state policies rank near the bottom of the country. That bottom level ranking in state appropriations has been documented in earlier sections of this chapter and earlier chapters of the report. The point here is to emphasize that state appropriations are a strategic policy tool in expanding enrollments and limiting tuition.

Similarly, state financial aid, whether merit or need based, is a strategic policy tool. It is not a tool that is being actively utilized by the state. A recent study of the National Association of State Student Aid programs (NASSGA, 2012) comparing states in their support of financial aid found Arizona ranked 37th in total aid provided, and 47th in grant dollars per estimated population. That helps explain the low college going rate of ninth graders in Arizona—only 30.7 percent compared to a national average of 38.8 percent, and a best state performance of 57.7 percent (ABOR, 2010). Notably, the 2000 Arizona Town Hall report called for greater investment in state financial aid. Although there has been growth in the past decade, a 2011

report revealed that Arizona had cut student financial aid programs 70% the previous two years (McBain, 2011). The state continues to lag far behind its competitors nationally.

The choice confronting policymakers in Arizona is whether and how to participate in the (inter)national competition for talented students in a knowledge society and economy. At present (and in the past) the state is opting out of the race for talented students and their intellectual capital, and for expanding the state's human capital. The state would benefit from a policy discussion of the strategic benefits and returns on investment of employing state level financial aid as an instrument of public policy serving the state's interest. Indeed, policymakers would benefit from state specific studies about the influence of particular policy levers, such as of various forms of financial aid. Such research and conversations are particularly important in a low-income state, with a relatively low proportion of its population with a college education, and with high percentages of low-income schoolchildren who have historically been underserved by the higher education system.

The rise of strategic enrollment management at the institutional level has been accompanied by a shift in perspective of campus policymakers about the nature and purpose of financial aid. At one time, financial aid was largely seen as a cost, an expenditure that is made to reward meritorious students and/or to make a college education more affordable for students with financial need. For some time, now, though, at the campus level policymakers have regarded financial aid as an investment. They see it as a policy tool that is utilized to achieve certain ends, and they evaluate their policies accordingly, in terms of their return on investment (McPherson and Shapiro, 1998). The question for state policymakers to consider is whether and how to adopt such an updated, strategic, return on investment perspective on financial aid.

The growth populations of prospective students in Arizona constitute valuable human and cultural resources for the state. Part of what makes Arizona distinctive as a state is the size and significance of its Native American population, of its large and growing Latino population, and of its large population of servicepersons and returning veterans. Each of these populations is important to the state's future, economically and otherwise. The lower levels of educational attainment achieved by these populations can lead policymakers at all levels to see such students in terms of being a "risk" (i.e., less likely to graduate), of requiring targeted services, and of needing financial aid, all of which can lead to them being viewed as "expensive." Yet, given their size and growth, the state's economic strength is dependent on larger numbers of students from these backgrounds realizing greater educational and thereby economic attainment.

> It is important for policymakers to calibrate system/state needs and interests that go beyond the interests of individual colleges and universities. It is also important for policymakers to consider a balanced equation of costs and returns in thinking about utilizing key policy tools employed by other states to leverage competitive success.

In short, in strategically managing enrollment and costs, then, it is important for policymakers to calibrate system/state needs and interests that go beyond the interests of individual colleges

and universities. It is also important for policymakers to consider a balanced equation of costs and returns in thinking about utilizing key policy tools employed by other states to leverage competitive success. At present, though, Arizona is not making the policy investment to participate in this competitive game. The question before state policymakers with regard to enrollments and costs is whether and how and to what extent to employ financial policy tools to pay to play in this game. For as in most games, if you do not pay, you cannot play, and if you do not play, you cannot win.

STRATEGICALLY GOVERNING FOR "SYSTEMNESS"

Most colleges and universities are part of larger systems of institutions. Many of the problems that colleges and universities experience (e.g., remediation, transfer articulation) are best addressed with approaches that involve coordination among institutions and systems of higher education, as well as with public school systems. Paying attention to the interconnectedness among institutions, and framing strategic planning and policy in ways that foster and are grounded in such intersections and cooperation among institutions, is to emphasize "systemness" (a concept that is borrowed from an initiative at the State University New York, SUNY, being promoted by the chancellor, Nancy Zimpher).

Yet, much governance, particularly in the realm of accountability, involves dealing with individual colleges and universities independently of one another, even when they are formally within the same system of higher education. Such an approach treats colleges and universities like independent enterprises. These firms are to be governed, measured and monitored, and resourced like autonomous firms, separate and even in isolation from one another. For example, in presidential searches within a system, the search committees and interview processes are almost entirely campus specific. So, too, with measures of educational and research outcomes, even though there flows of students and research partnerships among faculty that cut across institutional boundaries. With resource allocation as well, institutions within a system are allocated separate budgets, turning the process into a zero sum game of arch competitors.

Moreover, the institutions themselves often operate far more out of a competitive than a cooperative orientation (competing for students, programs, state resources, faculty, status, and more). Of course, some of the most heated rivalries in college athletics are between cross-town/state, within system institutions. There can be academic rivalries as well. The challenge from the system level is to foster cooperation amidst this competition, and to build synergies among institutions that help the system become greater than the sum of its parts.

The 2000 Arizona Town Hall recognized the challenge of coordinating multiple institutions and higher education systems. On the one hand, the formal governance system of Arizona's public universities, the Arizona Board of Regents, offers a good structure for achieving such cooperation in that it is a consolidated governing board, with significant powers over each of the three public universities, which do not have their own boards of trustees. On the other hand, the fact that community colleges do not fall within the purview of ABOR, and that there is

no statewide community college board, creates particular challenges for Arizona in integrating the work of the two public higher education sectors.

The structural situation complicates the negotiation of transfer and articulation agreements. In spite of such complications universities and colleges have established many "pathways" agreements to facilitate students' movement from the state's community colleges to its three public universities. Indeed, there are over 1,100 such pathways programs (ABOR, 2011b).

Moreover, Arizona's Academic Program Articulation Steering Committee (APASC), which was formed by the state legislature in 1996, has convened cooperative efforts by faculty and curriculum leaders at colleges and universities to foster increased transfer from colleges to universities. APASC is the coordinating body of articulation and transfer for the state. It has representatives of ABOR, the three universities, and rural and urban community colleges (see www.apascaz.org). Those cooperative efforts have been further facilitated by a getting AHEAD (access to higher education and degrees) grant from the Lumina Foundation, the aim of which is to smooth students' transitions between different educational sectors.

As a result of the above sorts of arrangements, significant progress is being made in increasing the number of transfer students in Arizona. From 2006-7 to 2011-12 transfers to the state's three public universities increased by 22.4 percent (APASC, 2012). Of those new transfers, nearly one-fourth (23 percent) were Latino's, 5 percent were African=American, and 4 percent were Native American. Those figures clarify how important the transfer path is for expanding access for underserved populations in the state.

For all the good work in the face of considerable challenges, Arizona policymakers would nevertheless benefit from statewide study of student flows among two and four-year colleges not only in the state but beyond, and in comparison to other states. There is an Arizona State System for Information on Student Transfer (ASSIST) that is a part of APASC. It provides institutional and state policymakers with important data. But there is a National Student Clearinghouse that includes thousands of institutions around the country, that can conduct studies of transfer not only within the state and beyond, and that can put this work in the context of state comparisons. Yet several Arizona community colleges as well as private two-year colleges are still not part of the National Student Clearinghouse, and do not provide it with data on their students (Pima Community College joined just this year). That reduces the state's ability to track students' postsecondary paths wherever they go, so as to inform public policy.

Similarly, it is important that the strategic plan of the university system devotes attention to community college transfers. ABOR has established several "dashboard" metrics that relate to transfer students—number of transfers, transfers that earn bachelors degrees, and four-year graduation rate of transfers. For each of these measures ABOR has established targets for each university and for the university system. Yet it is interesting that the strategic planning process for community colleges in Arizona, and the performance based budgeting system that are being developed with the support of a Lumina grant, is separate from the ABOR process. One question to consider is how these processes can be calibrated with each other. It would be

possible to effect such interaction and intersection as the two systems put their funding systems into place, studying them with an eye to adjusting them.

Historically, California has provided the national model of a state in which system integration was promoted within a so-called master plan. In the last decade, however, the different segments of the public higher education system are in some sense splintering apart. The problems that attach to the actions of the three public systems point to the value of working towards common, statewide goals.

The University of California system, the California State University System, and the Community College system have long been separately governed systems in the Master Plan of California. At the same time, they also have been well integrated, particularly with regard to the transfer of students from one sector to another, as well as in the development of joint programs between institutions in the different sectors. Moreover, they have until recently maintained relatively distinct missions, specific to their role in serving the public interest.

In recent years, though, as the state has dramatically disinvested in public higher education, the UC system has turned away from its historic commitment to the state's residents. It has substantially increased the admission of out-of-state students, making it more difficult for California residents to gain entry. Similarly, several of the middle tier (which Arizona lacks) California State University campuses have closed the doors on transfer students from the community colleges system. Several are also recruiting higher income and out of state students to increase their tuition revenues. As for the community colleges, they are turning away literally hundreds of thousands of students, as they focus on more middle and upper middle class students (who are starting there because of huge tuition increases in the other sectors), who are most likely to succeed. Community colleges are essentially closing their open doors. Each of the above patterns runs against the interests of the state and its citizens.

By contrast, the State University of New York has embarked on a strategic governance initiative that features the synergistic value of the entire system. Chancellor Nancy Zimpher has unveiled a new concept and word, "systemness."

> Systemness is the coordination of multiple components that when working together create a network of activity that is more powerful than any action of individual parts on their own. (Zimpher, 2012)

Part of what the concept means is also "orchestrating and bringing together [the] system's stakeholders." The idea, captured in the phrase, "The power of SUNY," combines a nurturing of individual institutions' individuality while at the same time cultivating the collective power of the combined whole.

More than any other system in the country, SUNY is addressing the major challenges the state faces by taking a system-wide, coordinated view in regards to: access and affordability; containing costs by increasing efficiencies; improving college readiness; enhancing educational

128

quality; improving graduation rates; facilitating articulation and transfer between two and four year colleges; and re-energizing the state economically, and building the foundation for a New Economy. In any of these realms, progress is contingent on institutions and sectors working more effectively together. It is also contingent on maintaining the distinct functions and niches of the different sectors and types of institutions within the system. Of course, such distinct missions are perhaps easier to maintain in a system of sixty-four campuses.

In its strategic planning, ABOR has in important ways adopted a strong system focus. It has established a large list of clear targets for the system and for individual institutions. Indeed, there are thirty-two metrics that are presented on a "dashboard." Yet there are some important gaps in terms of focusing the system's energy and strength, and in establishing synergies among institutions and sectors.

Consider first the large number of metrics. *The advantage of having many accountability measures is that many areas of work and output are covered. The disadvantage is that the resultant dashboard is so complicated that it does not focus attention and energy. That is particularly the case when the metrics are not weighted*, which is a way of prioritizing them. The principal measures that are the basis for allocating a portion of state funding are degree production, credit hours, and research monies. But beyond that, it would be useful to give different weights to metrics as a way of giving more guidance to the institutions.

Additionally, although each university has distinctive targets on the metrics, the metrics are common to all. The challenge in any system is to provide incentives, and metrics are one of those incentives, that differentiate among and speak to the specific missions and niches of the three universities. Part of a systems approach is to be sensitive to and to foster different functions and niches for different institutions. In the case of Arizona, for example, it would be useful to have metrics that are specific to the University of Arizona's special land grant mission, to Arizona State University's character as an urban university building a new model of a public university, and to Northern Arizona University's doctoral granting and outreach functions.

> The challenge in any system is to provide incentives, and metrics are one of those incentives, that differentiate among and speak to the specific missions and niches of the three universities. Part of a systems approach is to be sensitive to and to foster different functions and niches for different institutions.

Despite the large number of metrics, there are two important gaps by way of important state interests. One has to do with important issues in which the state has a compelling interest. For example, the metrics do not address returning or so-called "adult" students, who represent a major part of the potential population and who have been recognized nationally as a key to enhancing the proportion of adults with a college education. Moreover, there are no metrics on the socio-economic background of students, on the household income of their families or of themselves. In a low-income state where affordability of college is an issue, it would be useful for colleges and universities to track this characteristic of the student population. One common metric used in other states and

nationally is to track the proportion of students with federal Pell grants (as an indicator of and proxy for lower income). Further, there is no metric on a fundamentally important new economy need that was identified in the 2000 Arizona Town Hall report to "recruit and retain diverse, quality faculty" (p. xviii), as well as to produce these faculty members, who catalyze educational quality, innovative ideas, and economic development.

A second gap in the metrics is the absence of metrics that relate to cooperative efforts by universities, as well as by universities and colleges. It is fairly common for there to be accountability measures related to community engagement and/or to partnerships between universities and community groups or businesses. Also valuable, though, would be a measure relating to joint ventures among universities.

In sum, a system perspective can help policymakers balance between the interests of individual institutions and the broader needs of the state. Such a perspective can be particularly valuable in addressing the interests of students and the state in expanding transfer student numbers and in smoothing the transitions of those students. So, too, it can be useful in address policy challenges surrounding remediation and college readiness. Two major questions for policymakers are how to embed a focus on non-traditional returning students as well as on prospective students in high schools, and how to encourage cooperation among educational and other sectors that will enhance the educational opportunities and success of these populations?

STRATEGIC RESOURCE ALLOCATION TO CORE FUNCTIONS

At the core of responsible system and college governance is ensuring that resources are being optimally utilized to effectively and efficiently realize the institution's fundamental missions and core functions. That responsibility is all the more important in what are perceived to be tight financial times. The national push for a renewed focus on academic outcomes in accountability mechanisms speaks to such a responsibility. National data speaks to a shifting of resources away from core to more ancillary functions of colleges and universities. At the state level, too, policymakers are implementing accountability models to ensure that public monies are being wisely and productively utilized to fulfill institutions' principal missions.

> At the core of responsible system and college governance is ensuring that resources are being optimally utilized to effectively and efficiently realize the institution's fundamental missions and core functions.

One challenge in undertaking initiatives to assure accountability is to balance the energy and resources going into assessment and monitoring with the energy and resources going to the core functions of the institution. Another challenge is to go beyond accountability measures that fail to provide data on how mission focused the overall organization is. Thus far, few system or state level accountability models address one of the defining issues nationally in higher education resource allocation: to what extent are resources being concentrated on the

production activities of colleges and universities (i.e., teaching, research, and service) as compared to various support and ancillary activities and personnel? Accountability mechanisms are overwhelmingly focused on the performance of academic programs and personnel. Underlying that focus is a failure to recognize that faculty and academic programs account for but a portion of professional (and non-professional) employees and programs on campus.

A Goldwater Institute Report, "Administrative bloat at American universities: The real reason for high costs in higher education," frames the issue plainly (Greene, 2010). In opening, it states that "Most organizations achieve economies of scale over time," and then points to the reverse pattern in the top 198 American universities (the report does not focus on four year colleges or on community colleges).

> However, the exact opposite is happening in American universities. In U.S. higher education, there have actually been *diseconomies* [emphasis in original] of scale. Universities employ more people and spend more money to educate each student even as those universities increase their enrollment. Instead of being marked by productivity increases, academia suffers from bloat, particularly administrative bloat. It now takes more employees—especially more administrators—in higher education despite innovations in technology and increases in scale.

This framing of the problem resonates with a faculty view that there has been a proliferation of senior academic administrators on campus. It also resonates with a general public concern about bureaucracy, particularly in public sector entities and in the state, which is equated with waste, inefficiency, and self-perpetuation.

Drawing on national data from the Integrated Postsecondary Data System (IPEDS), the report details the disproportionate growth from 1993-2007 of non-academic personnel, who perform a range of administrative and ancillary functions. The Goldwater Institute report presents the data in a per/student format: from 1993-2007 there was a 39.3% increase in full-time administrators per-student (from 6.76 to 9.41 per 100 students), as compared to only a 17.6% increase in full-time employees engaged in instruction, research, and service (from 5.96 to 7.01). The pattern is even more dramatic in private universities (from 11.3 to 15.8); in public universities the pattern also holds (from 5.7 to 7.9). At present, faculty account for a little more than half of all professional employees on college and university campuses.

What is remarkable about these data are not only the disproportionate increase in full-time administrators, but the fact that the increases start from a baseline in 1993 of having slightly more full-time administrative staff per student than full-time employees engaged in instruction, research, and service. For public universities, there were 5.7 full-time administrators as compared to 5.4 full-time employees in academic realms. Indeed, the pattern of increasing proportions in colleges and universities of non-academic personnel in professional employment traces back to the 1970s.

The national pattern in personnel is even more pronounced in Arizona's three public universities. At ASU, UA, and NAU the increase in full-time administrative personnel was 94%, 45%, and 36.5% respectively. The increase of full-time employees in instruction, research, and service was 15.8% at NAU and only 3.1% at the UA, whereas the proportion actually declined by 2.4%.

The increase in the spending per student on non-academic administrative personnel nationally is even more dramatic. From 1993-2007, that spending increased 61.2%, as compared to a 39.3% increase in instruction. For Arizona's three universities the numbers were less dramatic, but still reveal disproportionate allocation of resources to administrative as compared to core academic functions: administrative spending per student increased by 46.3% at ASU, 36.5% at NAU, and 28.8% at UA.

There are three important caveats to the Goldwater Institute report. First, the lion's share of the growth in administrative personnel and cost in the U.S. is not in senior administrative personnel, but in other professionals. A range of those professions and positions have grown in order to assess and improve educational quality, to comply with and report on increased regulatory demands, and to generate new revenues. A few examples are illustrative of the causes of this growth in non-academic and of the significance of these professionals' work. To address issues of undergraduate education quality, offices and personnel have emerged in the realm of instructional improvement and assessment. To address the diverse needs of a changing student population, offices and personnel have been established to provide a variety of counseling, advising, and support services. To address the reductions in state funding, offices and personnel have been developed to generate new and independent revenue streams for universities, for example through fund raising, corporate education and partnerships, and technology transfer.

There would be real value in developing useful measures of the value added by non-academic professional employees (Rhoades and Sporn, 2002). But some value is certainly being added by many of them. It should be considered, for instance, that one of the contributors to the growth of some categories on non-academic personnel is the dramatic growth in regulatory requirements with which universities must comply. Moreover, in the case of professionals in development offices, that value can be seen in the growth of university endowments. Finally, there is evidence that at least some of these professionals, for instance in advising and student affairs, do contribute to enhanced student outcomes (Ehrenberg and Webber, 2010).

What we do not know is just how much value these non-academic professionals add to the institution. It would be useful to policymakers governing higher education to have state specific data and studies on the contribution of these professionals to important, core outcomes, for example, with regard to student success and revenue generation. At present, the categories of personnel, and their connection to core outcomes and key administrative functions, are not sufficiently clear for policymakers to be able to make fully informed assessments.

There would also be much value in addressing the basic issue raised in the Goldwater Institute report of the balance between college and universities' investment in non-academic personnel relative to the employment of academics engaged in core academic missions. However valuable the work of many non-academic personnel, the question remains, what is the relative investment in academic and non-academic personnel that colleges and universities should be working towards? Again, policymakers would benefit from state specific studies that specify in more detail the distinction between the different categories of employees and their connection to core institutional functions. That speaks to the next caveat that should be noted about the report.

A second caveat to the Goldwater Institute report is that IPEDS data includes in the category of full-time employees in instruction, research, and service a large number of administrative and professional employees, many of whom neither teach nor do research. That includes some who are full-time academic administrators in academic units, who nevertheless have faculty lines. So the IPEDS categories overestimate the number of personnel directly engaged in core academic functions and underestimates the number engaged in managerial, administrative, and support functions. Unfortunately, the data are aggregated to a level that is not possible to disentangle employees who are counted as academic personnel but who are neither teaching nor doing research. In short, if anything, the Goldwater Institute report may be underestimating the extent of the spending on non-academic personnel and programs.

A third caveat to the Goldwater Report is that it does not underscore the dramatic change in the nature of academic employment that has taken place. It briefly refers to the growth in employment of part-time faculty (of 31% in public universities), citing this as a sign "of economizing" by universities. Yet there is clear evidence nationally that the amount and conditions of part-time employment of faculty compromises various student outcomes, including graduation rates (see Bettinger and Long, 2010; Jaeger and Eagan, 2009, 2010; Umbach, 2007). One of those working conditions is limited access to key instructional resources, and these faculty not having the time or office space to work with students outside of class, which has been demonstrated to be a key to student success.

The extent of the part-time faculty challenge is clarified by national and state numbers regarding part-time faculty, particularly in community colleges. Nationally, faculty teaching in part-time positions account for 49.3 percent of all faculty, and for 68.8 percent of faculty in community colleges (NCES, 2011, Table 259). In Arizona, 75 percent of faculty in community colleges are in part-time positions, a little more than the proportion of part-time students, which is 70 percent (AACPC, 2010).

The scale of the part-time faculty workforce points to a larger challenge identified by the 2000 Arizona Town Hall Report – the pressing need for capacity building of higher education's intellectual capital, its faculties. That workforce is important not just to accommodate expanding student demand and to enhance student success, but also to generate the new ideas and discoveries as well as obtain the research grants that are so important to Arizona's future

knowledge based society and economy. All the more reason for policymakers to be focused on the balance between expenditures on academic and non-academic personnel.

A final point here is worth noting in regard to costs, which are often equated with the tuition that students pay. Tuition clearly has risen far more than the cost of living, as has been indicated. By contrast, though, costs in higher education (i.e., the cost of educating students) have not. For instance, as the Delta Cost Project found, utilizing IPEDS data, spending in public research universities per student from 2000 to 2010 increased by only about 1% per year (Hurlburt and Kirshstein, 2012a). In public community colleges it declined, by about 1% a year.

Why, then, is tuition going up so much, if costs are not rising that much? Although part of the answer lies in administrative costs, a major part also lies in the fact that tuition increases have resulted from institutions trying to replace reduced state monies. "Increases in net tuition in 2010 resulted from cost shifting, not from increased spending." (Hurlburt and Kirshstein, 2012b) Even so, such tuition increases were not enough to make up for declines in state appropriations.

> Historic declines in state and local funding per FTE student could not be recouped by increases in net tuition. Public funding per FTE student reached a decade-long low in 2010. Sharp increases in net tuition revenue were not enough to offset those losses… (Desrochers and Kirshstein, 2012)

Given the empirical pattern of rising administrative costs, and the high public profile that pattern has experienced, many institutions and systems have publicly launched processes to increase the efficiency of their administrative functions. Sometimes this involves seeking to reduce the number of administrative positions, particularly ones that are high profile.

Policymakers might want to know, however, whether it is possible for a system to publicly commit to strategically rebalancing the share of expenditures going to administration as compared to core academic functions. An important example of a system engaged in such refocusing is the State University of New York. In its strategic plan, The Power of SUNY, system leaders identify as one of their major themes, "getting down to business," under which the plan commits to a reallocation of resources over time to the system's core missions.

> Through its shared services initiative, SUNY will reduce administrative costs and move those resources toward direct instruction and student services. Over the next 3 years, all SUNY campuses will shift—at minimum—5% of their administrative spending to academics and student services, resulting in $100M being invested in instruction." (SUNY, 2010)

Notably, the plan involves reallocating resources to student services, which have not experienced reductions in personnel and expenditures over time. Also, despite the dramatic differential over a long period of time of investment in administrative versus in core functions, the three year commitment is not a long one. Nevertheless, the SUNY case demonstrates the

134

feasibility of such a strategic reallocation mechanism on the margins. It provides a real world example of the power of an incremental policy designed to refocus monies on core functions that will benefit students and the state.

Another example, closer to home, of strategic reallocation to the core academic mission is provided by the Financial Plan of the Maricopa Community College District (Maricopa, 2013). That plan commits to a goal of 60% of classes being taught by full-time faculty. Such a goal is grounded in the empirical evidence nationally of the positive relationship between the proportion of full-time faculty and student outcomes (in learning and in graduation).

Both the SUNY and Maricopa plans entail a commitment to capacity building, to investing in increasing the intellectual capital (the faculty) of colleges and universities. On the margins, as a way of rebalancing and refocusing the system on core academic missions, these plans represent a strategic investment in increasing the production capacity of colleges and universities, in education output, and in innovation, knowledge creation, and knowledge transfer. They represent a strategic policy effort that in part addresses the concern expressed of the 2000 Arizona Town Hall report:

> The 'brain drain' from higher education to the private sector and education systems outside the state is fostered by low pay and a lack of resources for further research, which in turn impacts the economic development of the state. Research serves as a catalyst for economic development… (p.xvii)

In sum, a defining governance challenge is to strategically address resource allocation in regard not only to the balance among academic programs but also to the balance between academic and non-academic programs and personnel.

CONCLUSION

The formal governance structures of public higher education in Arizona offer challenges and opportunities for addressing matters of compelling interest to the state. This chapter has examined data and posed questions regarding strategic management in three areas of responsibility for governing bodies: enrollments and costs; system-wide coordination; and priority setting in resource allocation.

Arizona's future will be profoundly shaped by how system and state policymakers manage enrollment and costs. The development of strategic enrollment management in colleges and universities has marked a shift in campus policymakers' perspective on tuition, financial aid, and admissions policies. Such policies have come to be seen as tools for leveraging particular enrollment outcomes and greater net revenues. The questions for policymakers are will they decide to utilize a return on investment approach to the financial policy tools for managing enrollment and tuition, and to what extent and how will they target those tools to enhance greater accessibility and affordability for the growth demographics of prospective students?

Arizona's future will also be shaped by the extent to which and how system and state policymakers work to coordinate activities among institutions to serve system and state goals. Much progress has been achieved toward important goals in Arizona, such as the expanded numbers of transfer students. Even so, there are other opportunities to effect fuller coordination among institutions as well as fuller realization of institutions' specific missions. The questions for policymakers are what sorts of data should be gathered to inform their efforts to achieve certain goals, to what extent should new metrics be developed to focus institutions on overlooked populations and areas of productivity, as well as on partnership and cooperation among institutions and sectors?

Further, Arizona's future will be shaped by the extent to which and how system and state policymakers address the resource balance between academic and non-academic personnel and programs. Much evidence exists about the existing balance, and the trend line for at least two decades, nationally and in Arizona. More evidence, however, would be useful in clarifying various aspects of non-academic professionals' work and the extent of their costs. The questions for policymakers to pursue include how to appropriately determine the value created by non-academic personnel and programs, how to accurately assess in appropriate detail the growth of non-academic personnel and expenditures in relation to academic ones, and how to decide the appropriate balance in resource allocation to ancillary and core functions of higher education in the future.

In each of the above situations there are exemplary models from other states as to what courses of action are possible. Moreover, some key baseline conditions of Arizona provide an opportunity. For example, in the case of whether to expand state financial aid as a policy tool to serve state interests, the current baseline of state support is so low that a small investment of state money would constitute a significant change in direction. The prevalence of enrollments in public sector higher education also makes it easier for public policy to shape institutional enrollment and costs. The fact that both the university system and community colleges are in the early stages of developing and implementing new, performance based models of accountability also makes it timely to recalibrate measures to prioritize state goals and outcomes. And the small size of the state in terms of number of institutions should further facilitate such coordination. Finally, in the case of administrative costs, there are prominent models nationally and in Arizona of how to address the issue incrementally. And given the work of a major think tank in the state, there should be considerable bi-partisan support for pursuing such a direction.

In short, then, strategically governing higher education for Arizona's future can generate significant enhancements of Arizona's higher education system and future with marginal adjustments to current patterns of policy and practice. It is clear where the current path leads: it is leaving Arizona well behind most other states and well short of the future defined in the 2000 Arizona Town Hall consensually developed recommendations. State policymakers have an opportunity to consider a wealth creation strategic approach, focused on medium to long-term systemic state interests in leveraging several realms of governing authority. That would mark a break from the prevailing cost containment, or cost reduction, regulatory perspective.

Ironically, choosing to develop policy that will strategically leverage returns on investment will ultimately reduce the considerable costs to the state of an undereducated citizenry and an underperforming economy.

QUESTIONS TO CONSIDER

- The questions for policymakers are will they decide to utilize a return on investment approach to the financial policy tools for managing enrollment and tuition, and to what extent and how will they target those tools to enhance greater accessibility and affordability for the growth demographics of prospective students?
- What is the relative investment in academic and non-academic personnel that colleges and universities should be working towards?
- To what extent should new metrics be developed to focus institutions on overlooked populations and areas of productivity, as well as on partnership and cooperation among institutions and sectors?

REFERENCES

ABOR. (2012). *Annual report: Fiscal year 2012 in review*. Phoenix, Arizona: Arizona Board of Regents.

ABOR. (2011a.) *2011 Annual report on wages earned by Arizona university system graduates*. December 1-2, 2011. Arizona Board of Regents.

ABOR. (2011b.) *Annual report: Fiscal year 2011 in review*. Phoenix, Arizona: Arizona Board of Regents.

ABOR. (2010). *2020 Vision: The Arizona university system long-term strategic plan, 2008-2020*. Phoenix, Arizona: Arizona Board of Regents.

ACCPC. (2010). *Arizona Community College President's Council Annual Report*, FY 2010-2011, Volume 1.

APASC. (2012). *Articulation and transfer for Arizona postsecondary education*. Phoenix, Arizona: Academic Program Articulation Steering Committee.

Besnette, F. (2000). *Higher education in the 21st century.* Seventy-sixth Arizona Town Hall. Arizona Board of Regents.

Bettinger, E & Long, B.T. (2010). Does cheaper mean better?: The impact
of using adjunct instructors on student outcomes. *The Review of Economics and Statistics, 92*,3:598-613.

College Board. (2012). *Trends in college pricing*. New York City: The College Board.

Desrochers, D.M., and Kirshstein, R.J. (2012). *College spending in a turbulent decade: Findings from the Delta Cost Project.* A Delta Data Update 2000-2010. Washington D.C.: American Institutes for Research.

Desrochers, D.M., Lenihan, C.M., and Wellman, J.V. (2010). *Trends in college spending: 1998-2008.* Washington, D.C.: Delta Cost Project.

ECS. (2013). *Postsecondary governance: On-line database*. Denver, Colorado: Education Commission of the States. Retrieved from: http://www.ecs.org/html/educationIssues/Governance/GovPSDB_intro.asp.

Ehrenberg, R.G., and Webber, D.A. (2010). Student services expenditures matter. *Change, 42*,3:26-39.

Greene, J.P. (2010). *Administrative bloat at American universities: The real reason for high costs in higher education*. Policy Report No. 239, Phoenix, Arizona: Goldwater Institute.

Harris, D.N., and Goldrick-Rab, S. (2012). Improving the productivity of education experiments: Lessons from a randomized study of need-based financial aid. *Educational Finance and Policy, 7*,2:143-169.

Hossler, D., Shapiro, D., Dundar, A., Ziskin, M., Chen, J., Zerquera, D., & Torres, V. (2012). *Transfer and mobility: A national view of pre-degree student movement in postsecondary institutions*. Signature Report #2, February 2012, Herndon, Virginia: National Student Clearinghouse Research Center.

Hurlburt, S. & Kirshstein, R.J. (2012a). *Spending: Where does the money go? A Delta Data Update 2000-2010*. Washington, D.C.: American Institutes for Research.

Hurlburt, S. & Kirshstein, R.J. (2012b). *Spending, subsidies, and tuition: Why are prices going up? What are tuitions going to pay for?* A Delta Data Update 2000-2010. Washington, D.C.: American Institutes for Research.

Jaeger, A.J., & Eagen, M.K. (2010). Examining retention and contingent faculty use in a state system of public higher education. *Educational Policy, 20,1:10*-31.

Jaeger, A.J., & Eagen, M.K. (2009). Unintended consequences: Examining the
    effects of part-time faculty members on Associate degree completion. *Community
    College Review, 36*,3:167-94.

Kalsbeek, D.H., & Hossler, D. (2008). Enrollment management and financial aid:
Seeking a strategic integration. *College and University, 84*,1:2-11.

Maricopa. (2013). *FY 2014 Financial Plan*. Retrieved from:
    http://www.maricopa.edu/business/budget/finplan/fy14finplan.pdf.

McBain, L. (2011). State need-based and merit-based grant aid: Structural
    intersections and recent trends. *Policy Mattters: A higher education policy brief*.
    Washington, D.C.: American Association of State Colleges and Universities.

McPherson, M.S., & Shapiro, M.O. (1998). *The student aid game: Meeting
    need and rewarding talent in American higher education*. Princeton, New Jersey:
    Princeton University Press.

NASSGA. (2012). *42nd annual survey report on state=sponsored student financial aid: 2010-
    2011 year*. Washington, D.C.: National Association of State Student Grant Association.

NCES. (2011). *Digest of education statistics*. Washington, D.C.: National Center for Education
    Statistics.

Rhoades, G. (2012). The incomplete completion agenda: Implications for academe and the
    academy. *Liberal Education, 98*,1:18-25.

Rhoades, G., & Sporn, B. (2002). New models of management and shifting modes
    and costs of production: Europe and the United States. *Tertiary Education and
    Management, 8*,1:3-28.

Shapiro, D., Dundar, A., Ziskin, M., Chen, J., Park, E., Torres, V., & Chiang, Y. (2012). *Completing
    college: A national view of student attainment rates*.
    Signature Report #4, November 2012, Herndon, Virginia: National Student
    Clearinghouse Research Center.

SUNY. (2010). *The power of SUNY*. State University of New York Strategic Plan.

Toutkoushian, Robert K., and Hillman, Nicholas W. (2012). The impact of state appropriations
    and grants on access to higher education and outmigration. *The Review of Higher
    Education, 36*,1:51-90.

Umbach, Paul. (2007). How effective are they: Exploring the impact of contingent faculty on
    undergraduate education. *The Review of Higher Education, 30*,2:91-123.

Zimpher, Nancy L. (2012). *2012 State of the University Address*. January 9, 2012, State
University of New York. Retrieved from:
http://www.suny.edu/chancellor/speeches_presentations/SOU2012.cfm.

CHAPTER 7

Possibilities and Limits for Leveraging Technology to Enhance Higher Education Access, Success, Quality, and Efficiency in Arizona

By Vernon Smith, MyCollege Foundation, and Gary Rhoades, Center for the Study of Higher Education, The University of Arizona

ABSTRACT

Nationally, there is much discussion among policymakers about how technology can enhance access, success, and quality in higher education. Arizona is well positioned in utilizing technology in higher education, with national leaders in this area and with the commitment of its public university system to increasing the use of information technologies to provide education at a distance. This chapter examines developments in the use of high technology in higher education nationally and in Arizona. It offers a balanced consideration of the possibilities and limits of leveraging technology to enhance performance in higher education. Further, it provides two examples of innovative initiatives supported by the Gates Foundation.
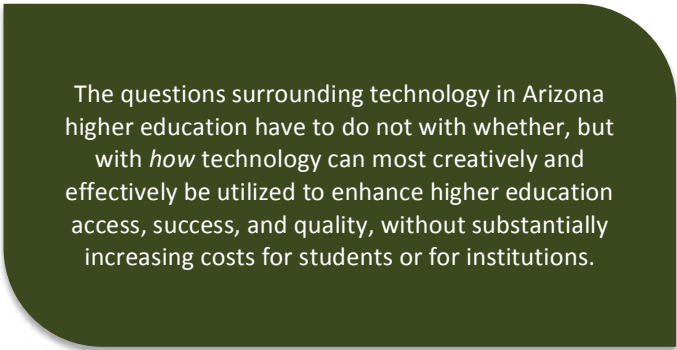
Nationwide, policymakers see technology as a mechanism for increasing access to colleges and universities and amplifying their productivity and effectiveness. There are significant opportunities to utilize technology to make higher education more available to more students, to enhance educational quality, and to improve student outcomes and institutional output. At the same time, it is important to be aware of the performance and cost realities of technology in higher education. Technology is not a silver bullet strategy for simply resolving the challenges states face. It may in some ways even contribute to exacerbating those challenges. Thus, it is important to provide Arizona policymakers a strategic and realistic assessment of technology's potential to enhance Arizona's higher education and future. This chapter provides a basic and balanced understanding of the possibilities and the limits of technology's ability to transform higher education's approach to the basic challenges of access, success, quality, and affordability.

Arizona is particularly well positioned to take advantage of technology's potential in higher education. It houses some national leaders in this realm. One example is Rio Salado College, of the Maricopa Community College District, which is the largest two-year, non-profit college nationally in providing distance education. Rio Salado has over 43,000 students in distance learning courses that account for over 60% of its instruction. Another example is the University of Phoenix, which is a leader in the for-profit sector of American higher education, with

extensive and longstanding experience and success in the use of distance education demonstrated by over 380,000 enrollments (Business Wire, 2012). Another proprietary institution, Grand Canyon University has also grown significantly in its online offerings with more than 42,000 students primarily in nursing and education (Fain, 2012). Moreover, with the state's vast rural areas, Northern Arizona University has established a statewide network through its over 35 community campuses and online programs serving over 7,600 students in its Extended Campus offering a full range of baccalaureate, master and doctoral level degree programs (NAU, 2012). The accompanying student services have been nationally recognized as a best practice benchmark for distance learning.

Nevertheless, although Arizona has individual institutions that are national leaders and exemplars in the use of technology, the challenges for the state system are immense. In terms of accessibility, for instance, given the geographical expanse of the state, and the distribution of its population in rural settings, technology has been particularly important in providing rural health education as well as other professional programs, for instance in special education. However, there remains enormous untapped need for technology to make higher education more physically accessible to Arizonans. Particularly challenging is the need to focus technology on ensuring access for physically distance students, not just access for convenience of students who are already close to a campus and who take classes online simply to enable overloading themselves with more classes than is advisable for a successful and quality educational experience. For instance, there is some indication that significant proportions of community college students who take distance education classes are also taking face to face classes at campuses only a few miles away. So it will be important to strategically target scarce technology resources to the areas and purposes of greatest need.

Another enormous challenge in Arizona is in a more traditional realm of accessibility. Much of the discussion of utilizing technology to increase access focuses on overcoming barriers of time (convenience for working adults) and space (barriers of distance from a campus) that limit access to higher education. What sometimes gets overlooked is the ongoing and growing challenge of socio-cultural and economic barriers to access for lower income populations and populations of color. Consider Arizona's adult population. U.S. Census data indicate that over 75%

> The questions surrounding technology in Arizona higher education have to do not with whether, but with *how* technology can most creatively and effectively be utilized to enhance higher education access, success, and quality, without substantially increasing costs for students or for institutions.

of the state's population does not have a bachelor's degree. Upon closer examination, the lack of access becomes clearer: over 95% are low-income, 79% are African American, 90% are Latinos, and 92% are Native American. This indicates a significant need to increase access, success and quality for these populations. A bachelor's degree holder will make 84% more (on average and over the course of a lifetime) than someone with only a high school diploma, and they will enhance the tax base accordingly (ABOR, 2011). Moreover, a more educated

population will make it easier for the state to attract and develop business and industry in a knowledge economy. Without some sort of post-secondary credential, the likelihood is that an adult will not reach the middle class.

The same points hold true with regard to the traditional aged potential student population. Here, too, Arizona faces a huge challenge. As noted in the background paper, "Arizona's intersecting demographic, educational, and economic futures," the state's educational system has not served these growth populations well. There are strong indications that distance education on its own—and as most non-profit and for-profit higher educations have employed it—has also not been very successful with these students. Moreover, there is an additional access issue of a digital divide for lower income and Native American populations in particular, which often do not have access to and proficiency with the technologies being employed in distance education.

Technology is clearly at the center of Arizona's higher education future, particularly given the leadership role that several of its higher education institutions have taken. The questions surrounding technology in Arizona higher education have to do not with whether, but with how technology can most creatively and effectively be utilized to enhance higher education access, success, and quality, without substantially increasing costs for students or for institutions. The questions have to do with what smart and realistic strategies can optimize the benefits of technology and minimize possible, unintended adverse effects.

In pursuing the answers to those questions, this chapter builds on the 2000 AZ Town Hall recommendations. Those recommendations offer cautions in pursuing possibilities.

> Initial costs to institutions and individuals, loss of community, lack of support services, mentoring, and oversight can be serious problems associated with technology-based and learning… Distance learning requires an elaborate support system and very high front-end funding…The public and private sectors should share responsibility and develop a plan and method of funding to overcome the digital divide…Access must be equitable and available to students in rural areas and those in a lower socioeconomic status. (p.xviii)

This chapter begins by speaking to the possibilities, promotion, and promise of technology. In doing so, it examines the growth of on-line, distance education, and the plans of Arizona's universities to expand offerings in this realm. It also walks through key developments in new technologies, exploring their implications for enhancing accessibility, success, and quality, and for reducing costs. Then, it considers some of the problems and costs of high tech education, potholes in the information superhighway. Finally, it features and expands on some key initiatives in utilizing technology spawned by the Gates Foundation, one of the key players nationally in fostering creative ideas for utilizing technology in education.

THE POSSIBILITIES, PROMOTOTION, AND PROMISE OF TECHNOLOGY

The expansion of distance education and the pace of new technological developments in higher education are remarkable. With each innovation come extraordinarily high hopes that it will be the innovation that finally resolves the challenges confronting higher education. In the beginning, the promise seems to know no bounds. Indeed, the hype around technology in higher education takes on a life of its own.

Predictions of higher education's demise, already decades old, in some sense miss the point. As new models of providing higher education emerge, preceding ones persist.

Amidst the promotion, what can be lost is the prudent consideration and analysis of possibilities and limits that leads to strategic action. Whether it's the expansion of distance education, the use of new apps, social media, or clever ways to "game" classes using the internet, the prediction is that higher education as we know it will go the way of local newspapers—high mortality rates as some of these enterprises fail to adapt to new technological realities and as others scramble to enter the age of digital media, or the music industry. Yet in contrast to the print industry, where sales of newspaper hard copy has declined, demand for higher education continues to increase, so much so that the system lacks the human and physical capacity to accommodate that demand. So predictions of higher education's demise, already decades old, in some sense miss the point. As new models of providing higher education emerge, preceding ones persist.

Nevertheless, technology is creating new opportunity structures within all of higher education. Some of these can begin to address critical issues around access, success and quality. It is precisely the complexity of access, success, and quality that also limit how technology has and will influence higher education, but recent developments make it understandable why the hype continues.

The impact of technology on the basic purposes of higher education has accelerated in recent years, opening new efforts to unbundle those functions and reconfigure roles surrounding them. If broken down into general categories with the student in mind, higher education can be seen as a system where students gain knowledge, get certification of learning that knowledge, build a network of contacts for the future, and to reflect on their identity, who they are and hope to be, allowing time to grow up slowly and, in the spirit of *Animal House* or *Monsters University*, perhaps have some fun along the way. There is also a promise that deeper learning and meta-cognitive skills like critical thinking, problem-solving, the ability to work in teams, effective communication, and a strong work ethic are obtained. Technology, however, takes on a life of its own as it infiltrates higher education as a system, resulting in variations that enhance and detract from those basic purposes.
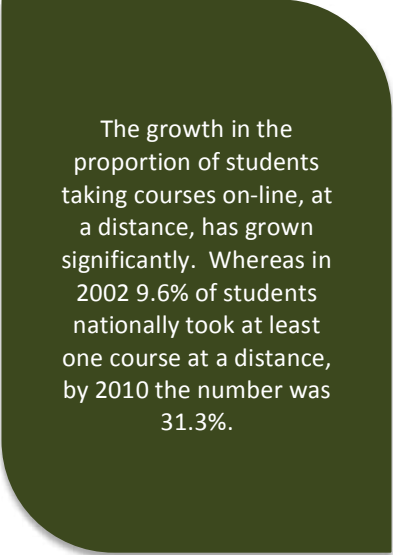
ON-LINE, DISTANCE EDUCATION

Distance education has expanded considerably in U.S. higher education in the past decade. Before reviewing the data on that growth, it is useful to clarify what is meant by distance education. One key point is that the term refers to classes or programs in which the overwhelming proportion of the content (80% or more), and in which typically there are no face to face meetings between students and faculty (Allen and Seaman, 2011). Yet that definition can refer to education provided with a wide variety of technologies and formats, some of which involve virtual interaction between students and the professors, and some which do not. Among the types of distance education are: prerecorded instructional videos; CD-ROMSs or DVDs; live, interactive audio or videoconferencing; webcasts; and computer based software systems accessed over the Internet (NCES, 2011). It does not include correspondence courses (which are not on-line).

The growth in the proportion of students taking courses on-line, at a distance, has grown significantly. Whereas in 2002 9.6% of students nationally took at least one course at a distance, by 2010 the number was 31.3% (Allen and Seaman, 2011). The dramatic increase in students taking distance education classes far outpaced the growth rate in the number of students in higher education. Moreover, the percentages are about 6 percentage points higher in public two-year than public four-year institutions (the reverse pattern is true in the for-profit sector, where distance education is more prominent in universities, such as the University of Phoenix and Grand Canyon University, than in the two year proprietary colleges (NCES, 2011, table A-43-1).

> The growth in the proportion of students taking courses on-line, at a distance, has grown significantly. Whereas in 2002 9.6% of students nationally took at least one course at a distance, by 2010 the number was 31.3%.

Part of the expansion of distance education is related to the increasing recognition by university and college of the value and place of distance education in their institution's mission. For example, a national survey of institutional leaders has found that whereas in 2002 less than half agreed with the statement, "On-line education is critical to the long-term strategy of the institution," by 2011 the percentage was nearly two-thirds (Allen and Seaman, 2011). The increase was the greatest in the for-profit sector, but the pattern of increased focus on distance education applied to leaders in each sector of postsecondary education.

Yet the study found a gap between leaders' statements and the extent to which on-line education had been built into their institutions' strategic plans. On this measure, fewer than half of public institutions had incorporated distance education into their strategic plan (Allen and Seaman, 2011). Given the greater prominence of distance education in community colleges, it can be expected that the absence of distance education in the strategic plans of public universities was even greater.

As noted in opening, Arizona has higher education institutions that are leaders in the utilization of distance education. Particularly prominent examples are found in each of the sectors of postsecondary education: Rio Salado College in the two-year public sector, NAU in the public university sector, and University of Phoenix and Grand Canyon University in the four-year for-profit sector.

It is also important to note that the Arizona Board of Regents has, in fact, built distance education into the system's strategic plan (ABOR, 2010). For each of the system's three public universities, ABOR has set a different 2020 goal, with an overall goal of doubling the number of on-line enrollments, to 20,715, and for roughly quadrupling the number of on-line degrees and certificates. The metrics dashboard of ABOR tracks the progress from 2008-2009 to 2020, for the system as a whole, as well as for each institution. The university with by far the greatest number of enrollments on-line, NAU with 7,603 in 2011-2012, has experienced a 10% decline in enrollments, pointing to the challenge of realistically achieving the 2020 goal. Similarly, NAU has the most programs and certificates on-line (706 in 2011-2012); again, though, the progress toward the 2020 goal is limited for the system (it has thus far achieved 3% of the goal. But the presence of distance education in the system's strategic plan speaks well for the state compared to national peers.
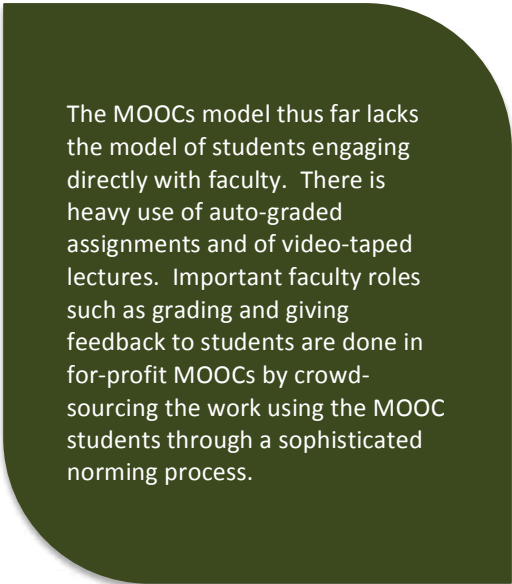
OPEN SOURCES OF CONTENT

The biggest impact of new technologies so far has been delivery of knowledge made possible through the Internet and related digital devices such as notebooks, tablet computers, and smart phones. Student utilization of these devices has increased with laptops replacing desktops in 2006 and smartphones gaining the greatest use starting in 2010 according to the 2012 ECAR Study of Undergraduate Students and Information Technology (Dahlstrom, 2012). This has shifted the source for content, the format or packaging of that content, and the delivery of the content. In essence, there has been a process of unbundling much like when the music industry experienced as Napster and iTunes unbundled the analog album into MP3 and digital formats.

The source for content is no longer localized to a specific time or place, and it is free or available at a much lower cost. Moreover, the quality of the content, at least the prestige of the providers, continues to improve. Open Educational Resources (OER) in higher education assembles vast repositories of information that were inaccessible in the past. In most cases, a learning platform also accompanies the open content. The number of students stating a desire that professors use OER in their teaching increased by 19% in one year to 57% in 2012 according to the ECAR study (Dahlstrom, 2012). OER offers alternatives to expensive textbooks, and offers a variety of sources that may match students' learning preferences. While by no means a comprehensive list, some long-standing examples of OER include the Open Learning Initiative through Carnegie Mellon University; the Connexions Consortium with Rice University, Indiana University, the Washington State Board for Community and Technical Colleges, among both national and international members; and the Community College Consortium for Open Educational Resources (CCCOER). OER content includes courses and multimedia content in

subject areas such as the Arts, Business, Humanities, Mathematics, Sciences, Statistics, and Technology in most cases, in multiple language formats.

Within the last year, Harvard and MIT, both with a previous history of offering OER, borrowed from the experience of Canadian professors George Siemmens and Stephen Downes in offering MOOCs (Massively Open Online Courses). These two elite universities have combined and committed $60 million in capital funding to build edX (Harvard News, 2012), which is touted as a "not-for-profit enterprise…that offers online learning to on-campus students and to millions of people around the world." (edX, 2013) The partnership has recruited other "X universities" like UC Berkeley and the University of Texas, with plans to offer many more courses than the nine currently available.

Simultaneously, the for-profit sector, primarily based in the Silicon Valley, has ventured into MOOCs as well. The first entrant was Stanford Professor Sabastian Thrune whose experience of teaching a computer course with over 150,000 students led him to create Udacity. The for-profit Udacity capitalizes on peer-to-peer interaction, like other MOOCs, and has 18 courses with more MOOCs in development. This venture recently was invited by Governor Jerry Brown to partner with San Jose State University to offer remedial education classes to increase college readiness for California high school and community college students (CFA, 2013).

> The MOOCs model thus far lacks the model of students engaging directly with faculty. There is heavy use of auto-graded assignments and of video-taped lectures. Important faculty roles such as grading and giving feedback to students are done in for-profit MOOCs by crowd-sourcing the work using the MOOC students through a sophisticated norming process.

Stanford professors Daphne Koller and Andrew Ng with $22 million starting capital from John Doerr (Netscape, Google, Amazon) and Silicon Valley venture capitalists announced Coursera, offering 43 MOOC courses and building a consortium of well-regarded university partners such as the University of Pennsylvania, the University of Michigan, Princeton, and their home campus at Stanford. Soon the consortium added other institutions in what seemed like a new Gold Rush for students and bragging rights including the California Institute of Technology, Duke, the École Polytechnique Federale de Lausanne, Georgia Institute of Technology, Johns Hopkins, Rice, UC San Francisco, University of Edinburgh, University of Illinois at Urbana-Champaign, University of Toronto, University of Virginia, and the University of Washington (Lewin, 2012).

The MOOCs model thus far lacks the model of students engaging directly with faculty. There is heavy use of auto-graded assignments and of video-taped lectures. Important faculty roles such as grading and giving feedback to students are done in for-profit MOOCs by crowd-sourcing the work using the MOOC students through a sophisticated norming process. Koller and Ng have also applied their knowledge of machine learning theory to build massive data sets on the interactions and success indicators of the almost two million students who have taken

Coursera MOOCs so far (Coursera, 2013). Yet the level of success is extremely limited—there is a less than ten percent success rate for students who sign up for a MOOC.

While MOOC mania may be slow to affect Arizona, the *New York Times* reports that ASU Online has joined with other public institutions to offer free, credit-bearing MOOC courses as an introduction to online learning with the hope that this will generate future enrollments toward a full degree program (Lewin, 2013). Named "MOOC2Degree," participants so far identified are ASU, University of Cincinnati and the University of Arkansas system.

The Khan Academy as OER has had an impact on higher education and the K-12 systems, raising expectations and continuing the hype as well. The Khan Academy was created by founder Salman Khan, and is a not-for-profit organization with the mission of providing a "free world-class education to anyone, anywhere." *USA Today* describes Khan as "spark[ing] a tech revolution in education." (Della Cava, 2012) With its own YouTube channel, Khan's work has been featured in *Time* and *Fortune* magazines, 60 Minutes, CNN, National Public Radio, Charlie Rose, and the Colbert Report, among others, reaching a high level of public awareness.

With over six million visitors a month who view a digital library of more than 3,300 videos, it is clear that the utilization of this content is popular and growing. Khan adopted and promoted the trendy term "flipped classroom" by allowing students to view content on their own, to practice during class time to build mastery of the topic, and to engage in problem-based learning with teachers, tutors and peers. The flipped classroom is also part of a larger social learning process that emphasizes the human aspects of learning while leveraging technology to work through the more basic, mechanical and route aspects (TechSmith, 2013). The use of Khan Academy exercises, gaming, badges, and deep learning analytics inform the current and future practices at Coursera, Udacity, edX, and others. Ask any Arizona math teacher, and they will have a story or an opinion about using Khan Academy in their lesson planning.
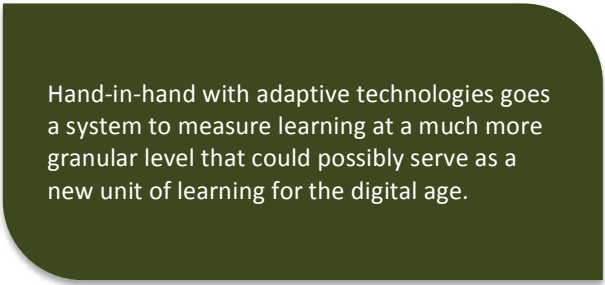
RE-PACKAGING CONTENT

The digital nature of content has created the ability to unbundle, re-format or re-package learning. This unbundling of content, combined with higher demands for measures of accountability in the policy environment, and the perhaps the dissatisfaction of employers with the outcomes of graduates has also called into question the packaging of content. Does learning have to be done in a credit hour course? And is seat time the best foundation to realize that learning? The course credit hour, based on Carnegie units, has been the proxy for learning and how learning has been measured in terms of degree completion, and more importantly, federal financial aid calculations. Technology has opened the possibility of repackaging the content and how the content is recognized.

Using the music industry as a model, consider how music for years was packaged until the 1990s. With the unbundling of content through technology, students no longer need to take an entire class (buy the album), or may need to not only take the class, they may need the prerequisite courses (previous albums) to bring them up-to-speed, fill in the gaps of missing

knowledge, and demonstrate mastery of the learning objectives. In the industrial design of courses, seat time has been fixed with the individual learning being variable. Now, the individual learning can be personalized and fixed to a specific performance level, and the seat time can be variable. The students' learning needs, not how the course is packaged, can be the fundamental design of learning.

Technology has also made the customization and personalization of the student learning experience possible to a much greater degree in the form of adaptive learning systems. Students come to college with different experiences and levels of mastery of the competencies (knowledge, skills, abilities, values, attitudes). Those levels can be diagnosed and identified at a more and more granular level. Personalized prescriptive pathways of content competencies in the form of activities, assignments, and assessments can be suggested or "recommended" to students. As the individual student progresses, new content competencies are automatically presented based on previous performance and predictive models, and previous student data that indicate the needed remediation to progress through the learning pathway. Students absorb and demonstrate their mastery of the competencies at different rates. With adaptive learning, students can spend time on modules where they have gaps in knowledge instead of time on content competencies where they have demonstrated mastery. Adaptive learning systems enable a post-industrial learning experience.

> Hand-in-hand with adaptive technologies goes a system to measure learning at a much more granular level that could possibly serve as a new unit of learning for the digital age.

Hand-in-hand with adaptive technologies goes a system to measure learning at a much more granular level that could possibly serve as a new unit of learning for the digital age instead of seat time, based on industrial-era Carnegie units. This competency-based approach in all or part of a course would change the way progress toward college completion is documented, with far-reaching implications (LaBlanc, 2013; Smith, 2012). It would facilitate recognition of prior learning for credit if students could demonstrate their mastery of course competencies by a recognized assessment process, which in turn would accelerate time to degree. It would improve the quality of assessment tools and foster their use at a more granular level while at the same time promoting the creation of higher-quality lesson content. Additionally, course and program competencies could be aligned with business and industry competencies to ensure a highly trained workforce that possesses relevant mastery of the knowledge needed to succeed and compete in a global economy.

For Western Governor's University (WGU), this is business as usual. WGU has developed competency-based approaches through its curriculum; however it translates those competencies back to Carnegie units for the purposes of being eligible for federal financial aid. The transfer of credits from WGU to another institution is also a process of translation back to credit hours – with the possibility of some credit being lost in translation, thus making it preferable that students simply graduate from WGU. This constitutes a significant pothole in

the information superhighway, because increasing numbers of students are moving among more than one institution in their undergraduate career. So WGU offers a high tech, virtual model with the traditional problem of disincentives for mobility in a highly mobile world.

Arizona State University has emerged as an early adopter of adaptive technologies; most noteworthy is the use of Knewton software and Pearson My Labs products. The Pearson My Labs and other "course packs," are being re-fitted with the Knewton software. The Knewton software "continuously adapts" in real time based on the historic data, the type of content, based on competencies seen as optimal for students, and the individual student's psychometric profile. Some 5,000 students utilized Knewton math for remediation in 2011 with student pass rates moving from 66% to 75% in the initial trials (Kolowich, 2013). Additional adaptive technology courses offered at ASU Online include economics, psychology, biology chemistry and physics have been reported as part of a larger strategy to build a completely adaptive degree pathway.

Northern Arizona University was awarded a $1 million Next Generation Learning Challenges (NGLC) grant as part of a competitive process to promote "Personalized Learning" that leverages these adaptive technologies while driving down the annual costs to around $5,000 (NAU, 2012). NGLC is funded by the Bill & Melinda Gates Foundation, the Hewlett Foundation, and others, and is administered by EDUCAUSE, the leading organization for information technology in higher education. At NAU, a Personalized Learning Division has been created as part of the Extended Campuses. The Personalized Learning Division seeks to enhance the traditional classroom-based model to achieve competency-based learning combined within-person faculty mentoring and support, OER, pre- and post-competency testing, credit for prior learning, internships, and service learning. The student tuition is based on length of time rather than by course or credit hours. NAU has also partnered with Pearson to use to the adaptive technologies embedded in LearningStudio, and online learning platform with Pearson content. Creating an adaptive pathway with specific program and course level competencies is also in the works to accelerate degree completion. This includes seeking authorization for the Higher Learning Commission, NAU's regional accrediting body to offer competency-based delivery of instruction.

PROBLEMS AND COSTS IN HIGH TECH EDUCATION

For all the promise of distance education, there are limits that are useful for policymakers to consider. Some of the limits have to do with the pace and scope of distance education's growth. For example, the pace of growth in distance education enrollments has slowed in recent years—in 2010, the 10.1% increase in distance education enrollments marked a substantial decline from the average growth rate of the previous eight years (Allen and Seaman, 2011). Moreover, the increase has been in the proportion of students taking only one course on line or more, whereas very few students take their entire programs of study on line. It is far more common, however, for students to take at least one class at a distance than it is for students to take their entire program at a distance: for instance, the percentage of students who took their entire program at a distance was only 4% in 2007-2008 academic year, and that

was a decline from the 5% the previous year (NCES, 2011, see Table A-43-2). It is useful, then, to put the promise of distance education in perspective.

Further, there is ongoing concern and evidence as to the quality and success of distance education. A national survey of institutional leaders reveals a continued concern about the learning outcomes of distance education as compared to face to face education. Nearly one-third of institutional leaders believe that learning outcomes from distance education are "inferior" or "somewhat inferior" than for face to face education (Allen and Seaman, 2011). Although that is a decline from responses in 2002, when 43% held this view, but it is still a substantial minority of institutional leaders in higher education.

> Ironically, shifting to individualized, adaptive models in the name of making the course content more accessible, can, at some point, isolate learners from one another, and unbundle the faculty role in a way that makes them less accessible to students.

In this context, it is important to consider the educational and other costs of technology. We start by focusing on the ways in which distance education can adversely affect learning communities, which are known to important for student success. Subsequently, we look to costs in student success, quality, and access to distance education. Such costs are particularly important to consider given that a far higher percentage of students attending college part-time take courses on-line (25%) than those attending full-time (16%) (NCES, 2011, Table A-43-1).

WHEN UNBUNDLING THE FACULTY UNRAVELS LEARNING (COMMUNITIES)

Ironically, shifting to individualized, adaptive models in the name of making the course content more accessible, can, at some point, isolate learners from one another, and unbundle the faculty role in a way that makes them less accessible to students. Parsing out the certification of learning into smaller, more granular "chunks," technology adversely affects the potential for creating learning communities of students and faculty, which evidence shows work to facilitate student learning and success (Visher et al., 2010). The ideal of effective learning communities and experiences is that students and professors are systematically engaged with each other and the curriculum over time. Those communities unravel if the faculty are not interconnected with the students and if they are not interweaving various parts of the course curriculum. The dis-integration of the curriculum into "bits" of knowledge undermines that reduce student learning and educational quality (Richardson et al., 1983).

Learning communities, and student learning, are being undermined by another pattern related to expanded use of technology and distance education. At the same time as online courses have grown in popularity, steadily increasing over the last decade at an average of about 15% (Allen and Seaman, 2012), there has been a concurrent expansion of part-time, relative to full-time faculty, such that part-time faculty account for nearly half of all the instructional faculty

nationally, and about three-quarters in community colleges, that serve the least advantaged student populations who would most benefit for intensive contact with faculty. For instance, a national study of part-time faculty revealed that 42% of part-time faculty members do not spend any time advising students (it should be noted that most are not paid for that—CCSSE, 2009). More than that, the design, creation, production and delivery of online courses has been separated from the hands of the adjunct faculty teaching the class, fundamentally changing, and in many cases compromising the relationship of the faculty member to the material and their ability to relate to the students.

The faculty skills required to create and deliver an online course have changed due to technology Smith, 2010). Online teaching skills now include: Course developer (66.4%), Facilitator or moderator, (65.8%), Subject-matter expert (55.7%), Instructor or lecturer (51.0%), Student counselor or advisor (36.1%), Technology Trainer (30.3%), and Program coordinator or developer (28.6%) (Kim and Bonk, 2006). One examination of online course in community colleges, found that essential faculty tasks had also been impacted by not only technology, but in unbundling the faculty role (Smith and Rhoades, 2006). The list of unbundled tasks begins to indicate how faculty roles have been reconfigured. A list of these essential tasks and how they can be unbundled is found in **Table 1**.

Table 1

Online Faculty Tasks (Smith and Rhoades, 2006)

Design The selection of teaching and learning pedagogies, strategies, and methods including the learning objectives, goals, and outcomes
Content The curriculum or subject matter, including the course materials, assessments, and competencies needed in order to reach the objectives and expected learning outcomes
Development The creation and placement of the content in order to be viewed digitally on the Internet—usually through placement of the content into a learning platform
Delivery The transmission of the developed course to students—via the Internet
Grading The evaluation and feedback of student assessments (quizzes, papers, exams, portfolios, and so on)
Interaction The communication, mediation, and motivation with students
Improvement The change process to improve course effectiveness, including its documentation
Advising Answering curricular, programmatic, college, and other questions from students

Technology and unbundling has produced a "Virtual Assembly Line." In addition to the utilization of part-time faculty there are many other non-faculty professionals. A virtual team of specialists builds an online course. An adjunct faculty member may be asked to organize and search for content as a "content specialist" or "subject matter expert," but is not required. Instructional designers build the course. Specialists put the course materials into the learning platform or course management system. Outsourced helpdesks provide technology support and tutoring services. Grading and interaction is performed by an adjunct faculty member, or possibly by a team of "graders" who may not be faculty with corresponding credentials. The instructional designers handle improving the course, and advisement is done in the student services or student enrollment management offices.

> It takes an investment to build an assembly line, even a virtual one. There are information systems and technological amenities to outfit classrooms.

The virtual assembly line has hidden financial costs as a result of the complex organizational structure built around it. It takes an investment to build an assembly line, even a virtual one. There are information systems and technological amenities to outfit classrooms with. There is an ongoing need to refresh and update the assembly line equipment, which in the case of information technology is obsolete after just a few years. Sometimes, it is necessary to fully retool the assembly line. Further, there are the sorts of personnel identified above who must be hired to staff and maintain the assembly line. Consider Rio Salado College, a national leader in distance education, as one example. Rio Salado offers over 600 online courses designed in a "one-course many sections" model utilizing over 1,200 adjunct faculty. This standardization and specialization increases the ability to drive down the costs of *academic* labor, and scale up the number of course sections *per faculty* offered to students. *But* it drives up other personnel costs as well as capital costs. In short, technological innovation is not cheap: as the 2000 AZ Town Hall report suggests, expanding the use of technology in education will require significant new investment. A fuller accounting, then, of costs suggests that high technology in higher education does not reduce costs but shifts them, from faculty to other labor and capital costs.
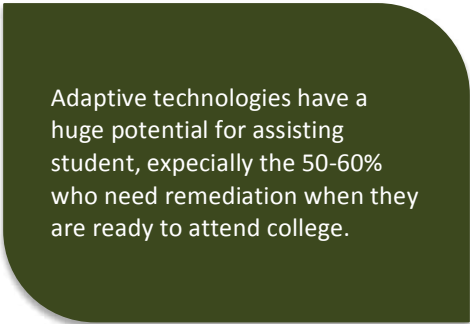
MORE COSTS OF TECHNOLOGY IN SUCCESS, QUALITY, AND ACCESS

More than just the financial costs of establishing, staffing, and maintaining technologies. There are also potential costs in terms of student success, quality, and access to the virtual assembly line. Once again, consider Rio Salado, known for its expertise in distance education and technology use. Yet the college has not been able to significantly increase the graduation or completion rates of students. Technology has been utilized to build predictive models to understand student behavior and to help improve student success. Rio Salado College has engaged in data mining and predictive modeling, and has emerged as a recognize leader in this emerging field. One effort using data from the learning platform and the student information system was able to predict within eight days, which students were on track to earn a "C" or better in their online course (Smith, Lange, and Huston, 2012). This creates the possibility of

early interventions to help students toward online course success. But that possibility and approach has not yielded the hoped for increases. Indeed, Rio Salado has the lowest graduation and completion rates in the Maricopa Community College District. Three other colleges in the district (Estrella Mountain, Paradise Valley, and Scottsdale) were recognized last year by the Aspen Institute as being among the top 120 colleges in the country for their achievement in graduation rates, student retention, degrees awarded, and equity in student outcomes.

While the possibilities of technology have created a great deal of hype, the reality is sometimes far from techno-utopia. OER content, while open, is not always found in coherent forms. There is a fragmentation of knowledge in the content. It takes a great deal of time and expertise to filter, sift and identify which OER is actually helpful to learning. OER is also become less open, or at least free. The recent announcement by FlatWorld Knowledge that it would begin charging a fee for its previously free digital textbooks and media is an indicator of the trend (Lederman, 2012).

Similarly, MOOCs still do not have a clear business model, nor have they yielded evidence of a broad, positive educational outcome. With no college credit attached, a MOOC does not help a student toward college completion. While recent efforts by Coursera, Udacity, and the American Council on Education to evaluate whether its courses are college-credit worthy, the less than 10% success rate of students means the impact would have a much longer time horizon before helping with success and completion. However, as one observer put it, "this is a way to bust accreditation" which may be a positive, but the loss of quality assurance and the need for authentication of student identity would be quality concerns that must be addressed.

> Adaptive technologies have a huge potential for assisting student, expecially the 50-60% who need remediation when they are ready to attend college.

Along related lines, the use of competency-based approaches opens the door to accelerated completion of a degree, but, as some fear, also also opens the door to a standarization of the curriculum and a reductionistic view of learning. What constitutes the minimal level of competency, and what is mastery of the competency, and who determines those levels? Adaptive technologies have a huge potential for assisting student, expecially the 50-60% who need remediation when they are ready to attend college, but without the supports and services needed for students engaged in the process, the likelihood for success decreases (CCSSE, 2012). The unbundling of faculty tasks in online courses lowers costs, but begs the question of which approaches are best when targeting all segments of students – not just those who are on he affluent side of the digital divide, have sufficient academic preparation, and have the knowledge of and support systems of higher education to be successful in an online student experience.

GATES WAYS TO LEVERAGE TECHNOLOGY TO ENHANCE ACCESS AND SUCCESS

One of the major challenges with technological innovations is to maintain a focus on enduring socio-cultural and economic obstacles to college access and success in leveraging the benefits of the new technologies. To overcome those obstacles, the evidence is that students benefit from engagement, from personal interaction with peers, professors, and professional staff. Technology can supplement and facilitate, but not replace that direct, face to face interaction. In this section, two initiatives aimed at enhancing access and success for students from underrepresented populations are explored. Each initiative combines the benefits of technology with those of face to face engagement. One involves setting up a blended online education campus, targeting lower income students. Another project involves a new platform embedded in Facebook created by a start-up company. Gates is funding a project to test (and study) that social media technology at community colleges (which disproportionately serve first generation students and students of color). The aim is to enhance student success by creating a virtually provided integrative sense of community for colleges with commuters who are dispersed throughout the region.

Portmont College at Mount St. Mary's. One Gates supported effort that leverages technology to creatively enhance access, success and quality, in a model that is affordable to lower income students is being led by MyCollege Foundation. It combines the best of online access with proven success of on-ground experience, funded as a "greenfield" approach primarily by the Bill & Melinda Gates Foundation. The mission of MyCollege Foundation is to transform student lives by continuously improving quality, broadening access, and lowering the cost of education. In partnership with Mount St. Mary's College in Los Angeles, California, MyCollege Foundation has established Portmont College at Mount St. Mary's. Portmont is a two-year, regionally accredited, non-profit college that blends personalized online education with in-person cohorts and social supports taken from best practices from higher education and other sectors. It has been designed from the ground up to enable motivated students who face barriers in traditional colleges to succeed in college and graduate with minimal debt.

Portmont College is innovative not only in its blended use of technology, but also in its distinctive approach to access. It is not an open door institution. Yet while Portmont is selective, its criteria for selectivity are new to higher education. Other than perhaps the military academies, Portmont is the first higher education institution to have a high bar on non-cognitive factors such as work ethic, grit, resilience and motivation. It combines that high bar on non-cognitive factors with a much lower bar on academic aptitude (requiring a high school diploma or G.E.D. and 10th grade proficiency in reading, writing and math). In short, Portmont's selection process prioritizes non-cognitive factors over academic preparedness. Moreover, students are selected at medium level for risk, meaning no more than two U.S. Department of Education risk factors (low-medium income, working part-time, has dependents, and is a first generation college student).

The assessment of non-cognitive factors takes place during a free, three-week course called *Launch Pad*. The course is taken online (http://portmont.la.edu) and presents lessons on three major themes that aim to increase a student's potential for success in college. During the course, a student is assessed for her/his level of grit, resilience, and motivation by using a number of instruments, including Angela Duckworth's (2013) grit assessment, data on student performance, and an evaluative interview. Students with proven grit are admitted to Portmont College.

Following the *Launch Pad* and admission to the College, students are placed into cohorts with peers from the local geographic area. They experience a week-long, in-person, experiential "boot-camp" called *Ignition* to prepare them for their college program. This peer cohort becomes students' community of support throughout their programs. As part of a blended support model, cohorts utilize social media for online interaction, and meet-up formally every eight-week semester session to demonstrate project-based learning, and learn from guest lecturers and presenters. To accomplish their work, students will have informal learning events with smaller "pods" or their entire cohort throughout their experience. At the end of *Ignition*, students meet their Success Coach who will be assigned to them throughout their entire Portmont experience and provide highly personalized support for students. The faculty members are also introduced to students as they begin their studies. In addition to a distinctive admissions process, then, Portmont offers a distinctive, blended support process, combining high technology with the face-to-face peer and professor engagement that we know enhances success.

The curriculum of Portmont again combines traditionally developed curricula, which we know are important to students' long term success with what we know is needed in more job relevant learning outcomes (Arum and Roksa, 2010). Students start with a strong general studies background, and then can select one of four degree pathways, cutting across a broad range of fields, in a curriculum that has been adapted from the Mount St. Mary's on-ground program and converted to the online format. Progress in pursuing the curriculum is facilitated by a combination of real-time, tracking of students' progress, visible to faculty members and support teams on a "student dashboard" of descriptive and predictive analytics allowing for early, effective intervention, combining the benefits of on-line, high tech information systems with an in person, high touch support system.

In short, Portmont brings together new technologies and proven practices, intensive and face to face contact supported with social media cohorts, with pedagogical and business model innovations. It offers a model of a new, non-profit hybrid higher education institution designed to better serve underserved populations with an affordable, quality college education.

Schools app, in community colleges. A second example of a Gates supported project creatively utilizing technology to enhance student success is Schools app. The developers of this application, from Inigral, Inc. are working with a team of university researchers from the Claremont Graduate University (led by Dr. Cecilia Rios Aguilar) and the University of Arizona (led by Dr. Regina Deil-Amen) to understand the ways in which social media can be utilized in

community colleges settings to more fully engage students in the campus community virtually, thereby improving student retention. The project, "Getting connected: Harnessing the power of social media technology to enhance community college student success," is being overseen by the League for Innovation, and is being conducted at eight community colleges nationally.

Schools app combines state-of-the-art high technology with a longstanding premise of the value of students being engaged in their campus community. It addresses the challenge that community colleges, like many higher education access institutions face, in having a largely or entirely commuter student population. In that context, how can one construct a community. The answer is virtually, with social media.

The origins of Schools app lie in providing a service for incoming students at traditional, four year, residential campuses. Responding to a potential market among incoming for a private virtual community to get to know their prospective roommates and peers led to the creation of Schools app. The application works within Facebook to provide a "private branded community" for students to "make friends," "share interests," and "get involved." In fact, Inigral is part of Facebook's "Preferred Developer Program", companies that are approved for developing applications on the platform. The tool is pitched to institutions with the lead line: "Build community. Boost enrollment and retention." (http://inigral.com/howitworks) The demo on the home page is entitled, "How do you build community?"

The point of the getting connected project is to test this product at community college sites. The nature of community college students makes this an important effort to enlist technology in enhancing the education of students who are disproportionately non-traditional in age, from lower income backgrounds, are first generation, and are students of color, as well as immigrants. The nature of community college settings will likely involve some adaptations to the realities of how community college students attend college—part-time, stopping in and out, and dispersed throughout metropolitan areas or throughout rural regions. The principal point of contact of these students with colleges is in the classes they take.

It may be, then, that Schools app will need to be adapted to the lives of community college students, who overwhelmingly are not traditional aged freshmen coming to live on campus and looking to make new friends. The concept of "socio-academic integrative moments" (Deil-Amen, 2011) may be one that guides further calibration and adaptation of the application to various community college settings. Underlying that concept is the idea that for community college students the most important interactions do not so much involve developing relationships that socially integrate them into the campus, as they are interactions that link academic purposes and social dimensions as these students look to negotiate their paths through college, from a distance. The getting connected project is in its second year, so it is too early to definitively speak to its potential for enhancing community college student success. But the project represents a creative effort to link technology to redress some of the challenges facing community college students.

The two Gates supported projects are suggestive of two interesting themes. First, technology's impact is at least partly mediated through personal, face to face relationships that are established over a period of time. In the case of Portmont, that theme is evident in an educational experience that blends academic (on-line) and social (intensive and face to face) elements in ways that leverage each other. In the case of Schools app, there is also a blending of social and academic interactions in a social media environment, among students who largely share particular class and other academic experiences. In other words, it is not just the technology that matters. Successfully leveraging technology's power is contingent on being sensitive and appropriate to the realities of the colleges and students that are utilizing the technology.

That relates to a second theme. Both of the Gates projects have an explicit aim of better serving underserved populations with the use of technology. In one case, that is evident in the target student population and in the distinctive admissions criteria. In the other case, that is evident in the type of institution being targeted; it may also come to be evident in the type of exchange being promoted or responded to on social media. The takeaway point is that technology's benefits will be enhanced by targeting and adapting high tech innovations to the particular needs of student populations that have been underserved by traditional higher education.

Arizona has an important role to play in fostering this work, not by establishing unified controls, but rather by investing in the infrastructural foundation for high tech initiatives. At the core of that infrastructural support is providing training and support for the faculty and professionals utilizing the new technologies and information systems.

CONCLUSION

In sum, amidst the commentary of pundits forecasting the end of higher education as we know it, and its transformation and/or replacement by new technologies and delivery systems, policymakers are well-served by engaging in a balanced consideration of and investment in technology. The possibilities of leveraging new technologies to enhance higher education for the future are exciting. However, understanding the limits of what these technologies can achieve, in themselves and on their own is important.

Arizona has been a site of much experimentation in the leveraging of technology in higher education. Many individual institutions and providers have developed important innovations. More such experimentation and entrepreneurial innovation will no doubt continue. As the 2000 AZ Town Hall recommended, the state has an important role to play in fostering this work, not by establishing unified controls, but rather by investing in the infrastructural foundation for high tech initiatives. At the core of that infrastructural support is providing for the training and support of the faculty and professionals utilizing the new technologies and information systems.

There are enduring challenges that higher education can better address in the future than it has in the past. As with the Gates projects, the beneficial impacts of technology will be all the greater if in their development and ongoing application to the diverse settings of U.S. colleges and universities, they are culturally calibrated to the distinctive settings and student populations that will utilize them. Broader success with the growth demographics of future students will come to the extent that policymakers are attentive to and strategically support: (a) access for overcoming social and economic barriers (affordability, and now technological accessibility as well as facility in navigating various transactions on line); (b) success in the full range of academic programs (rather than tracking lower income students into lesser opportunity tracks); and (c) quality and qualitative adaptations of curricula to the lives and realities of the new traditional student population. All of these involve (as at Portmont and School apps) investing in the socio-academic relationships among these new populations of students and between them and the professionals who serve them and the communities in which they are situated.

We close by offering two other thoughts about the ways in which information technologies can enhance learning and teaching. One has to do with the learning styles of diverse populations. The other has to do with re-bundling the faculty into learning communities that integrate regional curricular communities that develop courses and modules that address regional issues, making the learning relevant and authentic (connected to real world problems) for students in the area.

Recent research suggests that some Native American and Latino students can benefit from on-line courses that are tailored to patterns of time and place that facilitate learning (Chavez et al., 2012). Interviews of students in on-line courses revealed a couple of important culturally relevant benefits of the modality. One was geographical, that on-line classes enabled students to live in the local contexts that are so important to their sense of connectedness and belonging with the natural environment, family, and the local community. Another benefit was the pacing of learning in terms of time: students expressed a sense that in face to face classrooms the pace and pattern of interaction diverged significantly from the ways that in their homes and in their communities they had learned to take in and process knowledge. The self-paced format gave them the opportunity to reflect before jumping immediately into fast-paced, competitive conversations in which students are vying for the faculty members' attention. The more that designers of technology enhanced or delivered instruction, as well as of face to face instruction, can be sensitive to the culturally different ways that students learn, the greater the possibility that we can leverage technology to better serve these students.

Technology can also enable disparate part-time faculty members to find connection in communities of instructors focused on developing regionally relevant curriculum that speaks to the lives of underserved students and to the needs of local communities. As noted above, there is much fascination now with Massive, Open, On-Line Courses (MOOCs) that can take curriculum global. Yet that is one of the weaknesses of textbooks: they are disconnected from the lives of the students locally and regionally, and they do not speak to many of the defining issues that local communities need to address. What if we thought about technology as a

mechanism not to re-bundle faculty across barriers of time and space in curricular communities focused on developing truly customized, culturally relevant and responsive curriculum? We know that current patterns of part-time employment among faculty, up to three-fourths of the faculty in community colleges, lead to a disconnection and isolation of part-time faculty from the campuses for which they teach and from each other. Technology could connect these professors, enriching their professional development. Moreover, given the location of part-time faculty in so many disparate sectors of the community, and given the involvement and work of many of them in multiple institutions and settings, metro (or rural) curricular communities could develop projects partnering with local groups and agencies to address local problems.

One of the potential and relatively unexplored possibilities about technology, then, is to customize curriculum and educational experiences. In this case the focus would be not so much just for individual students in isolated areas, or for global mass markets of students. Rather, the focus would be on culturally customizing education to particular locales and communities in ways that hold the promise of more fully and effectively engaging, serving, and benefiting students and communities.

> **Questions to Consider**
>
> - How can technology be leveraged to support the success of key populations that are the growth demographic of American higher education?
> - What considerations and infrastructure are important for what we know works in engaging students for success?

REFERENCES

ABOR. (2011). 2011 *Annual report on wages earned by Arizona university system graduates*. December 1-2, 2011. Arizona Board of Regents.

ABOR. (2010). *The Arizona higher education enterprise: Strategic realignment 2010 forward.* Council of Presidents, Arizona Board of Regents, September, 2010.

Allen, I., and Seaman, J. (2012). *Changing Course Ten Years of Tracking Online Education in the United States*. Babson Survey Research Group. Retrieved from: http://www.onlinelearningsurvey.com/reports/changingcourse.pdf.

Allen, I., and Seaman, J. (2011). *Going the distance: Online education in the United States, 2011*. Babson Survey Research Group and Quahog Research Group, LLC, November 2011.

Arum, Richard, and Roksa, Josipa. 2010. *Academically adrift: Limited learning on college*

campuses. Chicago: University of Chicago Press.

Business Wire. (2012, October 19). *Apollo Group, Inc. Reports Fiscal 2011 Fourth Quarter and Year End Result*. Retrieved from: http://phx.corporate-ir.net/phoenix.zhtml?c=79624&p=irol-newsArticle&ID=1618736&highlight.

CCSSE - Center for Community College Student Engagement. (2010). *The Heart of Student Success: Teaching, Learning, and College Completion* (2010 CCCSE Findings). Austin, TX: The University of Texas at Austin, Community College Leadership Program. Retrieved from: http://www.ccsse.org/publications/national_report_2010/36379tw/cccse_2010_national_report.pdf.

CCSSE. (2009). *Making connections: Dimensions of student engagement*. Austin, Texas: Community College Survey of Student Engagement.

CFA - California Faculty Association. (2013). *Udacity, San Jose State to partner for online ed pilot program*. Carousel – Online Education. Retrieved from: http://www.calfac.org/headline/udacity-san-jose-state-partner-online-ed-pilot-program.

Chavez, Alicia Fedelina, Ke, Fengfeng, and Herrerra, Felisha A. 2012. *Clan, sage, and sky: Indigenous, Hispano, and Mestizo narratives of learning in New Mexico context*. American Educational Research Journal, 49,1:775-806.

Coursera. (2012, August 9). *Coursera hits 1 million students across 196 countries*. Retrieved from: http://blog.coursera.org/post/29062736760/coursera-hits-1-million-students-across-196-countries.

Dahlstrom, E. (2012) *ECAR Study of Undergraduate Students and Information Technology, 2012* (Research Report). Louisville, CO: EDUCAUSE Center for Applied Research. Retrieved from: https://net.educause.edu/ir/library/pdf/ERS1208/ERS1208.pdf.

Deil-Amen, Regina. (2011). Socio-academic integrative moments: Rethinking academic and Social integration among two-year college students in career related programs. *The Journal of Higher Education, 82*,1:54-91.

Della Cava, M. (2012, May 30). Sal Khan's 'Academy' sparks a tech revolution in education. *USA Today*. Retrieved from: http://usatoday30.usatoday.com/life/people/story/2012-05-30/sal-khan-profile-khan-academy/55270348/1.

Duckworth, A. (2013). *Get Your Grit Score*. University of Pennsylvania, Arts and Sciences. Retrieved from: https://sasupenn.qualtrics.com/SE/?SID=SV_06f6QSOS2pZW9qR

edX. (2013, February 2). *About edX.* Retrieved from: https://www.edx.org/about

Fain, P. (2012, October 8). Grand Canyon's Ground Game. *Inside Higher Education.* Retrieved from: http://www.insidehighered.com/news/2012/10/08/grand-canyon-uses-online-pay-scholarships-and-campuses.

Harvard News. (2012). Harvard, Extended. *Harvard Magazine*. July-August 2012. Retrieved from: http://harvardmagazine.com/2012/07/harvard-extended.

Kim. K., Bonk. C. (2006). "The Future of Online Teaching and Learning in Higher Education: The Survey Says . . ." *EDUCAUSE Quarterly*, 2006, 4, pp. 22-30. Retrieved from: http://www.educause.edu/ero/article/future-online-teaching-and-learning-higher-education-survey-says%E2%80%A6.

Kolowich, S. (2013, January 25). The New Intelligence. *Inside Higher Education*. Retrieved from: http://www.insidehighered.com/news/2013/01/25/arizona-st-and-knewtons-grand-experiment-adaptive-learning.

LeBlanc, P. (2013, January 31). "Accreditation in a Rapidly Changing World." *Inside Higher Education*. Retrieved from: http://www.insidehighered.com/views/2013/01/31/competency-based-education-and-regional-accreditation#ixzz2JYygjbAI.

Lederman, D. (2012, November 5). Fleeing From 'Free.' *Inside Higher Education.* Retrieved from: http://www.insidehighered.com/news/2012/11/05/flat-worlds-shift-gears-and-what-it-means-open-textbook-publishing.

Lewin, T. (2012, July 17). Universities Reshaping Education on the Web. *New York Times*. Retrieved from: http://www.nytimes.com/2012/07/17/education/consortium-of-colleges-takes-online-education-to-new-level.html?_r=0.

Lewin, T. (2013, January 23). Public Universities to Offer Free Online Classes for Credit. *New York Times.* Retrieved from: http://www.nytimes.com/2013/01/23/education/public-universities-to-offer-free-online-classes-for-credit.html.

Maricopa. (2013). *Institutional effectiveness-IPEDS data feedback reports*. http://www.maricopa.edu/business/ir/IPEDS_Data_Feedback_Reports.php.

MCCCD. (2013, February 2). *Maricopa Trends*. Retrieved from: http://www.maricopa.edu/business/ir/trends/HTML/FY_RS.htm.

NCES. (2011). Distance education in higher education, in *The Condition of Education*, Washington, D.C.: National Center for Education Statistics.

Northern Arizona University. (2012, June 19). NAU awarded $1 million grant to help launch

Personalized Learning. *NAU Newsroom*. Retrieved from: http://extended.nau.edu/Newsroom/06192012.aspx.

Richardson, Richard C., Fisk, Elizabeth C., and Okun, Morris. (1983). *Literacy in the open access college*. San Francisco: Jossey-Bass.

Smith, V. (2010). "Essential Tasks and Skills for Online Community College Faculty," *New Directions for Community Colleges*. Regina L. Garza Mitchell, editor. Vol. 2010, Issue 150, pp. 43-55.

Smith, V. (2012). "Scaling Up: Four Ideas to Increase College Completion," in *Game Changers: Education and Information Technologies*. Diana Oblinger, editor. EDUCAUSE, pp. 105-113. http://net.educause.edu/ir/library/pdf/pub72038.pdf

Smith, V., Lange, A., & Huston, D. (2012). "Predictive Modeling to Forecast Student Outcomes and Drive Effective Interventions in Online Community College Courses." In *Journal of Asynchronous Learning Networks*, Vol. 16, Issue 3, pp. 51-61. http://sloanconsortium.org/jaln/v16n3/predictive-modeling-forecast-student-outcomes-and-drive-effective-interventions-online-co.

Smith, V., Rhoades, G. (2006). "Community College Faculty and Web-based Classes." In *Thought & Action*, Volume XXII, Fall 2006, pp. 97-110.

TechSmith. (2013, February 2). Teachers Use Technology to Flip Their Classrooms. Retrieved from: http://www.techsmith.com/flipped-classroom.html

Visher, M., Schneider, E., Wathington, H., & Collado, H. (2010). *Scaling up learning communities: The experience of six community colleges*. Teachers College, Columbia University, National Center on Postsecondary Research.

CHAPTER 8

Entrepreneurial Strategies for Public Higher Education Creating Value for Arizona

By Matthew M. Mars, Outreach College, University of Arizona and Randy Burd, Office of the Vice President for Regional Development, Outreach, and Global Initiatives, University of Arizona

ABSTRACT

This chapter examines the multiple ways in which public higher education entrepreneurially creates value in the state. It reviews the performance of colleges and universities in fund raising and technology transfer. It considers strategic plans, data, and examples in private/public partnerships and outreach activities. The chapter also speaks to the possible limitations of the prevailing entrepreneurial strategy of seeking short-term "profits" for universities and colleges. It points to the benefits of a "social entrepreneurship" strategy that focuses on medium-term capacity building, innovation, and creation of value in the community. In the process, it poses the question for policymakers of what types and mix of entrepreneurial strategies in public higher education can leverage value for Arizona's future.

INTRODUCTION

What are the entrepreneurial mechanisms through which public higher education generates value for Arizona? The current chapter addresses this question by discussing fund raising and technology transfer, reviewing the performance of Arizona universities and colleges in these two areas, and putting that performance in a national context. Private/public partnerships and outreach activities are also carefully considered. In each case, the chapter calls on supporting data to speak to the possibilities, limits, and structure of colleges and universities' entrepreneurial efforts in fostering economic and community development. The chapter also looks to an alternative model of "social entrepreneurial" activity that could be a highly promising catalyst to university and college activities that are directly responsive to local and regional needs and reflective of a broader national context.

The premises of this chapter are based on several core assumptions related to the real and potential contributions of higher education to statewide community and economic development initiatives. These core assumptions are that universities and colleges should (a) provide creative resources for entrepreneurs in the intellectual capacity of the faculty and students; (b) prepare talented students and graduates who are current and future entrepreneurs; and (c) help attract businesses, and business executives for whom the quality of

life, cultural attractions, and educational quality that a university brings are key factors in deciding where to locate. These three assumptions are essential for creating the critical mass needed to support a vibrant entrepreneurial community and all the benefits thereof (i.e., expanded, healthy middle class and tax base). Also, embedded within these assumptions are strategic activities and outcomes that are particularly powerful in terms of promoting economic growth and spawning community development. Examples of such activities include university transfer of technology and faculty and student entrepreneurship, as well as the multiplier effects of the general operations of universities (e.g., talent generation through instruction, employment, athletic events and cultural activities that attract tourists).

CREATING VALUE FOR ARIZONA ENTREPRENEURIALLY

The entrepreneurial strategies discussed in this chapter are important extensions of the 2000 AZ Town Hall recommendations. With two exceptions, little attention was devoted in that report to higher education's transfer of knowledge to or connections with the private sector. First, some attention was devoted to fundraising, though the report explicitly indicated that "the Legislature should not supplant or offset public funding for higher education institutions with private donations." (p. xxi) Second, there was one explicit reference to technology transfer: "A focused, substantial, and sustained investment in research, technology transfer, and innovation related to the New Economy must be undertaken by Arizona and its universities." (p. xxvii)

> Policymakers often see university entrepreneurship as a solution to institutions' financial challenges, believing that universities and colleges can generate large, self-sustaining revenue streams in this way. The evidence is to the contrary.

By contrast, this chapter offers a broader consideration and assessment of entrepreneurial efforts aimed at enhancing community and economic development. Policymakers often see university entrepreneurship as a solution to institutions' financial challenges, believing that universities and colleges can generate large, self-sustaining revenue streams in this way. The evidence is to the contrary. For example, data contained within the 2011 Association of University Technology Managers (AUTM) Licensing Survey showed at the national level university research expenditures outpaced institutional licensing revenues at an approximate ratio of 30 to 1 (AUTM, 2011). This finding indicates universities are far more equipped to produce strong academic outputs than they are at creating and pursuing business opportunities. Similarly, too often policymakers see higher education entrepreneurship as a quick and major stimulus to both local and state economies. Here again, technology transfer performance data suggests otherwise. For instance, the national median of university start-up companies created in FY2011 was just two (AUTM, 2011). While it is true that just one new venture can have profound economic effects, high failure rates indicate that such success stories are extremely rare. It is useful, then, to consider some creative and feasible alternatives for how public higher education can generate innovation and create statewide value.

One such alternative model that is being utilized across the nation is called social entrepreneurship. This model focuses not on short-term profits for the institutions, but rather on medium term capacity building in areas that are critical to the health and vitality of the communities in which colleges and universities are situated. The promise of social entrepreneurship is illustrated in the current chapter. Several brief case examples suggest that social entrepreneurship in public higher education can in various ways make substantial contributions to the economic vitality and overall quality of life available Arizona.

FUNDRAISING

Institutional fundraising has become an activity of growing importance across Arizona's public higher education system. **Figure 1** illustrates the current amounts of the annual endowments for NAU, ASU, and the UA as presented at the February 2013 Arizona Board of Regents (ABOR) meeting. Based on the 2012 national average spending rate of 4.2% (NACUBO, 2013), the estimated annual payouts would be $23.1 million at ASU, $3.7 million at NAU, and $23.7 million at UA.   The annual endowments of ASU and the UA represent remarkable growth over the past decade[12]. Specifically, ASU's annual endowment has more than doubled over the past decade going from $202 million in 2002 to just over $500 million in 2012 (ASU Foundation, 2013). Similarly, the market value of UA's annual endowment grew from approximately $268 million in 2006 to just over $532 million in 2011 (UA Foundation, 2013).

Figure 1

2012 NACUBO Annual Endowment Rankings

---
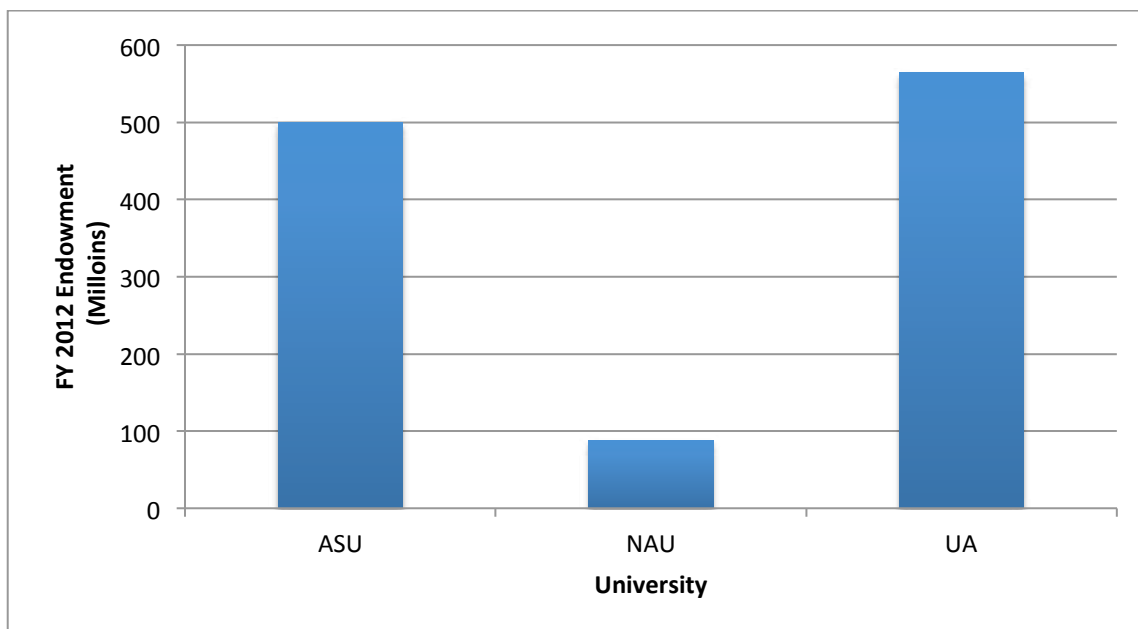
[12] Endowment trend data for NAU was not available at the time this chapter was written.

Arizona community colleges are also actively pursuing fundraising as an important source of institutional revenue generation. Specifically, almost all of the standalone colleges and both of the two community college districts have active foundations. No specific data specific to the annual size or performance of Arizona community college endowments was available at the time this chapter was written. This paucity of data is consistent with a 2010 report released by the Council for the Advancement and Support of Education (CASE) that indicated little is known at the national level about the general range in size and performance of community college foundations. However, the same CASE report did state that based on a national survey of 130 community college foundations, the median community college endowment in 2009 equaled $3.4 million with a range from $20 thousand to $80 million. The comparison of this data with those describing the three university endowments suggests that the fundraising capacities of Arizona community colleges are notably less than those of the three public universities. Regardless, the relative institutional investments in fundraising activities by the community colleges and districts are nonetheless important.

Despite the statewide evidence of fundraising activity and in some cases growth, Arizona public universities and colleges fall below in this area when considered in the national context. In particular, the 2012 NACUBO annual endowment national ranking positioned NAU at 413, ASU at 144, and UA at 135 (see **Figure 1**). These data indicate that the three Arizona public universities are not among the nation's most productive institutions when it comes to fundraising. Considering community colleges work to raise funds within an environment that is shared with their university counterparts, it can be assumed that their performance also falls short in the national context.

One primary limitation that restricts the fundraising capacities of Arizona universities and colleges is the relative absence of wealth and corporations in Arizona. One strategy to overcoming this limitation may be redirecting institutional efforts toward entrepreneurial activities and partnerships aimed developing local communities and growing the state's economy. The argument here is that the movement away from institutional revenue generation in favor of capacity building would have a positive effect on institutional revenue generation based on economic and industrial growth, as well as overall community development.

TECHNOLOGY TRANSFER AND ENTREPRENEURSHIP

The National Context. Technology transfer is widely understood as the primary mechanism by which university discoveries are moved from the laboratory to the marketplace. The involved process is assumed to ascend from creative resources in the form of intellectual properties (IP) developed out of faculty research being made available to entrepreneurs and innovative

Typically, the primary measures used for evaluating the performance and impacts of university technology transfer are the amount of income generated from IP and the number of start-up companies created based on IP.

companies for commercialization purposes. Of course, faculty and students can also act as entrepreneurs working to commercialize the university IP they either developed or helped develop. Typically, the primary measures used for evaluating the performance and impacts of university technology transfer are the amount of income generated from IP and the number of start-up companies created based on IP.

Expectations as to the payoff potential for university technology transfer have been quite high. That has been true for state policymakers who see in university technology transfer the potential to recreate the economic stimulus and boon of the Silicon Valley. It has also been true for university advocates of these activities, seeing in royalties and licensing revenues a new revenue stream, with aspirations of attaining the major "big fish" type-discoveries that spawned millions of dollars in returns for other select institutions.

Thus far, such potential has not been realized, either for states or universities. It turns out that it is extraordinarily difficult for university innovation to recreate the economic equivalent of a Silicon Valley, Research Triangle (in North Carolina), or Route 128 (Massachusetts). As a recent book, *The Rainforest: The Secret to Building the Next Silicon Valley* (Hwang and Horowitt, 2012) suggests, the creation of these economic miracles is contingent on complex networks of context specific social relations that take a long time to generate substantial returns (see also Owen-Smith and Powell, 2006). Similarly, any large payouts to universities have mostly not been forthcoming (Powers and Campbell, 2009). Also, those universities that have more recently become active in the area of technology transfer and/or have smaller amounts of research revenues to build on face a higher risk of losing money or realizing only marginal gains.

Technology Transfer across Arizona Public Universities. As the national data would predict, university technology transfer activities have not been significant catalysts for economic boon and massive institutional profitmaking in Arizona. In fact, it is possible that technology transfer activities are costing Arizona universities money and making only marginal contributions to surrounding communities and the state as whole. For instance, a 2009 external report developed by the Organisation for Economic Co-operation and Development (OECD) indicated "The University of Arizona's Office of Technology Transfer may be losing money as is the case with many other technology licensing offices in the United States" (OECD, 2009; p. 143-144). The next several paragraphs of the current chapter look more closely at the outcomes of Arizona university technology transfer activities according to two conventional performance measures: licensing revenue figures and start-up company creation rates.

Data provided in the 2011 AUTM Annual Licensing Survey places the performance of the three Arizona public universities in the national context (see **Figure 2**).

For the 2011 fiscal year, Arizona State University (ASU) generated $1,059,372 in licensing revenues, Northern Arizona University (NAU) realized $42,684 in licensing revenue, and the University of Arizona (UA) generated $981,495 in licensing revenue. The national median of licensing revenues generated during FY2011 was $1,533,711. Thus, technology transfer

performance across the three Arizona public universities fell below the national median when considered in terms of licensing dollars generated.

Figure 2

FY2011 Licensing Revenue Generation
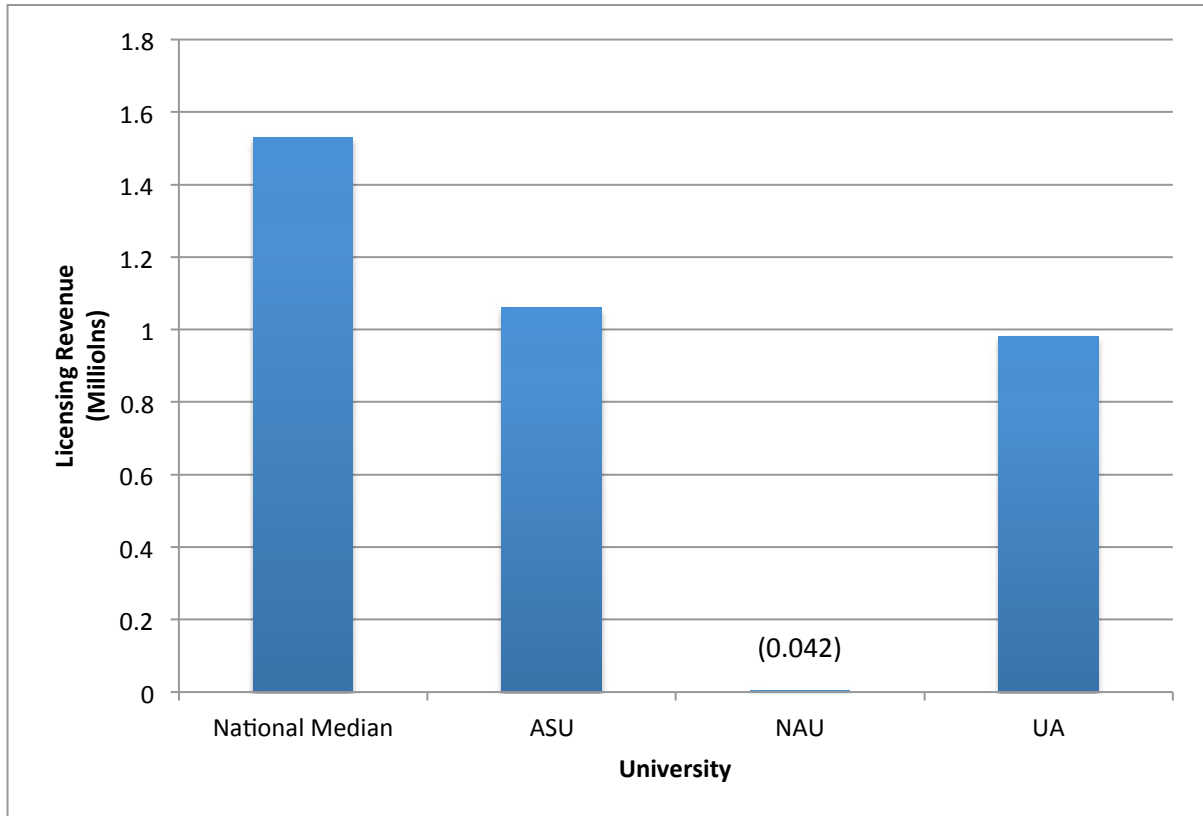
In FY2011, the amount of licensing revenues generated by the three Arizona public universities were dwarfed by the amounts of research expenditures at each institution (ASU: $355.2 million, NAU: $30.8 million, UA: $610.6 million) (see **Figure 3**).

More specifically, ASU's $1,059,372 in licensing revenues equaled approximately $30,000 in licensing revenue for every $10 million in research expenditures.

NAU's $42,684 in licensing revenues equaled approximately $10,000 in licensing revenue for every $10 million in research expenditures.

UA's $981,495 in licensing revenues equaled approximately $20,000 in licensing revenue for every $10 million in research expenditures. These highly disproportionate figures are not intended to dismiss the merits of technology transfer activities across the three state universities. Instead, these data indicate that the entrepreneurial efforts of universities to generate research monies have been far more effective than parallel efforts in the realm of technology transfer as gauged by licensing revenues.

Figure 3

FY2011 Licensing Revenue Generation vs. Research Expenditures
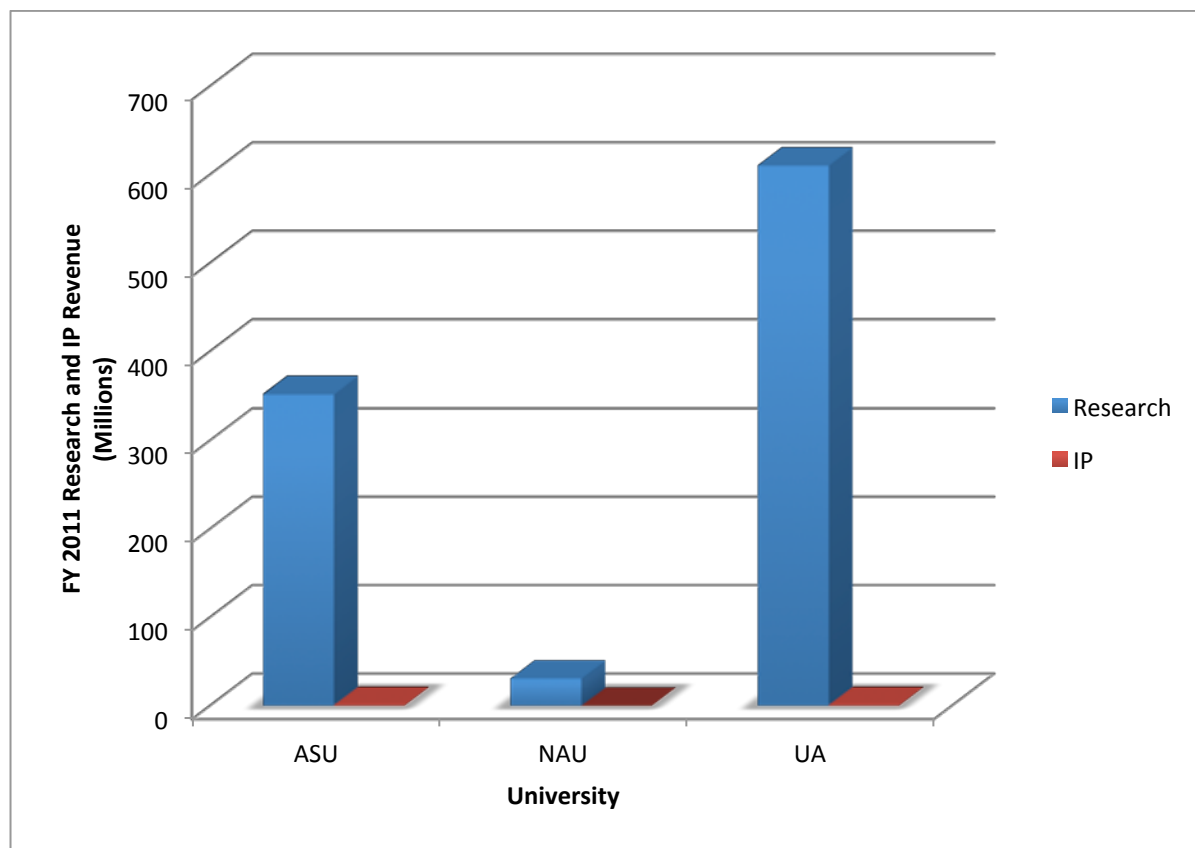
A second measure of technology transfer performance is the number of new companies started through the commercialization of university IP.   In 2011, there were a total of 18 start-up companies launched that were based on university technologies, 10 of which involved ASU technologies, while eight were developed out of UA innovations. No start-up companies emerged from NAU in 2011. The national median for start-up companies created in FY2011 was two.

Accordingly, both ASU and the UA performed above the national median. It should also be noted that both ASU and the UA also outperformed the national median in terms of number of patents issued during FY2011 (see **Figure 4**). These data indicate that there is a strong entrepreneurial climate in Arizona, which would likely be further nurtured if the goals of institutional revenue generation (e.g., licensing revenues) were minimized.

Figure 4

FY 2011 Start-up Companies and Issued Patent Data
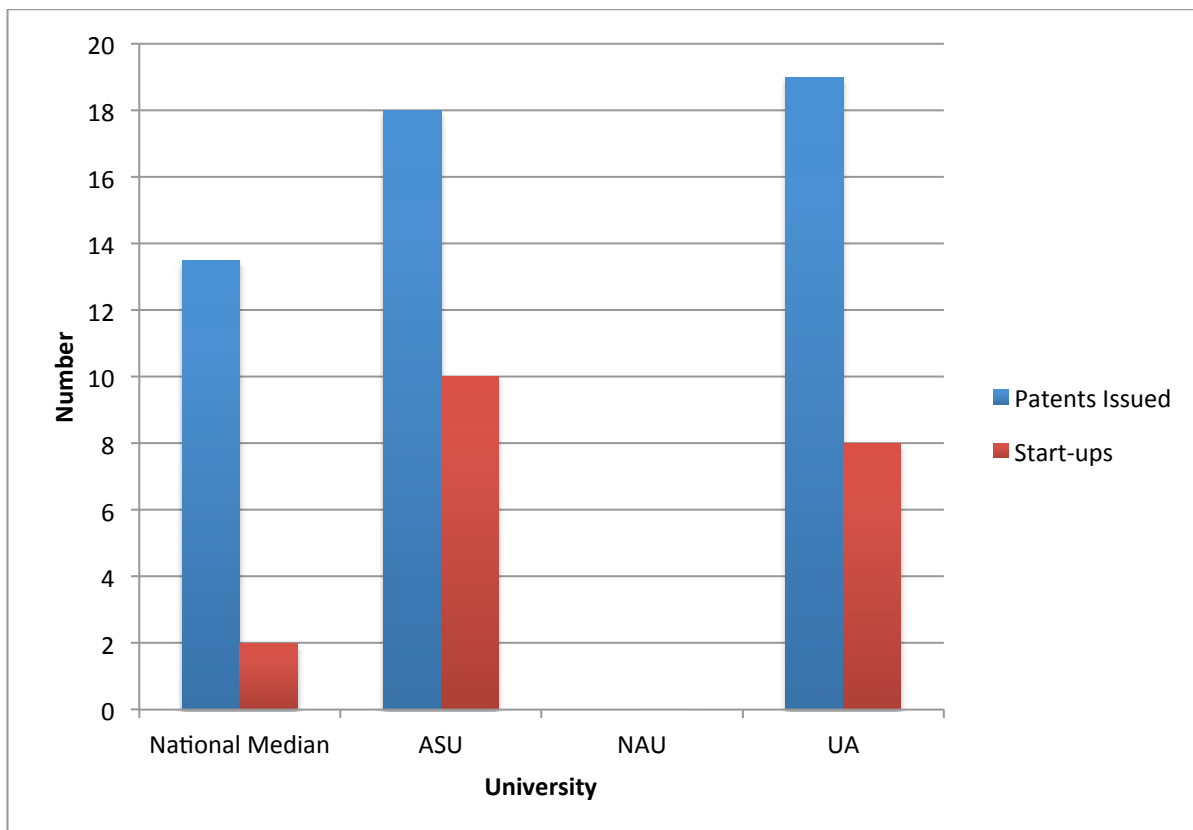
In terms of research expenditures, 0.3 new ventures were created for every $10 million spent on research by ASU and 0.1 start-up companies were created for every $10 million the UA spent on research.

Put differently, one company was formed for every $33 million of research expenditures at the ASU and one company was launched for every $100 million of research expenditures at the UA (see **Figure 5**). These numbers reflect a level of entrepreneurial performance that is far from optimal.

Figure 5

Million $'s of Research Expenditures per University Start-Up
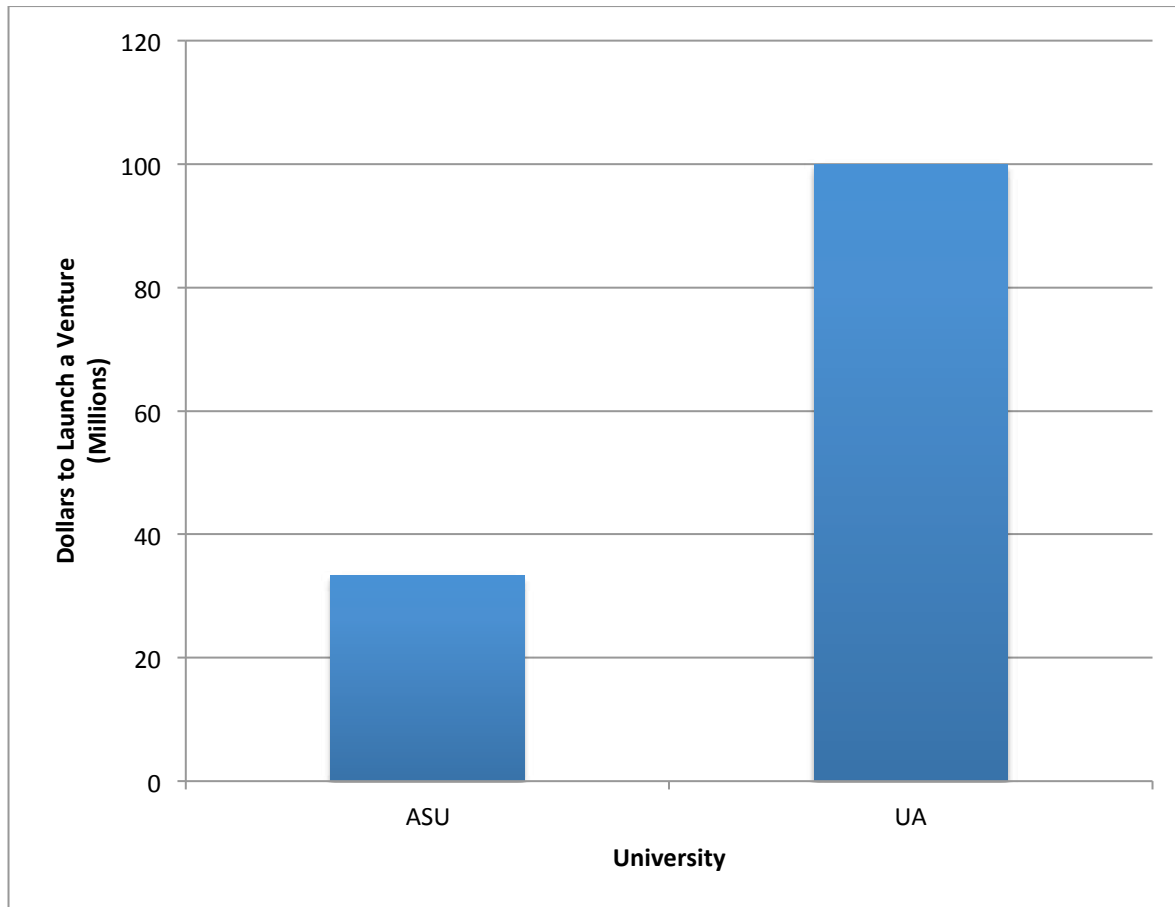
The impact of university start-up activities should be considered beyond just the numbers of companies created. In particular, what are the long-term contributions of university start-ups to communities and the statewide economy?

No concrete data is available at this time that directly speaks to this question. There are, of course, anecdotal examples that indicate the likely social and economic impacts of select Arizona university start-ups are profound. For example, Ventana Medical Systems, Inc., a cancer diagnostic company that spun out of the UA in 1987, annually manufactures over 200 cancer diagnostic tests that contribute to the treatment of approximately four million patients worldwide each year (AZBio, 2013). Furthermore, the company has 1,500 full-time employees in the U.S. (Ventana Medical Systems, 2013).

A second example of a university start-up company is Fluidic Energy, which was recently launched out of ASU with the help of development funding from the U.S. Department of Energy. Fluidic Energy designs, manufactures and globally distributes batteries that are cheaper to make, have higher density, and offer significantly longer run times than

conventional batteries. Currently, this venture is based in Scottsdale, AZ. According to Fluidic Founder and ASU Associate Professor of Materials Science Cody Friesen, the company is creating "high-tech jobs, high paying jobs locally in Arizona" (ASU, 2013a).

Unfortunately, success stories like Ventana and Fluidic Energy are the outliers. Instead, there exists a high level of uncertainty that comes from the high failure rates that generally accompany entrepreneurial activities and the relative likelihood that successful ventures will be sold to or merged with larger companies that are headquartered outside of the state or country. This same uncertainty was reflected in the 2009 OECD report, which concluded that the migration of biotechnology commercialization activities out of Arizona should be expected. While the report was specific to the UA, the following concluding remark is relevant to all three state universities: "Given the fact that the national pharmaceutical industry is concentrated in Southern California and New England, it can also be expected that much of the current [technology transfer] activity [in the areas of biotechnology] involves commercialization outside of… the state of Arizona, hence benefiting other regions" (OECD, 2009; p. 144). It should also be noted that while Ventana medical continues to operate in Tucson, the Roche Group, a global biotechnology company, acquired it in 2008.

Regardless of the questions just raised over the general performance of technology transfer activities in the state, all three public universities continue to frame technology transfer as an institutional priority. For example, ASU lists *entrepreneurial activity* as the third of eight design aspirations that together frame the university's vision of *The New American University*. The entrepreneurial activity aspiration reads, "ASU inspires innovation. We harness knowledge for innovation and create purposeful ventures. We are entrepreneurial as individuals and as an institution" (ASU, 2013b). This description clearly indicates technology transfer is positioned near the core of ASU's current mission and ongoing vision. In laying out the university's current strategic plan, NAU President Dr. John D. Haegar stated, "the university is an engine of prosperity and innovation… we can apply, and in some cases commercialize, our academic inventions" (Haeger, 2013). Finally, the UA recently launched a new organizational unit under the title *Tech Launch Arizona (TLA).* The UA created TLA "to advance UA discoveries into intellectual property, inventions and technology… TLA will move knowledge and inventions developed by students and faculty into the market with the primary goal of unifying UA researchers and the business community to significantly enhance the impact of university research, technological innovation, and technology park assets" (UA, 2013).

> Considering the continued institutional investment in technology transfer, the time is right for all three Arizona public universities to consider experimentation with alternative models that break free from conventional profit-based performance standards.
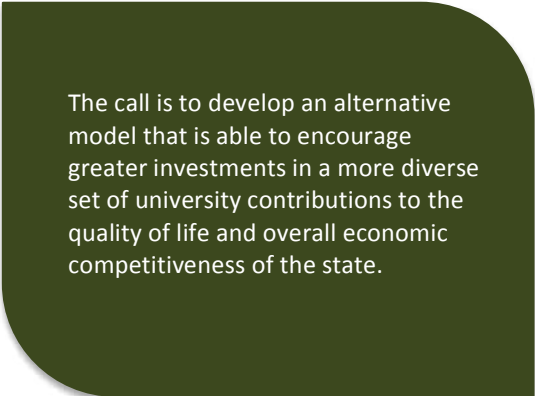
Alternative Models of Technology Transfer. Considering the continued institutional investment in technology transfer, the time is right for all three Arizona public universities to consider experimentation with alternative models that break free from conventional profit-based performance standards. In fact, the challenges of technology transfer and university-spawned entrepreneurship at the national level has resulted in the call for rethinking how university technology transfer is oriented and evaluated. For example, Powers and Campell (2010) proposed evaluation changes that would place less focus on short-term, profit measures and more on medium to long term innovation and capacity building. Under such a model, indicators of community and economic capacity building would displace monetary performance measures. The potential for this alternative evaluation standard is also reflected in the ongoing development of AUTM's "Better World Project." This global project seeks to advance the understanding that broad "impacts" of innovation are more compelling than the limited monetary gains that currently frame university technology transfer performance.

Consistent with the discussions that are taking place at the national level regarding new ways of thinking more broadly about what constitutes technology transfer, the three Arizona public universities should also explore how technologies is being transferred to society. Such explorations should leave open the possibility of assessing technology transfer activities in ways that extend beyond profit measures and are more inclusive of non-monetary contributions to community and economic capacity building. Accordingly, the argument is not for the universities to divest in technology transfer. Instead, the call is to develop an alternative model that is able to encourage greater investments in a more diverse set of university contributions to the quality of life and overall economic competitiveness of the state.

> The call is to develop an alternative model that is able to encourage greater investments in a more diverse set of university contributions to the quality of life and overall economic competitiveness of the state.

Beyond a recalibrated set of performance metrics, an alternative technology transfer model should account for a wide continuum of activities that range from low to high technologies. The current model is aimed almost exclusively at the most sophisticated discoveries that have high forecasted market values. Previously described standard performance figures indicate very few, if any, large scale commercial successes are ever achieved. Furthermore, high technologies are often slow to come to market due to research and development requirements. This is especially true of medical technologies and pharmaceutical therapies that require lengthy trials and extensive FDA approval processes. The combination of slow movement to market and high rates of commercial failure stifles the contributions of the universities to the development of the state's economy and the well being of its citizens and communities. By broadening the efforts to transfer less complex technologies that stand to make meaningful contributions to the health and wellness of Arizona, the high risk and slow to market pace that accompany more sophisticated technologies would be offset.

A technology transfer model that is based at least in part on the principles of social entrepreneurship would be one approach to folding in less sophisticated technologies that have high potential for community impact and economic development, but low institutional profit potential. Consider, for example, mobile health (mHealth) technologies that capture and track human behaviors and health-related data, which are now being developed on many university campuses. The potential social impact of these applications is significant based on the abilities to at a low cost provide medical practitioners and public health experts with individual and group wellness data. These data, for example, would be useful to practitioners who counsel individuals on leading healthier lifestyles, as well as to public health officials who are developing programs to counter the obesity epidemic that is disproportionately affecting lower income populations both in Arizona and across the country.

Many of these software technologies rely on portable technologies (i.e., smart phones, SMS devices) that are becoming increasingly available to lower income populations both domestically and globally. Thus, the potential scope and scale of impact is significant. Transferring the technology into the community through a non-commercial channel is likely to be the most immediate and effective application route. Unfortunately, the pursuit of a non-commercial distribution strategy does not align with the market-based metrics of the current technology transfer model and would therefore not be considered in the standard performance metric. Thus, these are mHealth technologies are not strong technology transfer candidates.

An alternative model that would account for entrepreneurial activities that are more socially oriented, such as mHealth technologies, would help balance the rigidity and narrowness of the conventional technology transfer model. This alternative model would include incentives to award the movement of technologies with high forecasted social and/or economic impact, but low institutional profit potential. These incentives would be particularly compelling to professors who are by and large driven by motives that transcend financial profit. In particular, tenure and promotion decisions partially consider service and contributions to the community. Professors are, however, not awarded for participation in the mainstream entrepreneurial activities that underpin the current technology transfer model. In short, a technology transfer model that accounted for social entrepreneurship would have the potential to expand university contributions to the entrepreneurial environment and overall community and economic development of Arizona.

Universities and colleges are first and foremost academic institutions that possess vast intellectual resources. Such resources are effective in attracting and training the entrepreneurial talent that is critical for both community development and economic competiveness.

Entrepreneurial environments also directly benefit from the distribution of knowledge and innovation that is achieved through student pipelines. In fact, the idea of counting students as unit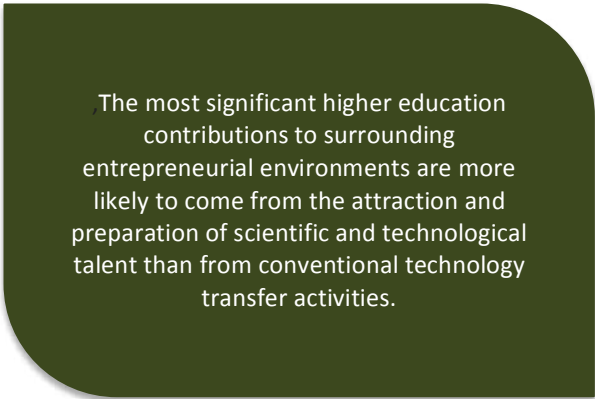s of technology transfer is not unheard of. For example, Stephan (2009) argued graduates of STEM programs are highly effective in transferring innovation from the university laboratories where they were trained to the

companies where they work. Universities and colleges are first and foremost academic institutions that possess vast intellectual resources. Such resources are effective in attracting and training the entrepreneurial talent that is critical for both community development and economic competiveness.

Indeed, the most significant higher education contributions to surrounding entrepreneurial environments are more likely to come from the attraction and preparation of scientific and technological talent than from conventional technology transfer activities. However, Arizona investments in the development of human capital in the science and technology fields are relatively low when compared to other states. For example, the Milken Institute, a nonpartisan think tank with the mission of promoting economic solutions to global social problems, ranked Arizona 32nd in terms of human capital investments in scientific and technological fields (Milken Institute, 2011). Accordingly, investments in Arizona higher education that are intended on stimulating entrepreneurial growth should more generously support STEM education.

PUBLIC/PRIVATE PARTNERSHIPS

Public-private partnerships that involve universities and colleges can make notable contributions to statewide community and economic development, as well as enhance the overall entrepreneurial environment in Arizona. For example, consider ASU's collaboration with the Mayo Clinic in Arizona, which began in 2002. This partnership provides specialized training programs for ASU nursing students, (65% of whom are hired on full-time by Mayo), dual degree offerings in fields ranging from bioengineering to healthcare management, and the development of a co-sponsored innovation research fund (ASU, 2013b). This type of entrepreneurial collaboration in the area of healthcare is particularly impactful considering the specialized role of university medical centers and teaching hospitals in defining state healthcare systems. In particular, university-affiliated hospitals provide 75% of all burn care units, 62% of all pediatric intensive care units, and 61% of all level one regional trauma centers (AAMC, 2013). Furthermore, a vibrant entrepreneurial environment must be able to compete for world-class talent. A robust healthcare system, which is enabled through collaborative partnerships such as the one between ASU and Mayo, is critical to developing the high quality of life that top entrepreneurial talent demand of their communities.

> The most significant higher education contributions to surrounding entrepreneurial environments are more likely to come from the attraction and preparation of scientific and technological talent than from conventional technology transfer activities.

A second example of a public-private partnership that contributes to Arizona's entrepreneurial environment and physical climate involves NAU's Institute for Sustainable Energy Solutions (ISES). The ISES "provides society with broadly educated energy experts and new technologies, and helps shape energy decision-making in both the private and public sectors while increasing

the public's energy literacy" (ISES, 2013a). In delivering on this mission, ISES partners with both government organizations and private industry in activities that include research and development, technology transfer, business planning and analysis, training, and community outreach. An example of the service and work performed through a public/private partnership involving ISES is a recent assessment of the solar patterns and resulting energy output trends in Prescott Valley. The resulting report, which provides critical insights into the viability of solar energy systems in the Northern Arizona region, was developed through a partnership between the ISES, Arizona Public Service, and 3Tier, Inc. (ISES, 2013b). Similar to healthcare, the development of renewable energy systems that are able to create economic efficiencies is essential to the type community and economic development that is characteristic of entrepreneurial locales and regions.

The above two examples illustrate the importance of public/private partnerships to the development of robust local and regional entrepreneurial environments and a vibrant statewide economy. Traditional partnership models, which often include technology transfer transactions, nearly always involve private enterprise seeking profits based on the time and/or funds invested into joint ventures. In many cases, the socially oriented values, priorities and practices common to higher education conflict with the financially-focused goals of industry partners. A social entrepreneurship model of technology transfer would loosen the confines of institutional profit seeking and rigid IP protection policies. This loosening would allow universities to more fully concentrate on the non-monetary contributions being made to communities through technology transfer activities, while leaving profit-seeking to the private partners. As such, the cultural tensions between universities and industry would be alleviated and further collaboration would be promoted.

In general, social entrepreneurship is a strategy for making greater community investments that over time can lead to compelling returns to both the public and private sectors. The returns to the private sector, as well as to universities, would come from general improvements in the local and regional quality of life factors. Such improvements ultimately help locales and regions attract new industry and compete nationally and globally for human talent. In this regard, social entrepreneurship represents a potential middle ground between purely academic outcomes and direct financial returns.

OUTREACH ACTIVITIES

Higher education outreach is of critical importance to the economic prosperity and overall wellness of the state of Arizona. Examples of outreach efforts and activities include distance education offerings, community-based learning and research, extension services, and other various engagement models that increase institutional contributions to communities and economies statewide. The importance of institutional outreach has prompted ABOR to develop a new metric that is aimed at capturing the levels of community engagement at each of the three state universities (ABOR, 2013). This new metric, which has yet to be assigned a performance target, is placed within the third goal of 2014-2018 Arizona University System Five-Year Strategic Plan, which is specific to "Community Engagement and Workforce Impact."

This alignment between engagement and workforce development points to the importance of university and college engagement to the development of a statewide entrepreneurial environment.

Extension and Engagement*.* A primary intent of university and college outreach activities is to increase community access to knowledge and training. The most longstanding tradition of providing such outreach activities is through the cooperative extension, which was a central component of the land-grant institutional model. Cooperative extension centers on the delivery of informal workforce and professional development training and the application of university research within community- and market-based settings. Historically, extension services focused mostly on applied technological fields such as agriculture and mining. The UA is the state's only land grant institution and as such houses Arizona's formal cooperative extension within the its College of Agriculture and Life Sciences (CALS). The UA describes Cooperative Extension as "a statewide non-formal education network bringing research-based information into communities to help people improve their lives " (UA CALS, 2013).

While the Cooperative Extension model in its traditional form is limited to the UA, the other two state universities also contribute to local, regional and statewide community and economic development through extension-like initiatives and activities. For example, ASU maintains a community development office, which houses programs such as *ASU for Arizona.* Through this program, ASU has among other things provided a traffic study to help the Yuma region prepare for increased heavy transport and international travel, as well as conducted an economic development assessment for the Douglas Port of Entry (ASU for Arizona, 2013). At NAU, extension-like activities are observed through a variety of initiatives located across various university units. One example of NAU engagement that is particularly compelling is the Coconino County Sustainable Economic Development Initiative. This initiative, which is based on a public/private partnership, fosters economic development within Coconino Country in ways that promote "social equity, economic prosperity, and ecological health" (Green NAU, 2013).

Institutional engagement that reflects a spirit and intent similar to extension is also an important component of the missions and goals of Arizona community colleges. The importance of institutional engagement is commonly observed in the strategic plans and visions of a number of Arizona community colleges (see **Table 1**). Moreover, the contributions of community colleges to surrounding communities can be significant. For example, the Maricopa County Community College District generates an estimated $2.8 billion worth of annual countywide economic activity (Pelham, 2011). Similarly, a recent report indicated that the education and training provided by Pima Community College contributes over $887 million dollars to Pima County each year (PCC, 2012).

178

Table 1

Examples of Arizona Community College Commitment to Institutional Engagement and Extension-Like Activities and Initiatives

Community College/District	Statement(s)	Resource
Coconino Community College (CCC)	"CCC will build greater awareness of its services throughout the District and collaborate with community partners to promote the economic health and vitality of the County."	CCC 2012-2015 Strategic Plan Goals & Objectives (CCC, 2012)
Maricopa County Community College District (MCCCD)	"Maricopa residents will have access to college programs, activities, and events, and facilities as appropriate." "Maricopa residents will have access to courses of an avocational nature to include leisure, wellness and specialized training."	Maricopa Community Colleges Strategic Planning Guide (MCCCD, 2013)
Pima Community College (PCC)	"Strategy 4.6: Strengthen connections between the College and community."	Pima Community College Plan (PCC, 2013)

Extension and extension-like services make invaluable social and economic contributions to the state of Arizona. Indeed, such forms of university and college engagement add richness to the cultural and economic landscape of the state, which in fuels the development of a vibrant entrepreneurial environment. Traditionally, extension and extension-like services have been offered to communities free of charge. However, institutional resource constraints that have increased as a result of broader economic challenges have in some cases pushed universities and colleges toward fee-for-service outreach and extension models. Arizona universities and colleges should consider resisting this trend. Specifically, the social and economic returns on investments in extension and extension-like activities and initiatives as public service are far more compelling than are the marginal institutional profits that may be achieved through fee-for-service models.

Distance Education. An approach to increasing community access to knowledge and training is the development and delivery of high demand programs and courses via distance education. While this topic was discussed more fully in Chapter 7, some brief mention of the real and

potential contributions of distance education to the statewide entrepreneurial environment is warranted here. Specifically, distance education can be a pipeline for transferring knowledge and technology from campuses to statewide communities and key industrial sectors. The capacities to deliver high demand content through flexible instructional models opens up greater possibilities for the formation of strategic partnerships between universities and colleges, government agencies, public organizations, and private businesses. In particular, public/private partnerships enable the development of novel business models and creative methods for cost sharing and resource pooling that together promote the scalability and sustainability of high impact distance education programs. In turn, widely accessible degree and training programs will continue to contribute to the statewide capacity to attract, grow, and retain 21st century industries.

CONCLUSION

The current chapter has explored the efficacies and limitations of conventional approaches to the transfer of knowledge and expertise from Arizona public universities into local, regional and state markets. The productivity of internally directed entrepreneurship (i.e., fundraising, licensing activities) was considered along with externally focused forms of institutional engagement (i.e., outreach, extension, distance education) that make important contributions to the development of the state's entrepreneurial environment. Importantly, university technology transfer activities in the traditional sense should not be viewed as standalone proxies for institutional contributions to external entrepreneurial environments. For instance, NAU, the least active of the three Arizona public universities in the area of technology transfer, may very well contribute more to the entrepreneurial climate of Arizona through instructional programs and educational outreach than what could ever be expected through IP management and start-up company activities. Furthermore, the recognition of social impact as an entrepreneurial measure has the potential to enable universities and colleges to better facilitate innovative public/private partnerships that are central to local, regional, and statewide entrepreneurial activities. Lastly, the intellectual talents of faculty and students could be more directly weighed as entrepreneurial drivers of community and economic development.

Questions to Consider

- How might Arizona universities and colleges more purposefully position themselves to make greater impacts on the entrepreneurial climate of Arizona? And, how can this impact be assessed and demonstrated?
- How might entrepreneurial strategies and activities more effectively create value for Arizona?
- How should Arizona prioritize its entrepreneurial efforts?

REFERENCES

ASU for Arizona (2013). *Projects.* [on-line]. Accessed March 8, 2013.
http://www.asu.edu/vppa/asuforaz/projects.html.

AZBio (2013). *About Ventana.* [on-line]. Accessed March 10, 2013.
http://www.azbio.org/events/beer-and-bio-at-ventana.

American Association of Medical Colleges (2013). *What roles do teaching hospitals fulfill.* [on-line]. Accessed March 9, 2013. https://www.aamc.org/linkableblob/70248-5/data/teachhospfacts1-data.pdf

Arizona Board of Regents (2013). *The Arizona higher education enterprise.* [on-line]. Accessed March 8, 2013. https://azregents.asu.edu/ABOR%20Reports/Arizona-University-System-5-year-strategic-plan-2013-2017.pdf.

Arizona State University (2013a). *ASU spin-out develops innovative battery technology.* [on-line]. Accessed March 10, 2013. https://asunews.asu.edu/20130307_video_fluidic.

Arizona State University (2013b). *Value entrepreneurship.* [on-line]. Accessed March 10, 2013. http://newamericanuniversity.asu.edu/design-aspirations/aspirations.php#3.

Arizona State University (2013c). *Mayo Clinic and ASU: Transforming health care.* [on-line]. Accessed January 20, 2013. http://mayo.asu.edu/collaboration-history-and-timeline.

Arizona State University Foundation (2013a). *2011-2012 annual report.* [on-line]. Accessed March 10, 2013. http://asufoundation.org/s/1469/images/gid2/editor_documents/ar-endowment-infographic_2012.pdf.

Association of University Technology Managers (2011). *AUTM licensing activity survey:FY2011.* [on-line]. Accessed March 9, 2013. http://www.autm.net/FY_2011_Licensing_Activity_Survey/9920.htm.

Coconino Community College (2013). *2012-2015 strategic plan goals & objectives.* [on-line]. Accessed March 9, 2013. http://www.coconino.edu/research/Documents/2012-2015%20strat%20plan%20goals%20-%20objectives.pdf.

Council for the Advancement and Support of Education (2010). *Community college foundations.* [on-line]. Accessed March 9, 2013. http://www.case.org/Documents/WhitePapers/CCF_WhitePaper.pdf.

Green NAU (2013). *Community engagement.* [on-line]. Accessed March 9, 2013. http://green.nau.edu/programs/community.aspx.

Haeger, J.D. (2013). *Strategic planning.* [on-line]. Accessed March 8, 2013.
    http://nau.edu/President/Strategic_Plan/.

Hwang, Victor W., and Horowitt, Greg. (2012). *The rainforest: The secret to building the
    next Silicon Valley*. Los Altos, CA: Regenwald.

Institute for Sustainable Energy Solutions (2013a). *About ISES.* [on-line]. Accessed March 9,
    2013. http://nau.edu/CEFNS/Centers-Institutes/Sustainable-Energy-Solutions/About/.

Institute for Sustainable Energy Solutions (2013b). *Prescott Airport solar facility solar variability
    study.* [on-line]. Accessed March 9, 2013.
    http://nau.edu/uploadedFiles/Academic/CEFNS/Centers-
    Institutes/Folder_Templates/_Media/Prescott-Airport-Solar-Facility-Solar-Variability-
    Study.pdf.

Maricopa County Community College (2013). *Strategic planning guide.* [on-line]. Accessed
    March 9, 2013.
    http://www.maricopa.edu/stratplan/docs/StrategicPlanningGuide2012.pdf.

Milken Institute (2011). *State technology and science index home.* [on-line]. Accessed March 9,
    2013. http://www.milkeninstitute.org/tech/tech2010.taf?sub=hcic.

National Association of College and University Business Officers (2013). *Educational endowment
    earnings.* [on-line]. Accessed March 9, 2013.
    http://www.nacubo.org/Documents/research/2012NCSEFinalPressReleaseJanuary2920
    13.pdf.

OECD/Southern Arizona's Regional Steering Committee (2009). The Southern ArizonaRegion,
    United States: Self-evaluation report. *OECD Reviews of Higher Education in Regional and
    City Development,* IMHE*. [on-line]. Accessed January 19, 2013.
    http://www.oecd.org/edu/imhe/regionaldevelopment.

Owen-Smith, Jason, and Powell, Walter W. (2006). Accounting for emergence and novelty
    in Boston and Bay Area biotechnology. In P. Braunerhjelm and M. Feldman (Eds.),
    Cluster genesis: Technology-based industrial development. Oxford: Oxford University
    Press.

Pelham, V. (2011, February 10). Maricopa community colleges generate $2.8B. *Phoenix
    Business Journal.* [on-line] Accessed March 10, 2013.
    http://www.bizjournals.com/phoenix/news/2011/02/10/maricopa-colleges-generate-
    28b.html#ixzz1DhEqVFWm.

Pima Community College (2012). *Analysis: PCC boosts economy by $887 million annually.* [on-

line]. Accessed March 10, 2013. http://www.pima.edu/about-pima/reports/finance-reports/docs-general/2011-economic-impact-pcc.pdf.

Pima Community College (2013). *Initiative 4: Expand educational and workforce opportunities.* [on-line]. Accessed March 9, 2013. http://www.pima.edu/about-pima/college-plan/initiatives/initiative-4.html#4.6.

Powers, Joshua B., and Campbell, Eric G. (2009). University technology transfer in tough economic times. *Change*, 41,6:43-47.

Powers, Joshua B., and Campbell, Eric G. (2010). Fixing technology transfer. *Inside Higher Ed*, March 16, 2010.

Stephan, P. (2009). Tracking the placement of students as a measure of technology transfer. In G. Libecap (Ed.), *Measuring the Social Value of Innovation: A Link in the University Technology Transfer and Entrepreneurship Equation.* Bingley,   UK: Emerald Publishing Group, pp. 113-140.

University of Arizona (2013). *Office of technology transfer.* [on-line]. Accessed March 10, 2013. http://www.ott.arizona.edu.

University of Arizona Foundation (2013). *2011 annual and endowment report.* [on-line]. Accessed March 10, 2013. http://www.virtualonlinepubs.com/publication/?i=89874.

University of Arizona College of Agriculture and Life Sciences (2013). *Arizona Cooperative Extension: About us*. [on-line]. Accessed March 8, 2013. http://extension.arizona.edu/state/about-us.

Ventana Medical Systems (2013). *Facts and figures.* [on-line]. Accessed March 10, 2013. http://www.ventana.com/site/page?view=overview.

Contributing Authors

W. PATRICK BRYAN

W. Patrick Bryan is a doctoral student in the University of Arizona Center for the Study of Higher Education, and is a research assistant for the Arizona Medical Education Research Initiative (AMERI). He has also worked for many years in the UA Office of Early Academic Outreach coordinating many college access programs for K-12 families, and created StartNow.arizona.edu, a website that educates students, parents and counselors about college preparation in Arizona.

RANDY BURD

Randy Burd is the Assistant Vice President for Program Innovation and Associate Professor of Nutritional Sciences at The University of Arizona. His research focuses on issues related to oncology, as well as on technological strategies for improving community and public health. Both federal agencies and industry sponsors have funded Burd's research. Following earning his doctoral degree in Molecular and Cellular Biophysics from Roswell Park Cancer Institute, he completed a post-doc at Thomas Jefferson University College of Medicine where he was later appointed Assistant Professor of Radiation Oncology.

RUFUS GLASPER

Rufus Glasper has served as the Chancellor of Maricopa Community Colleges since 2003; he previously held District leadership positions for more than two decades. Dr. Glasper oversees all educational and administrative operations of the Maricopa District, which includes 10 colleges, two skill centers and multiple satellite locations. Dr. Glasper is a member of numerous organizations whose purpose is to improve higher education on local, state, national, an international levels. Active in the community, he serves on several community boards, and has received numerous leadership and advocacy awards for his commitment to excellence in education and civic engagement. Dr. Glasper earned a bachelor's degree in business administration from Luther College and a master's and advanced degrees in school business administration from Northern Illinois University, and a Ph.D. in higher education finance from the University of Arizona.

JENNY J. LEE

Jenny J. Lee is an Associate Professor for the Center for the Study of Higher Education at the University of Arizona. She has researched a range of organizational and student issues in US higher education and abroad. Dr. Lee has authored over 40 publications in these areas and her work has appeared in the top journals in the field. She is most widely known for her extensive studies on international student populations and their experiences in the US, Korea, and Mexico. She has served as an honorary visiting scholar in London and Seoul and serves on a numerous international projects and scholarly boards.

MATTHEW M. MARS

Matthew M. Mars is the Associate Dean of the Outreach College and Faculty Associate in the McGuire Center for Entrepreneurship at The University of Arizona. His research on university innovation and academic entrepreneurship has been widely published in peer-reviewed journals and as chapters in various texts. Mars has taught both undergraduate and graduate courses at The University of Arizona on topics that range from entrepreneurship and innovation to organizational theory. Mars earned his doctoral degree through the Center for the Study of Higher Education at The University of Arizona.

JEFFREY F. MILEM

Jeffrey F. Milem is the Ernest W. McFarland Distinguished Professor in Leadership for Education Policy and Reform at the University of Arizona and Director of the Arizona Medical Education Research Initiative (AMERI), a collaborative venture between the Colleges of Education and Medicine that investigates topics pertaining to medical education, diversity, climate and access to medical school. In the spring of 2012, Dr. Milem was named as a Fellow of the American Educational Research Association and in March of 2013 he received the American College Personnel Association's Contribution to Higher Education Award. He is Past President of the Association for the Study of Higher Education.

STEPHANIE MONTAÑO

Stephanie Montaño is currently an undergraduate student at the University of Arizona studying Management and Education. She plans on pursuing a graduate degree in Higher Education focusing on college access and equity for underrepresented students.

GARY RHOADES

Gary Rhoades is Professor and Director, Center for the Study of Higher Education, in the University of Arizona's College of Education, where he began as an Assistant Professor in 1986. From January 2009 to June 2011 he served as General Secretary of the American Association of University Professors, where he also served for a year on the Board of Directors of the American Council on Education. Rhoades' research (two books and articles in journals including Change, Liberal Education, Sociology of Education, Journal of Higher Education, and Review of Higher Education, among others) focuses on the restructuring of professions and institutions in higher education.

DIANA SESATE

Diana Sesate is currently a student in the University of Arizona's Higher Education Ph.D. program. After earning her M.Ed. in Higher and Postsecondary Education from Arizona State University, she served in the Department of Physics. Diana earned her bachelor's degree from Northern Arizona University in Criminal Justice.

VERNON C. SMITH

Vernon C. Smith is Chief Academic Officer and Provost at MyCollege Foundation, dedicated to providing high-quality, low-cost college degrees to students who face barriers through Portmont College at Mount St. Mary's. Previously, he served as faculty, Faculty Chair, Dean, and

Vice President of Academic Affairs at Rio Salado College, one of the Maricopa Community Colleges. Smith also serves on the Board of Directors of EDUCAUSE, a nonprofit association whose mission is to advance higher education by promoting the intelligent use of information technology.

DEBRA THOMPSON

Debra Thompson has served as Vice Chancellor for Business Services for the Maricopa Community Colleges since 2004, having joined the district in 1994 as Budget Manager and later held other financial positions. Thompson has been credited for helping the district maintain its strong financial reputation and helping the Maricopa District achieve and maintain a AAA bond rating. Prior to Maricopa, Thompson held a number of financial posts including Senior Analyst in the New York City Office of Management and Budget as well as the New York City Office of the Comptroller. Thompson holds a master's degree from the University of Massachusetts at Amherst and a Bachelor of Arts degree from the State University of New York at Binghamton. She is an active volunteer with Liberty Wildlife, Treasurer of Tempe Rotary and Chair of the Community College Business Officers Association.

BLANCA TORRES-OLAVE

Blanca Torres-Olave is a doctoral candidate of Higher Education at the University of Arizona. Her research focuses on the quality of employment for STEM degree holders and issues in international and comparative higher education. Her recent publications in the Comparative Education Review and the Higher Education Journal examine the boundaries that define academic communities in Mexico, and how these boundaries are intertwined with larger social, cultural, and geopolitical phenomena, including language, transnational movements, and national identity.

Town Hall	Date	Subject
1.*	Oct. 1962	Arizona's Tax Structure
2.	Apr. 1963	Welfare Policies & Administration
3.*	Oct. 1963	Elementary & High School Education
4.	Apr. 1964	Arizona's Water Supply
5.*	Oct. 1964	Revision of Arizona's Constitution
6.*	Apr. 1965	Gearing Arizona's Communities to Orderly Growth
7.	Oct. 1965	Public Land Use, Transfer & Ownership
8.*	Apr. 1966	Crime, Juvenile Delinquency & Corrective Measures
9.*	Oct. 1966	Higher Education in Arizona
10.	Apr. 1967	Do Agricultural Problems Threaten Arizona's Total Economy
11.*	Oct. 1967	Arizona's Tax Structure & Its Administration
12.*	Apr. 1968	Mental Health & Emotional Stability
13.	Oct. 1968	Traffic & Highways
14.*	Apr. 1969	Civil Disorders, Lawlessness & Their Roots
15.	Oct. 1969	Economic Planning & Development
16.	Apr. 1970	The Future of Health & Welfare in Arizona
17.*	Oct. 1970	Preserving & Enhancing Arizona's Total Environment
18.*	Apr. 1971	The Arizona Indian People & Their Relationship to the State's Total Structure
19.	Oct. 1971	Alcohol & Drugs—Quo Vadis?
20.	Apr. 1972	Arizona's Correctional & Rehabilitation Systems
21.*	Oct. 1972	Arizona's Heritage—Today & Tomorrow
22.*	Apr. 1973	Adequacy of Arizona's Court System
23.*	Oct. 1973	Cost & Delivery of Health Care in Arizona
24.*	Apr. 1974	Land Use Planning for Arizona
25.	Oct. 1974	The Problems of Transportation: People & Products
26.*	Apr. 1975	Responsive & Responsible Government
27.	Oct. 1975	The Problem of Crime in Arizona—How Do We Solve It?
28.	Apr. 1976	Arizona Energy—A Framework for Decision
29.	Oct. 1976	Arizona's Economy—Yesterday, Today & Tomorrow
30.*	Apr. 1977	Of, By & For the People—How Well Is It Working?
31.	Oct. 1977	Arizona Water: The Management of Scarcity
32.*	Apr. 1978	Cost & Quality of Elementary & Secondary Education
33.*	Oct. 1978	Corrections in Arizona: Crisis & Challenge
34.*	Apr. 1979	Indians & Arizona's Future—Opportunities, Issues & Options
35.	Sept. 1979	Toward Tax Reform
36.	Apr. 1980	Arizona's Transportation Dimension
37.	Oct. 1980	Toward the Year 2000: Arizona's Future
38.	May 1981	Arizona's Hispanic Perspective
39.	Oct. 1981	Arizona's Energy Future: Making the Transition to a New Mix
40.*	Apr. 1982	Crime & Justice in Arizona
41.*	Oct. 1982	Impact of the New Federalism on Arizona
42.	Apr. 1983	Postsecondary Education in Arizona
43.	Oct. 1983	The Role & Responsibilities of the News Media of Arizona
44.	May 1984	Health Care Costs
45.	Oct. 1984	County Government in Arizona: Challenges of the 1980s
46.	Apr. 1985	Growth Management and Land Use Planning in Arizona
47.	Oct. 1985	Managing Water Quality in a Water Scarce State
48.	May 1986	Social Services in Arizona: Increasing Needs—Changing Resources
49.	Oct. 1986	Arizona's Changing Economy
50.	May 1987	Culture & Values in Arizona Life
51.	Oct. 1987	Arizona's Relations with Northern Mexico
52.	May 1988	Air Quality in Arizona
53.	Oct. 1988	Civil Justice in Arizona/How Much? For Whom?
54.	May 1989	SOS: Save Our Schools . . . Save Our State
55.	Oct. 1989	Of Dreams, Deeds & Dollars . . . Achieving Better Mental Health Care in Arizona
56.	May 1990	New Directions for Arizona: The Leadership Challenge
57.	Oct. 1990	The Many Faces of Economic Development in Arizona
58.	Apr. 1991	Arizona's Taxing Choices: State Revenues, Expenditures & Public Policies
59.	Oct. 1991	Preserving Arizona's Environmental Heritage
60.	Apr. 1992	Harmonizing Arizona's Ethnic & Cultural Diversity
61.	Oct. 1992	Free Trade: Arizona at the Crossroads
62.	Apr. 1993	Hard Choices in Health Care
63.*	Oct. 1993	Confronting Violent Crime in Arizona
64.*	May 1994	Youth At Risk: Preparing Arizona's Children For Success In The 21st Century
65.	Oct. 1994	American Indian Relationships in a Modern Arizona Economy
66.	May 1995	Making the Grade: Arizona's K-12 Education
67.	Oct. 1995	Public Spending Priorities in Arizona: Allocating Limited Resources
68.	May 1996	Arizona's Growth and the Environment – A World of Difficult Choices
69.	Oct. 1996	Building a Community of Citizens for Arizona
70.	May 1997	Forging an Appropriate Transportation System for Arizona
71.	Oct. 1997	Ensuring Arizona's Water Quantity and Quality into the 21st Century
72.	May 1998	Meeting the Challenges and Opportunities of a Growing Senior Population
73.	Oct. 1998	Who Is Responsible for Arizona's Children?
74.	May 1999	Future Directions in Arizona Health Care
75.	Oct. 1999	Uniting a Diverse Arizona
76.	May 2000	Higher Education in Arizona for the 21st Century
77.	Oct. 2000	Values, Ethics and Personal Responsibility
78.	May 2001	Moving _All_ of Arizona into the 21st Century Economy
79.	Oct. 2001	Pieces of Power – Governance in Arizona
80.	May 2002	Building Leadership in Arizona
81.	Oct. 2002	Arizona Hispanics: The Evolution of Influence
82.	May 2003	Health Care Options: Healthy Aging—Later Life Decisions
83.	Oct. 2003	The Realities of Arizona's Fiscal Planning Processes
84.	Jun. 2004	Pre-K - 12 Education: Choices for Arizona's Future
85.	Nov. 2004	Arizona's Water Future: Challenges and Opportunities
86.	Jun. 2005	Arizona as a Border State -- Competing in the Global Economy
87.	Nov. 2005	Maximizing Arizona's Opportunities in the Biosciences and Biotechnology
88.	Apr. 2006	Arizona's Rapid Growth and Development: Natural Resources and Infrastructure
89.	Nov. 2006	Arizona's Rapid Growth and Development: People and the Demand for Services
90.	Apr. 2007	Health Care in Arizona: Accessibility, Affordability and Accountability
91.	Oct. 2007	Land Use: Challenges and Choices for the 21st Century
92.	Apr. 2008	Who Will Teach Our Children?
93.	Nov. 2008	Housing Arizona
94.	Apr. 2009	From Here to There: Transportation Opportunities for Arizona
95.	Nov. 2009	Riding the Fiscal Roller Coaster: Government Revenue in Arizona
96.	Apr. 2010	Building Arizona's Future: Jobs, Innovation & Competitiveness
97.	Nov. 2010	Arizona's Government: The Next 100 Years
98.	May 2011	Capitalizing on Arizona's Arts and Culture
99.*	Nov. 2011	Arizona's Energy Future
100.	May 2012	Civic Engagement
101.	Nov. 2012	Civic Leadership for Arizona's Future
102.	May 2013	Is Higher Education Ready for Arizona's Future?

ARIZONA TOWN HALL
One East Camelback, Suite 530
Phoenix, Arizona 85012
Phone: 602-252-9600
Fax: 602-252-6189 Website:
www.aztownhall.org
Email: townhall@aztownhall.org