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Executive Summary



Recognizing that universities and colleges are critical to their state's growth and economic prosperity, many governors and state policymakers have been considering how best to get more students to both enter college and get college degrees. In fact, many of the nation's governors are participating in the National Governors Association (NGA), 2010-2011 Chair's Initiative, *Complete to Compete*, which focuses on helping states improve their students' college graduation rates.

Recently, however, a growing number of governors and state policymakers have come to recognize that higher education, including community colleges, four-year colleges, and research universities, cannot help drive economic growth in their states unless students' academic success is linked to the needs of the marketplace. Thus, some governors and state policymakers are beginning to move beyond their focus on getting more students to get "degrees" to asking: "Degrees for what jobs?"

Given the longstanding independence of institutions of higher education—and their emphasis on broad liberal arts education—getting such institutions to embrace a more active role in a state’s economic development is often challenging. Yet, governors and policymakers in some states are demonstrating that state governments—through leadership, policy decisions, and funding strategies—can help higher education institutions recognize and embrace the critical role they play in preparing a state’s workforce for 21st century jobs that will enable the state to prosper in the new economy.


Governors and state policymakers in **Minnesota**, **North Carolina**, **Ohio**, and **Washington** have undertaken bold, comprehensive strategies to align postsecondary education with the state’s economic goals. In the context of their overall strategies, discussed in this report, these pioneering states have taken the following steps to strengthen universities and colleges as agents of workforce preparation and sources of more opportunity, more growth, and more competitive advantage:

- 1. Set clear expectations for higher education’s role in economic development.** Articulate the expectation that postsecondary education in the state will contribute to the success of industry and the state in a global economy by preparing a 21st century workforce.
- 2. Emphasize rigorous use of labor market data and other sources to define goals and priorities.** Ask institutions of higher education to use data on global, state, and regional labor market needs to develop courses and degree programs that prepare students for high-paying, high-demand jobs.
- 3. Encourage employers’ input in higher education.** Encourage—even incentivize—institutions of higher education to seek state and regional employers’ input about how best to ensure that students have the 21st century skills employers need.
- 4. Require public higher education institutions to collect and publicly report impacts.** Track higher educational institutions’ impact on students’ employment outcomes, workforce gaps, employer satisfaction, and state economic growth.
- 5. Emphasize performance as an essential factor in funding.** Use performance-based funding for institutions of higher education to get—and reward—outcomes aligned with state strategic goals. Award funds on a competitive basis to develop industry-oriented curricula and create new efforts to meet the workforce needs of specific key sectors.



States are taking steps to strengthen their universities and colleges as agents of workforce preparation and sources of more opportunity, growth, and competitive advantage.

I. Introduction



State institutions of higher education, including community colleges, four-year colleges, and research universities, play a critical role in preparing a skilled and educated workforce. For several years, governors and state policymakers have focused considerable attention on policies related to students' success at such institutions—how to get more students into postsecondary institutions and how to help more students graduate. In fact, many of the nation's governors are participating in the National Governors Association (NGA) 2010-2011 Chair's Initiative, *Complete to Compete*, which focuses on helping states improve their students' college graduation rates.

Yet, a growing number of governors and business leaders have come to recognize that the production of college degrees is not enough; the degrees must match the needs of the marketplace. Thus, some governors and state policymakers are beginning to move beyond their focus on getting more students to get “degrees” to asking: “Degrees for what jobs?”

The American economy is facing gale-like market forces—rapid globalization, accelerating innovation, and relentless competition. If higher education is truly going to help drive economic growth, students’ academic success must be tied to the needs of the marketplace—not only to ensure that students get jobs, but also to maximize the value of an educated workforce to the economy as a whole. Thus, governors and state policymakers are increasingly asking questions they have not asked before, including:

- How do we know that the degrees and certificates students are pursuing are the ones they will be able to use in new jobs?; and
- Are we producing degrees that provide the greatest chance of yielding the most benefit—for individuals, industry, and the state economy?

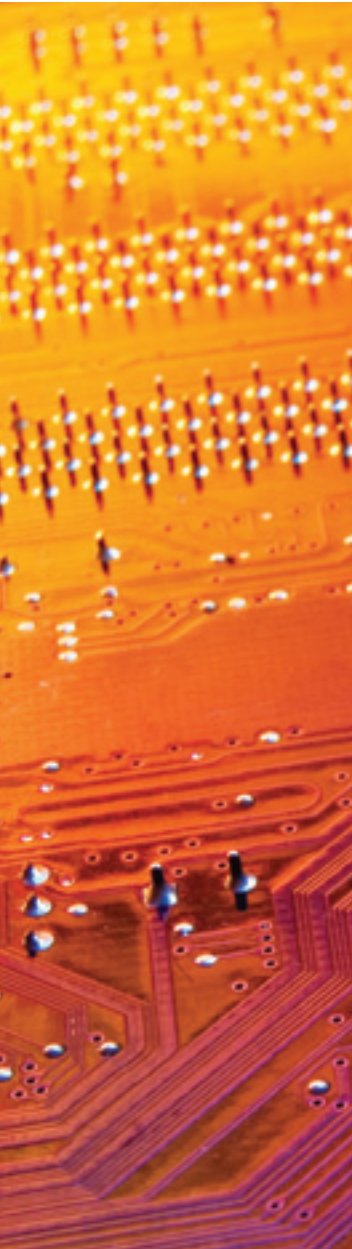
At this time of rapid change, institutions must be driven less by internal customs and more by external awareness. They must track labor markets rigorously and respond to market changes quickly. And they must focus on *outcomes* like employment success and regional economic competitiveness, not only on outputs like enrollment growth and completion of educational programs.

State governments control nearly two-thirds of all higher education funding in the United States.¹ This report is a guide to what governors are doing—and can do—to better align the priorities of institutions of higher education with the needs of students, industries, and states competing in the global, knowledge-based economy.



How do we know that the degrees and certificates students are pursuing are the ones they will be able to use in new jobs?

II. Keeping Up with Change



The next decade is likely to be one of the most disruptive in American history. Given the state of the economy, it perhaps is not surprising that turbulence lies ahead. But the Great Recession and financial crisis are part of a much deeper set of trends that are working together, often at warp speed, to create a powerful new reality. The deeper trends are, of course, rapid globalization, accelerating innovation, and relentless competition.

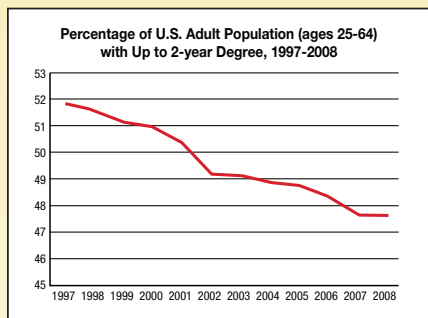
Recession or not, these three forces are dramatically raising the bar for performance in America today. As a result of these forces, a number of routine tasks that once characterized middle class work have either been eliminated by technological improvements or are now conducted by low-wage but highly skilled workers in other countries. They are driving technological changes that lead to 80 percent of the technology we operate being obsolete within 10 years and replaced with new, more advanced technologies.²

They are creating pressure on industries, companies, and workers to shift toward sectors of the economy where innovation, imagination, and critical thinking—knowledge, that is—are the building blocks of adding value and creating wealth. (Figure 1.)

At the same time, the three forces—globalization, innovation, and competition—have intensified what economist Joseph Schumpeter called the forces of “creative destruction.” Decades-old institutions can disappear overnight, while new companies spring up from nowhere. Whereas it took 20 years to replace one-third of the Fortune 500 companies in 1960, it took just four years to accomplish this task in 1998.³

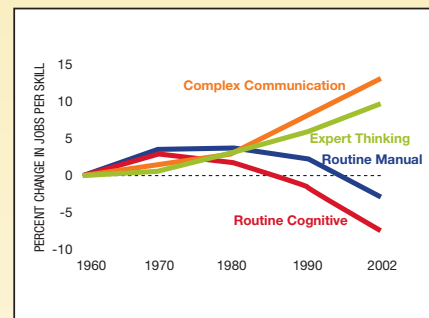
FIGURE 1: In a Changing World, the Economy Can't be an Afterthought

As Educational Attainment Lags...



For the first time, America's younger generation has attained the same or less education than their parents' generation.

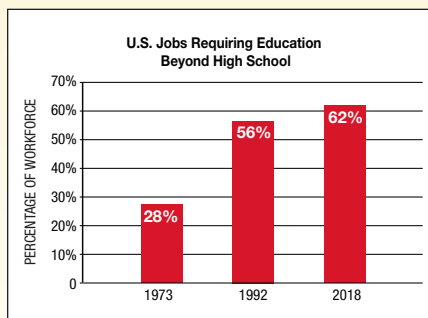
Skill Requirements Increase...



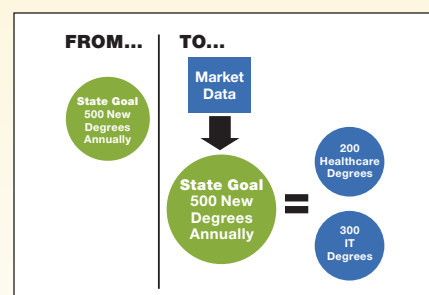
More work shifts to be more creative and less routine.

The Economy Can't Be an Afterthought for Workers or Students

More Degrees are Important.



But Some Degrees are More Valuable Than Others.



A degree is better than no degree, but degrees that do not fit the job market and raise the standard of living will not lift the economy.

Source: OECD; Council on Competitiveness; Center on Education and the Workforce, Georgetown University; <http://www.oecd.org/dataoecd/45/39/45926093.pdf>

At all times, but especially in this environment, ensuring that the workforce is adequately prepared is a big challenge.

- How do we prepare a workforce when an industry can be here one year and gone the next—either through creative destruction or through offshoring?
- Even if we know, as many have noted, that innovation, entrepreneurialism, and the sheer generation of new ideas are increasingly the essential elements required to enhance productivity and create jobs in all economic sectors, how do we prepare an entire workforce to be more entrepreneurial and creative?
- How do we prepare a workforce for an industry that has positions and responsibilities that do not fit into our current industrial or occupational classification systems (e.g., green jobs)?

Signs of Not Keeping Up

Currently, businesses and states are not getting the talent they want—and students and job seekers are not getting the jobs they want. There are problems with quality. For instance, employers responding to a recent survey estimated that 40 percent of college graduates available to them do not have the necessary applied skills required to meet their needs.⁴ Almost one-third of U.S. manufacturing companies say they are suffering from some level of skills shortages.⁵ There are also problems with quantity. In the health sector, for instance, there is a shortage of nurses. Of the 50 states, 46 face nursing shortages, ranging from a shortage of 200 nurses in Alabama to a shortage of 47,600 in California in 2010.⁶ Even though shortages exist in such well-paying jobs as nurses and manufacturing, over 30 percent of American college graduates between the ages of 25 and 29 are currently working in low-skilled jobs.⁷

Currently, businesses and states are not getting the talent they want—and students and job seekers are not getting the jobs they want.

The result is that the U.S. has a mismatch between the skills employers need and the degrees and certificates students receive. Narayana Kocherlakota of the Minneapolis Federal Reserve Bank calculates that if we had a normal match between the skills workers possess and the skills employers require, then the U.S. unemployment rate would be 6.5 percent instead of 9.6 percent.⁸

The future does not look much better. By 2018, it is estimated that the United States will come up at least 3 million postsecondary degrees short of employers' demands.⁹ Human resources executives indicate very high talent shortages in the United States in technology, trade, financial services, real estate, health care, and education by 2030. Of 10 countries (including China, Brazil, India, and the United Kingdom), the United States faces the second most pressing talent gap across 10 sectors of the economy after Japan.¹⁰ And perhaps even more disturbing, as Figure 2 shows, the U.S. is far behind many competitor countries when it comes to degree attainment among young adults.¹¹

The trends are challenging, but governors and other state leaders can make a difference. Even in the current economic environment, policy makers can lead their states toward competitiveness in the knowledge economy by marshaling the immense capacity of their state's colleges and universities to create high-skill workers of all kinds in key, high-growth sectors of the economy where businesses have very specific and changing labor needs.

FIGURE 2: Comparison of the U.S. States with Other OECD Countries* in the Percentage of Young-Adult (Ages 25-34) Postsecondary Degree Attainment



*The OECD (Organisation for Economic Co-operation and Development) is an international organization of the 30 most economically advanced countries.

**Average attainment of states in this percentage range.

Source: OECD Education at a Glance, 2010; U.S. Census Bureau: American Community Survey.

III. Doubling Down on Policy

Right now, most states have their attention on student access, student achievement, and degree completion in colleges and universities. To ameliorate problems, states have been creating—largely through their education systems—an entire infrastructure for boosting students' likelihood of succeeding in and graduating from college. But the changes we need do not end there. A new era of educational strength and economic competitiveness lies not only in colleges and universities getting more Americans into—and successfully out of—college, but also in colleges and universities helping create new, good paying jobs in the economy and getting workers—both young people and working adults—ready for those jobs.

The challenge then is to “double down” on higher education policy—one track for more students and more degrees, the other for better jobs and better workers. Table 1 presents a policy framework to guide—and link—the two agendas. Policy Agenda 1.0, focusing on student access and degree completion, seeks to get more students into and through the higher education pipeline. Policy Agenda 2.0 seeks to ensure that new degree holders—as well as the existing workforce, many of whom lack degrees—find high-quality, knowledge-intensive jobs within the state. A large part of ensuring a fertile environment for new and innovative industries, and the well-paying jobs they bring, is for universities and colleges to strategically match students, degrees, skills and research to an innovation economy, as well as to state and national economic development efforts to develop and revitalize key industry clusters.



With globalization encouraging businesses to extend their ties beyond local areas, universities and colleges must contend with the reality that they can attract and hold businesses by offering them worker training, world-class research and flexible relationships in a way that is specific and responsive. This undeniable fact requires states to devote more time and attention to the whole arena of universities' and colleges' role in workforce education and economic development.


Together, these two policy agendas address this important economic principle: Any higher education degree is better than no degree, but degrees that do not fit the both increasingly globalized and increasingly knowledge-based job market and raise the standard of living will not lift the economy. Pursuing both policy agendas simultaneously may eventually gather enough collective momentum to usher the United States into a new era of educational strength and economic growth.

Policy Agenda 2.0 focuses on the contributions of colleges and universities in creating new, good paying jobs and making sure workers are ready for those jobs.

TABLE 1: Doubling Down On Higher Education Policy To Generate Economic Growth: Policy Agendas 1.0 And 2.0

Policy Agenda 1.0: Getting more Americans into—and successfully out of—college			
	THE CHALLENGE	KEY POLICIES	NGA RESOURCES
College Access	<p>The United States has fallen from 1st to 8th place in the OECD in the fraction of 25- to 34-year-olds that has graduated from high school.¹²</p> <p>By 2018, America will need 22 million more new workers with college degrees—but will fall short of that number by at least 3 million postsecondary degrees.¹³</p>	<ul style="list-style-type: none"> ■ Target financial aid for low-income students; ■ Recruit and prepare more high school students for Advanced Placement, dual enrollment, and International Baccalaureate; ■ Upgrade K-12 standards in math and language arts; ■ Use data systems that link high school, college, and workforce outcomes. 	<p><i>Achieving Graduation for All: A Governor’s Guide to Dropout Prevention and Recovery</i>¹⁴</p> <p><i>Setting Statewide College- and Career-Ready Goals</i>¹⁵</p>
Degree Completion	<p>More than half of all college students drop out of school before earning a degree or credential.¹⁶</p> <p>Community colleges have an average degree-completion rate of about 22 percent for full-time students and 15 percent for part-time students.</p>	<ul style="list-style-type: none"> ■ Set degree completion goals for colleges and universities; ■ Use new technologies and delivery models to guide toward enhanced learning and completion; ■ Accelerate pace of credit accumulation; ■ Reduce time to degree. 	<p><i>Complete to Compete: Common College Completion Metrics</i>¹⁷</p> <p><i>Increasing College Success: A Road Map for Governors</i>¹⁸</p> <p><i>Measuring Student Achievement at Postsecondary Institutions</i>¹⁹</p>
Policy Agenda 2.0: Creating new, good paying jobs in the economy and making workers ready for those jobs			
	THE CHALLENGE	KEY POLICIES	NGA RESOURCES
Workforce Preparation	<p>Nearly 8 in 10 new jobs will require workforce training or a higher education degree by the end of this decade.</p> <p>In 2006, only 37 percent of U.S. adults aged 25-64 had an associate’s degree or higher, while the best performing countries averaged 55 percent of their adult workforce. In order to match these rates of degree attainment by 2025, the U.S. will need to add over 63 million degree recipients to its adult workforce.²⁰</p>	<ul style="list-style-type: none"> ■ Refocus higher education missions; ■ Use labor market data to set priorities; ■ Integrate industry input into curriculum design; ■ Track employment outcomes and industry satisfaction. 	<p><i>A Sharper Focus On Technical Workers: How to Educate and Train for the Global Economy</i>²¹</p> <p><i>Degrees for What Jobs? (This report, and Table 2 specifically)</i></p>
Economic Development	<p>More than 70 percent of American economic growth since 1945 has been driven by technological innovation.</p> <p>In 2006, universities were the source of over 70 percent of <i>R&D Magazine’s</i> top 100 “most technologically significant new products,” while private firms were the source of about 25 percent.²²</p>	<ul style="list-style-type: none"> ■ Invest in university R&D that promotes state economic growth; ■ Cultivate ties between academic researchers and local entrepreneurs; ■ Reward faculty for innovation, entrepreneurship, and company formation; ■ Emphasize technology transfer activities. 	<p><i>Investing in Innovation</i>²³</p> <p><i>Cluster-Based Strategies for Growing State Economics</i>²⁴</p>

IV. Policy Agenda 2.0 for Higher Education: Workers and Jobs



How universities and colleges can support workforce preparation and job creation has increasingly been attracting the attention of both policymakers and industry leaders. How should universities and colleges respond to these new challenges? What should we expect of them? What should they expect of themselves?

Presently, a great deal of attention is being paid to the job creation questions, as states increasingly define universities as “engines of innovation” and invest public dollars to encourage universities to partner with industry to create new technologies, new businesses and new industries. (See Box A - State Policy, Universities, and the Competitiveness of States.) A well-functioning workforce system, particularly at the national scale, however is an element that has rarely been pushed to the fore of the higher education policy agenda.

Major efforts to address the contribution of universities and colleges to workforce preparation are underway—including efforts from the Obama Administration, Lumina Foundation for Education, and the NGA Center itself. Three states—**Minnesota, Indiana, and Utah**—are now working with Lumina Foundation for Education on a “tuning” initiative to develop common learning outcomes across a total of six fields.²⁵ And there are countless examples of community colleges and four-year colleges or universities across the country working closely with employers to provide custom training programs for employees. The Automotive Manufacturing Technical Education Collaborative (AMTEC), which began as a collaboration between Toyota and the **Kentucky** Community Technical College System, brings together auto manufacturers and community



A bold new vision for workforce development requires rethinking the way training has traditionally been done at public colleges and universities.

BOX A: State Policy, Universities, and the Competitiveness of States

States have significant control over a wide variety of policies associated with economic competitiveness. Colleges and universities are central to most of those policies.

Developing Talent

States have most of the money and most of the power to educate the talented people who work in our industries, businesses, and civic sectors—about three-quarters of all undergraduates are educated at *public* universities and community colleges.

Supporting Universities

States have most of the responsibility for research universities and research institutions—the places where much of the research and development that benefits this country is conducted.

Establishing Market Signals

States have authority to set policies and provide incentives that generate the market pull for new products and services for sectors across the economy (e.g., green products and services and health care).

Investing in Research and Development (R&D)

States have their own R&D funds and are making major investments in renewable energy, alternative vehicles and nanotechnology, etc. and increasingly using these investments to push new ideas to the market place, create new firms, and build-up capacity tied to the needs of regional industries.

Scaling Up Industry Collaboration

States are “pioneers” in cluster-based economic development, giving them strong partnerships for engaging all sorts of industry clusters (e.g., information technology, construction and real estate, biotechnology) in strategies to innovate together, support ambitious transdisciplinary initiatives, and build infrastructure that creates economic value for a critical mass of firms.

colleges across 12 states to identify and implement wide-ranging improvements in technical education for automotive manufacturing workers.²⁶ (See NGA Center report *A Sharper Focus on Technical Workers: How to Educate and Train for the Global Economy*.²⁷)

Although these undertakings are impressive, they are still not the systemic and comprehensive policy agenda that can ensure a stronger, 21st century foundation for economic growth. What does that reform look like?

Table 2, Workforce Development Reform, lays out the basic principles for overhauling approaches to workforce development. It suggests that a bold new vision for the role of colleges and universities in workforce development involves:

- Everyone from the governor down to students must have access to better information about what employers need, rather than simply relying on anecdotal information about jobs.
- This information must be used to shape curricula and degrees so that the most needed skills are taught and learned.
- Incentives—and success—must be based not just on increasing enrollments or even completion of degrees, but also on the contribution of postsecondary education to the state and/or region's economy.

At first glance, the current global economic crisis would not appear to be a good backdrop against which governors and their policymakers could

TABLE 2: Workforce Development Reform: Moving from Traditional Higher Education to Higher Education Aligned with State Economic Needs


TRADITIONAL HIGHER EDUCATION	ALIGNED HIGHER EDUCATION
Colleges and universities use limited, often anecdotal information on the workforce needs of industries that hire their graduates.	A regular system of quantitative and qualitative information on the labor market and changing employer needs provides dynamic, reliable measures of demand and supply, with a focus on high-wage, high-skill occupations by region.
Colleges and universities base curricula decisions on the expertise and interests of faculty, the interests of students, and other internal factors.	Universities and colleges develop new programs and revise existing programs in response to industry input and labor market information .
Students and faculty have limited interaction with employers .	Students and faculty engage with industry through internships, cooperative education, research opportunities , and faculty externships.
Measures of success are focused on the enrollment in and completion of educational programs by students.	Measures of success include those relating to students' employment after graduation and on the ability of the college and university to meet employer needs and state economic and strategic goals.
Students have inadequate, limited information about the labor market , limiting their ability to make informed major/certificate choices.	Students, through improved information on the labor market and changing employer needs and through internships and cooperative education, are able to make informed decisions about their education and career choices.

initiate a new policy agenda for university and college education. Yet times of economic crisis are often the moments of greatest opportunity for “rethinking” of all kinds, and today is no exception. Indeed, during the current economic downturn, President Obama has called for a “fundamental rethinking of our job training, vocational education, and community college programs.”²⁸ The President has urged every American to acquire at least one year of postsecondary education or training.

In the current economic environment, everyone—educators, employers, job seekers, students and policy makers—will have to take a big leap forward

in external awareness and in adaptability. Education institutions, for example, will need to offer real-world curricula, developed collaboratively with the relevant industries, so that the skills being taught are precisely those that the industry needs. Industries other than those interested in more science, technology, engineering and math (STEM) degrees will need to invest in and be engaged in employee training and education. Individuals will need to be more globally-aware when they make their degree and career choices. And states, for their part, will need to overhaul their familiar approaches to workforce development.

V. What Governors Can Do to Align Higher Education with State Economic Goals



Given the traditional independence of institutions of higher education—and their long-established emphasis on broad liberal arts education—getting such institutions to embrace a more active role in workforce development will not be easy. Nevertheless, the experience of a few pioneering states suggests that it is possible to get such institutions to set priorities that reflect the needs of industry and the state in the new global economy. The key is to follow five action steps.

This report focuses on four states that have undertaken bold, comprehensive strategies to align postsecondary education with state economic goals:

Minnesota—Operating under a series of initiatives by former Governor Tim Pawlenty and others, Minnesota’s postsecondary education system is placing a high priority on state and regional economic competitiveness.

North Carolina—At the urging of former Governor Mike Easley, the University of North Carolina (UNC) created a strategic plan called UNC Tomorrow. The UNC Tomorrow plan, which has been expanded under current Governor Bev Perdue, calls on the UNC system to be more “demand-driven,” focusing on the education and skills needed by the state’s key industries.

Ohio—Former Governor Ted Strickland, under his TurnAround Ohio initiative, catalyzed significant reforms to postsecondary education—especially to the mission, governance structure, funding formulas, and accountability mechanisms.

Washington—Under a 2008 law enacted by the Washington legislature and Governor Chris Gregoire, several state agencies responsible for higher education and workforce development are working together to assess the type and number of higher education and training credentials necessary to match forecasted employer demands for skilled workers. Moreover, Washington’s new master plan for postsecondary education calls for better alignment of higher education in the state with the state’s economic development goals.

In the context of their broader strategies to align postsecondary education more closely with the state’s economic objectives, these four states provide five steps for governors to keep in mind as they pursue reforms in their states:

- 1. Set clear expectations for higher education’s role in economic development.** Articulate the expectation that postsecondary education in the state will contribute to the success of industry and the state in a global economy by preparing a 21st century workforce.
- 2. Emphasize rigorous use of labor market and other data to define priorities.** Ask institutions of higher education to use data on global, state, and regional labor market needs to develop courses and degree programs that prepare students for high-paying, high-demand jobs.

Four states –
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and **Washington** –
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- 3. Encourage employers' input in higher education.** Encourage—even incentivize—institutions of higher education to seek state and regional employers' input about how best to ensure that students have the 21st century skills employers need.
- 4. Require higher education to collect and publicly report impacts.** Track higher educational institutions' impact on students' employment outcomes (e.g., wages and employability), workforce gaps, employer satisfaction, and state economic growth.
- 5. Emphasize performance as an essential factor in funding.** Use performance-based funding for institutions of higher education to get—and reward—outcomes aligned with state strategic goals. Plus, award funds on a competitive basis to develop industry-oriented curricula and create new efforts to meet the workforce needs of specific key sectors.

Although Minnesota, North Carolina, Ohio, and Washington are the focus of this report, many other states have undertaken notable initiatives. Thus, descriptions of actions taken in other states (e.g., Michigan and Florida) are sometimes used in this report to supplement the examples from the other four states.

ACTION 1

Set Clear Expectations for Higher Education's Role in Economic Development

Articulate the expectation that postsecondary education in the state will contribute to the success of industry and the state in a global economy by preparing a 21st century workforce.

Setting clear goals for postsecondary institutions is the first important action a state can take and, of course, there is no better “bully pulpit” for setting goals than the governorship. As described below, **Washington, Ohio, and North Carolina**—using somewhat different tactics, but with the strong support of the governor in each case—undertook strategic planning processes that gave their universities and colleges clear goals for contributing to the success of industry and the state in a global economy.

Washington State's Strategic Plan for Higher Education

In 2006, **Washington** State's decennial strategic master plan for higher education set two important goals for higher education in Washington—which, again, combine traditional student achievement goals with economic development goals:

- To create a quality higher education system that provides expanded opportunity for more Washingtonians to complete postsecondary degrees, certificates, and apprenticeships; and
- To create a higher education system that drives greater economic prosperity, innovation, and opportunity.

The Washington plan also calls for incentives and accountability programs that reward higher education institutions for achieving the goals in the plan. The Washington State Board for Community & Technical Colleges is already piloting the funding methodology, the details of which will be discussed later in this report, but the goals to be achieved are instructive to other states. The goals are as follows:

- **Economic demand:** Strengthen state and local economies by meeting the demands for a well-educated and skilled workforce.

- **Student success:** Achieve increased educational attainment for all residents across the state.
- **Innovation:** Use technology, collaboration, and innovation to meet the demands of the economy and improve student success.

Ohio's Strategic Plan for Higher Education

In 2007, when **Ohio** Governor Ted Strickland made higher education central to his TurnAround Ohio economic development initiative, he quickly recognized a need to restructure governance of the state's higher education system. He took two structural steps. First, he made the chancellor of the Ohio Board of Regents a member of the governor's cabinet. Second, he consolidated all public higher education institutions into the "University System of Ohio."

Subsequently, Governor Strickland and other state policymakers set out to more tightly link the mission of higher educational institutions in Ohio to the state's economic competitiveness and prosperity. In 2008, the Ohio Board of Regents used Ohio's legally required Strategic Plan for Higher Education as a vehicle for this purpose.

In 2008, for the first time, Ohio's strategic plan for higher education laid out an overarching vision for the University System of Ohio—namely, to "increase the state's economic competitiveness in the nation and the world" by providing "transformative leadership."²⁹ Related efforts included the following:

- The University System of Ohio created distinctive missions for each of the 13 universities—so they will not be competing against each other—establishing Centers of Excellence at each that will contribute to growth in high-wage, high-skills jobs.

- Governor Strickland encouraged greater collaboration between the new University System of Ohio and the Ohio Department of Development.
- The strategic plan called on the University System of Ohio to be more responsive and flexible in serving the needs of businesses in training incumbent workers.

North Carolina's Strategic Plan for Higher Education

In 2007, at the urging of **North Carolina** Governor Mike Easley, the University of North Carolina (UNC) system undertook an extensive planning process called UNC Tomorrow to develop a vision and strategy for increasing the UNC system's role in economic development.³⁰ (The UNC system was already centralized, with all 17 campuses reporting to a single board.)

The UNC Tomorrow planning process, led by a blue-ribbon commission made up of business, education, government, and nonprofit leaders, was based on two main premises:

- Public colleges and universities must contribute to the economic health and well-being of the residents of the state; and
- In a knowledge-driven, global economy, a skilled workforce is critical to the economic future of the state.

The UNC Tomorrow Commission's final report identified seven challenges facing North Carolina that could be addressed by colleges and universities. Two of the challenges pertain directly to the alignment of higher education with economic development priorities: (1) global readiness, and (2) communities and their economic transformation.¹ The identification of these challenges

1 The other five strategic issues facing North Carolina, and hence what roles the UNC educational programs and scholars are to play, are the following: (1) our citizens and their future: increasing access to higher educations; (2) our children and their future: improving public education; (3) our health; (4) our environment, and (5) our university's outreach and engagement.

emphasized that UNC should educate its students to be professionally successful in the 21st century, enhance the global competitiveness of its institutions and their graduates, and be more actively engaged in enhancing the economic transformation and community development of North Carolina's regions and the state as whole.

Currently, the UNC system and individual campuses are reviewing missions and operations and preparing specific plans on how UNC will "reposition" to meet the challenges facing North Carolina and its regions, and in doing so, integrate the seven goals into missions, programs, and curriculum. This process will continue until 2012.

ACTION 2

Emphasize Rigorous Use of Labor Market and Other Data to Define Priorities

Ask institutions of higher learning to use data on global, state and regional labor market needs to develop courses and degree programs that prepare students for high-paying, high-demand jobs.

Colleges and universities have access to all sorts of demographic and economic information for identifying general trends in workforce needs, but they tend to have limited, anecdotal information on the workforce needs of industries that hire their graduates. In today's economy, postsecondary institutions need not only to know about labor markets in their states and about where the gaps in their own educational system lie, but also to systematically use this market intelligence in their priority-setting and other decisions. As described below, **Minnesota**, **Washington**, and **North Carolina** are taking a combination of qualitative and quantitative steps to identify high-skill, high-growth workforce needs and translate the information into strategic planning, programmatic, and policy decisions.

Minnesota's Use of Labor Market Data to Inform Key Decisions

Leaders in the **Minnesota** State College and University System recently visited 352 private-sector companies across the state to better understand their workforce needs. Three themes emerged when business leaders were asked about the skills employers seek in new employees. Business leaders spoke overwhelmingly of the need for (1) technology

skills (e.g., robotics and automation, medical record keeping, managing financial systems, customer marketing and sales through e-commerce); (2) business-critical "soft" skills (e.g., customer relations, innovation, flexibility, adaptability, and teamwork); and (3) skills necessary for emerging business practices (e.g., using "green" products and responding to global competition).

Using the results (Figure 3) from such visits to employers and the quantitative labor market information, the Minnesota system is developing a plan to do the following:

- Strengthen courses and programs so that students learn the emerging skills employers have identified;
- Expand opportunities for internships and apprenticeships;
- Strengthen relationships with local businesses through outreach, communications, and collaborations; and
- Expand educational offerings to include more online education, experienced-based learning, and flexible options.³¹

Minnesota policymakers also decided that colleges and universities needed easy-to-use labor market information in order to support decision making by chief academic officers and institutional research staff. The system purchased an online labor market planning tool, and trained staff at each institution to use it to inform decision making.

Washington State’s Assessment of Education Credentials and Employer Needs

In **Washington**, postsecondary education officials and the state’s workforce board have conducted a biennial assessment of the match—or mismatch—between higher education and training credentials available on the one hand and the forecasted employer demand for skilled workers on the other. The most recent assessment identified an under-supply of mid-level workers prepared for jobs in science, technology, manufacturing and production, health occupations, and several other fields. The assessment found that the postsecondary system in the state will meet 88 percent of Washington’s labor market needs for bachelor’s degrees and just 67 percent of its needs for graduate level degrees.

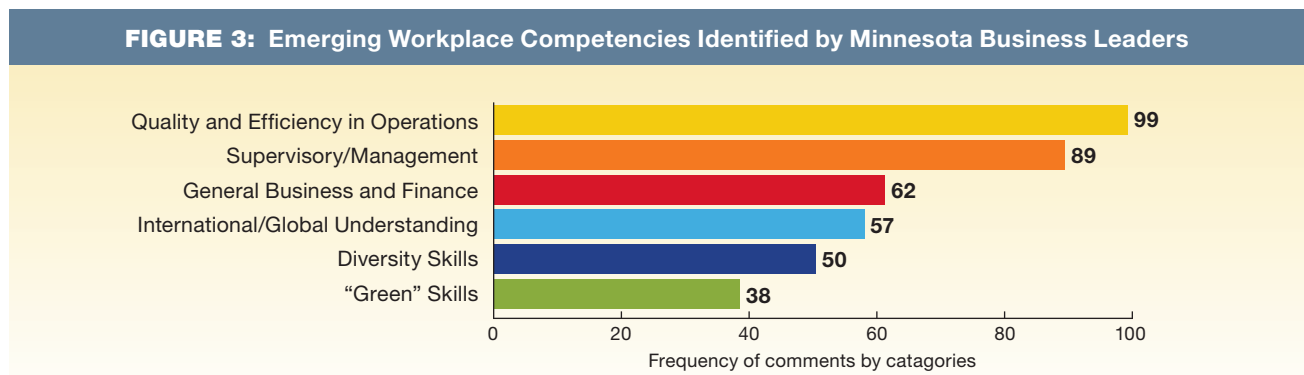
Officials in Washington also found that the state was increasingly relying on attracting specialized talent from outside the state rather than producing enough of its own skilled workers to meet economic

needs. As a result, the master plan for higher education included recommendations for the following:

- Expanding investment in high-demand programs;
- Increasing the number of students in these fields, especially engineering and computer science;
- Building a “re-entry pipeline” to encourage working adults to acquire new skills;
- Improving student completion rates; and
- Strategically expanding the overall capacity of the higher education system.

North Carolina’s Requirements in the UNC Tomorrow Strategic Plan

The approval process for new programs within the UNC system, based on the UNC Tomorrow document issued in December 2007, now requires colleges and universities within the UNC system to consider the demand for graduates. In addition, a restructured budgeting process requires all budget requests from the 17 colleges and universities in the UNC system be aligned with the seven challenge areas facing the state that could be addressed by colleges and universities. The 17 colleges and universities in the UNC system must explain the connection between any program change and the workforce needs in the region and state. Upon receipt of new program requests, institutional



Source: Minnesota State College and University System Workforce of the Future: Leadership Reaches Out to Business.

research and academic planning staff from the UNC system review labor market data and information and examine the offerings of other colleges and universities to ensure that there is no unnecessary duplication of program offerings.

In 2008, for example, after receiving approval from the UNC system, Appalachian State University in Boone, North Carolina, began developing a bachelor of science in nursing (BSN) degree program in response to local nursing shortage. The UNC system already had 11 four-year nursing programs, but most were concentrated in the eastern half of the state, and the nursing shortage in the western half of the state was much worse than that in the eastern half. North Carolina averages about 90 nurses per 1,000 residents, but the counties of North Carolina served by Appalachian State University average 48 to 52 nurses per 1,000 people.³² An inaugural class of 20 students started Appalachian State University's new BSN program in the fall semester of 2010.

Another example of North Carolina's responsiveness to labor market demand is the establishment of a new type of degree program intended to meet the rising demand for multi-skilled scientists—the Professional Science Master's (PSM) degree program. In 2003, North Carolina State University launched its first PSM degree in microbial biotechnology in response to the growing need for an improved graduate workforce in the biotechnology and pharmaceutical industries. The PSM model, which strongly emphasizes meeting the skill demands of local employers, became a best practice, and many of the UNC campuses included the implementation of PSM degrees in their UNC Tomorrow strategic plans. North Carolina now has 15 operational PSM degree programs and 16 PSM programs in the planning stages.³³ PSM degrees have been established in fields ranging from bioinformatics to environmental assessment, and each degree has been created in response to industry demand for more skilled workers in a particular sector.

ACTION 3

Encourage Employers' Input in Higher Education

Encourage—even incentivize—institutions of higher education to seek state and regional employers' input about how best to ensure that students have the 21st century skills employers need.

Setting education priorities to reflect labor market needs involves much more than simply awarding the degrees and teaching the specific occupational skills required in high-demand careers. It also involves:

- Ensuring that students have complex thinking, communication, technology, and analytical skills they will need in the labor force in the years ahead no matter what their area of study;
- Focusing postsecondary curriculum changes on the needs of specific key industries, often with a regional focus; and
- Encouraging credentialing in key industries.

As discussed below, governors and state policy-makers in **Minnesota**, **North Carolina**, **Ohio**, and **Washington** are encouraging and/or requiring the integration of such skills into college and university curricula.

Integrating 21st Century Skills into Higher Education Curricula

The skills that workers must have to thrive in the 21st century economy are different from the skills that workers had to have in the past. To participate in the 21st century knowledge-based economy, students must increasingly be comfortable with critical thinking and problem solving, communication, collaboration, and creativity and innovation (see Table 3). Moreover, recognizing what kind of information matters, why it matters, and how it connects and applies to other information is the “must-have” skill.³⁴

In response to the call in **Ohio’s** Strategic Plan for Higher Education for public and private colleges and universities to have a more global orientation, institutions of higher education in Ohio are doing the following:

- Encouraging foreign language study, including teaching such languages as Chinese, Russian, Hindi, Japanese, and Arabic, which are not commonly taught but are critical to both national security and Ohio’s trade linkages;
- Collaborating with Ohio’s private institutions and the Ohio Department of Development to jointly market and promote Ohio’s higher education offerings across the globe and to share the costs of recruiting international students; and
- Partnering with the Ohio Department of Development to identify Ohio companies that have a significant global presence and tailor programs to help them, including global internships for Ohio students, special educational programs to support their work in other countries, and recruitment of foreign nationals to Ohio’s institutions.³⁵

Moreover, Ohio State University opened its first gateway office in Shanghai in early 2010. The office is tasked with encouraging partnerships between Chinese universities and Ohio State University. Additional offices are planned for India and Brazil.³⁶

TABLE 3: Top Areas of Job Growth – 2008-2018

AREAS OF WORK	NEW JOBS	
	2008-2018	PERCENT GROWTH
Taking Care of People	2,629,300	24.6 %
Making Computers Work	677,700	23.7 %
Taking Care of Business	655,100	22.7 %
Building and Maintaining Our Infrastructures	1,488,200	12.9 %
Teaching Children	860,400	12.7 %
Designing Things; Solving Problems	178,300	11.0 %
Keeping Businesses Running	1,909,800	12.0 %
Selling Goods and Providing Basic Services	1,873,900	6.7 %
TOTAL NEW JOBS	10,272,700	

Source: Mary Walshok, *Closing America’s Job Gap, 2011*; U.S. Bureau of Labor Statistics

In **North Carolina**, the UNC system requires the state’s 17 public four-year colleges and universities to integrate into the curriculum so-called “soft skills,” such as critical thinking, analysis, problem solving, communication, teamwork, and ability to work in a diverse environment. The UNC system is also expanding courses on entrepreneurship. These new economy skills were identified during the “UNC Tomorrow” planning process. North Carolina’s Professional Science Master’s (PSM) degrees, noted earlier, are a compelling example of curricula that educates scientists at the crossroads between scientific, business, and leadership skills. (See Box B for an example of this kind of approach to engineering education.)

Minnesota asks its employers to evaluate its postsecondary institutions’ success in producing students with 21st century skills. Table 4 shows the results of the 2008-2009 Employer Survey. In the survey, employers are also asked to rate the importance of 21 different employee attributes. Importantly, the top five highest priority attributes/skills are professionalism (punctuality, time management, attitude); professional ethics, integrity; self-direction, ability to take initiative; adaptability, willingness to learn; and verbal communication skills.

BOX B: Olin College Transforms Curriculum to Prepare Engineering Innovators

Olin College – founded in 2002 near Boston, **Massachusetts**, with a vision to redefine engineering as a profession of innovation – is radically changing the way students learn about engineering. The college seeks to prepare “engineering innovators” by broadening the content of engineering education beyond technical subjects. Engineering innovators excel not just in science, engineering, and math, but also in creativity, systems thinking, and design. They are able to identify needs, solutions, and engage in creative enterprises that solve real world problems.

Richard Miller, president of Olin College, explains that engineering innovators need a solid understanding of viability, desirability, and feasibility, but traditional programs focus only on skills related to feasibility. Olin curriculum goes beyond science, engineering, and math, and Olin students – who are extremely competitive and often turn down opportunities to attend top universities such as Stanford and the Massachusetts Institute of Technology – work with students from Babson College and Wellesley College on projects that bring together engineering, business, and design skills. In order to graduate, each student must both complete a substantial year-long capstone small team design project that is sponsored by industry at the \$50,000 level and must start and run a business.

Source: Miller, Richard. Beyond Technology: Preparing Engineering Innovators Who Don't See Boundaries. May 2010.

Responding to the Talent Needs of Specific Industries

Many states, including **Minnesota**, **Washington**, and **Ohio**, as discussed below, have established college- or university-based centers of excellence in particular industry sectors important to the state or regional economy. Although these centers are often established at flagship research universities to strengthen state and local capabilities for innovation—enhancing industry’s ability to conceive, develop, and/or produce new products and services, for instance—they are also expected to obtain input from employers on their workforce needs, develop new curricula to meet these needs, and

provide education and training to prepare students for job openings in the industry. In most cases, the centers of excellence are expected to share curricula developed with state funding and expertise, thus improving responsiveness throughout the system and reducing duplication.

In 2005, the **Minnesota** legislature appropriated \$10 million for Minnesota State Colleges and Universities to establish centers of excellence in health care, manufacturing, engineering, and information security at four state universities and their 18 community and technical college partners. Four centers of excellence have been established:

- **HealthForce Minnesota**—a center that involves a collaborative partnership of education, industry, and community and focuses on transforming health care education and delivery across the state;
- **360° Center for Manufacturing and Applied Engineering**—a center that serves the manufacturing and industry needs by offering programs in applied engineering, engineering technology, and precision manufacturing, including automation and robotics, machining, and welding;
- **Minnesota Center for Engineering and Manufacturing Excellence**—a center that provides workforce education student interns, teaching institutes, and long-range recruitment strategies for engaging students in science, technology, engineering, and math; and
- **Advance IT Minnesota**—a center that engages learners, educators, and information and communication technology professionals to develop a community of such professionals in the state.³⁷

Minnesota’s centers of excellence offer state-of-the-art programs, practical research, and connections with K-12 schools and business and industry to help local economies thrive. Each center is charged with developing “best-in-class” programs in their sectors.

TABLE 4: Top Skill Needs of Minnesota Employers*Employer Evaluation of Employee Attributes, 2008-2009 Employer Survey*

Attribute	Not At All Satisfied	Not Very Satisfied	Somewhat Satisfied	Very Satisfied
Professionalism (punctuality, time management, attitude)	0%	3%	53%	44%
Self-direction, ability to take initiative	0%	6%	58%	36%
Capability for promotion advancement	0%	6%	60%	33%
Creativity	0%	9%	64%	27%
Adaptability, willingness to learn	0%	4%	50%	46%
Professional ethics, integrity	0%	4%	46%	51%
Ability to work in a culturally diverse environment	0%	4%	57%	39%
Ability to work in teams	0%	4%	54%	42%
Written communication skills	0%	11%	54%	35%
Verbal communication skills	0%	5%	55%	39%
Basic mathematical reasoning (arithmetic, basic algebra)	0%	5%	57%	38%
Critical thinking and analysis	0%	11%	60%	30%
Problem solving, application of theory	0%	8%	61%	31%
General computer skills (word processing, spreadsheets)	0%	6%	53%	42%
Advanced mathematical reasoning (linear algebra, statistics, calculus)	1%	15%	61%	23%
Technical communications	0%	10%	64%	26%
Fluency in a language other than English	5%	25%	56%	14%
Knowledge of specific computer applications required for the job	0%	6%	63%	31%
Knowledge of technology/equipment required for the job	0%	7%	59%	33%
Application of knowledge from a specific field of study	0%	4%	57%	39%

■ Most frequent ratings of “very important” (top five)

■ Most frequent ratings of “not at all” or “not very important” (lowest 5)

Source: Minnesota Office of Higher Education, Minnesota Measures: 2009 Report on Higher Education Performance.

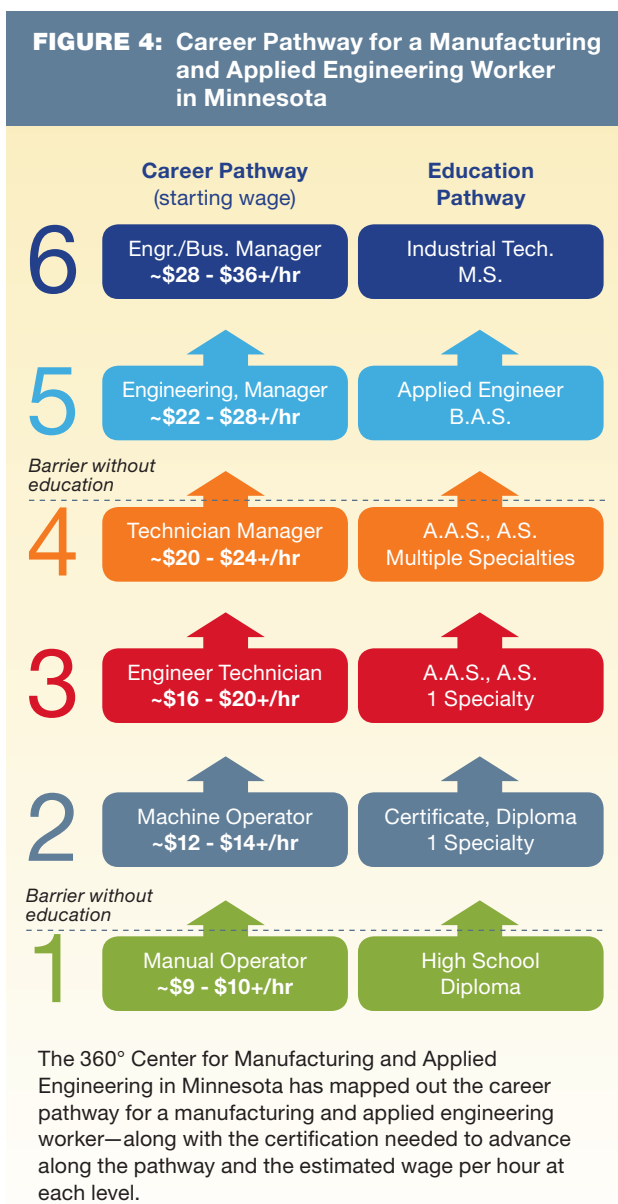
Findings from a recent evaluation of the centers include the following:

- The centers use information from employers to help update curricula.
- The centers help departments update equipment and facilities.
- Through the centers, some courses are being offered in more flexible formats, including short-term training in community locations and some online training.
- The centers help students find the best path through education and training options.
- The centers have leveraged over \$15 million from a range of sources, helping ensure their long-term sustainability.³⁸

Figure 4 shows the career pathway for a manufacturing and applied engineering worker, along with the certification needed for each step, that was developed by the 360° Center for Manufacturing and Applied Engineering.

Washington's 11 centers of excellence are housed at two-year institutions of higher education. The centers were originally established to serve regional industry needs, but they have evolved to serve as statewide industry sector leaders, overseeing services and programming affecting their sector for the system's 34 colleges. The 11 centers of excellence help employers and individuals in Washington find education and training opportunities in their local areas or arrange distance-learning opportunities. They also serve as conveners for collaborative, targeted sector projects. Each center is evaluated annually and is also required to have articulation agreements with four-year institutions.³⁹

As an example, Washington's Center of Excellence for Energy Technology has established a skills panel process for identifying the critical work functions, key activities, performance indicators, and knowledge, skills, and abilities an individual needs to



Source: 360° Manufacturing and Applied Engineering Center of Excellence.

succeed in certain energy-related occupations (Box C). The skills panels define skills standards through focus groups of employees who actually work in the occupations being studied. The standards are then used by colleges, high schools, and training organizations to make sure that their programs are up-to-date in order to attract students to careers in the industry and to ensure that students and workers get high quality training. The standards can also be used as the basis for awarding college credit for prior learning.⁴⁰

BOX C: Occupations for Which Washington State's Center of Excellence for Energy Technology Has Developed Skills Standards

By engaging local industry in skills panels, Washington's Center of Excellence for Energy Technology has developed detailed skill standards for the following occupations:

Bonneville Power Administration:

- BPA Chief Substation Operator III
- BPA Electrician Foreman III
- BPA Lineman Foreman III
- BPA Lineman
- BPA Power System Control Craftsman I
- BPA Power System Control Craftsman II
- BPA Substation Operator

Power Generation:

- Power Plant Operators and Mechanics
- Combustion Turbine Technician
- Power Plant Electrician

Energy Industry:

- Electrician
- Instrument/Control/Relay/Meter Technician
- Lineman
- Millwright

Renewable Energy:

- Wind Technician

Source: Pacific Northwest Center of Excellence for Clean Energy.

The **Ohio** Innovation Partnership provides an example of another step states are taking to respond to world-class scientific and research talent needs of key industries. Of the \$340 million increase in funding for higher education included in Ohio's 2007-2009 biennial budget, \$150 million was for the Ohio Innovation Partnership. The goal of the Ohio Innovation Partnership is to increase the role of the state's higher education institutions in building research and talent pipelines that contribute to Ohio's economic competitiveness.

The Ohio Innovation Partnership has two main components: the Ohio Research Scholars Program and the Choose Ohio First Scholarship.⁴¹ The Ohio Research Scholars Program emphasizes recruiting

research talent from outside Ohio in one of five focus areas: advanced materials, biosciences, instruments-controls-electronics, information technology, and power and propulsion, which includes advanced energy. Seven institutions were awarded a total of \$147 million in the initiative's first year.

The \$100 million Choose Ohio First Scholarship program provides funds to recruit talented students to science, technology, engineering, and math (STEM) disciplines. At least half of the students receiving scholarships must be involved in cooperatives or internships in a private industry or university lab.⁴² The first round of fiscal 2009 Choose Ohio First Scholarship awards included \$13.3 million in scholarship funds going to 11 collaborations for information technology, health care, engineering, sustainable energy, teacher education, and science, with a goal of reaching 1,700 new STEM students over five years.⁴³

Encouraging Credentialing in Key Industries

Ohio and **Minnesota** are both working to encourage adult learners to acquire academic and technical skills through a series of pre-college and college-level "stackable certificates"—allowing students to upgrade their skills while receiving employer-recognized credentials in particular industries. These certificates were developed to meet the needs of key industries in specific regions of the state. They also reflect the needs of working learners, as well as targeting individuals who may have limited English skills, people with disabilities, and others who have traditionally had barriers to postsecondary education.

The **Ohio** Skills Bank establishes standards for programs in specific technical areas, such as automotive technology and information technology, based on industry need. Students who receive their education in a program that meets the state standards will be able to transfer to another college or university and progress in a defined career ladder,

allowing students to obtain increasingly complex skills tied to the needs of key industries. Educational institutions also provide basic skills and English language education that are tied to the needs of particular regional industries.⁴⁴

Minnesota's FastTRAC initiative targets low-wage, low-skill workers to help them access training and education tied to the demand for workers in growing occupations. The FastTRAC initiative is working with seven ongoing education and work transition programs called incubators. Each incubator receives a grant and assistance to identify its stackable credential model and incubate innovative ideas surrounding student support services and bridging curricula.

Minnesota's FastTrac Program is based, in part, on the success of **Washington's** Integrated Basic Education and Skills Training (I-BEST) program, which was launched in 2004 to increase the number of basic skills students who earn transition to

college-level programs. The program challenges traditional notions that students must first complete all levels of adult basic education before they can advance in workforce education training programs. Instead, it pairs workforce training with adult basic education (ABE) and English as a second language (ESL) in Washington's community and technical colleges, so students learn literacy and workplace skills at the same time. Adult literacy and vocational instructors work together to develop and deliver instruction, and a portion of the credits earned must be college-level, paving the way for students to continue their training or return for more education. Further, I-BEST certificates are closely tied to the needs of local industry. I-BEST program areas must be linked to career pathways that appear on the demand list for the local area and meet a minimum set wage.⁴⁵ There are 134 I-BEST programs offered in Washington, and the number of students benefiting from these programs has grown by over 50 percent annually since 2008.⁴⁶

ACTION 4

Require Public Higher Education to Collect and Publicly Report Impacts

Track higher educational institutions' impact on students' employment outcomes (e.g., wages and employability), workforce gaps, employers' satisfaction, and state economic growth.

Minnesota, Ohio, and Washington have all developed accountability measures tied to their strategic goals—which, again, combine traditional student achievement goals with economic development goals—and have in place report cards or dashboards to show progress and to make their efforts more transparent. Because **Florida** is recognized as a national leader in this area, we discuss its approach here, as well.

The Minnesota Measures Report on Postsecondary Education

Minnesota Measures is an annual report issued by the **Minnesota** Office of Higher Education that provides a statewide look at the effectiveness of higher education in the state. The report was developed in response to state legislation passed in 2005 requiring the Minnesota Office of Higher Education to “develop and implement a process to measure and report on the effectiveness of postsecondary institutions in the state.”⁴⁷ Although Minnesota's higher education systems and many institutions are

actively engaged in implementing accountability measures specific to their operations, *Minnesota Measures* offers a statewide perspective on the post-secondary sector as a whole.

Minnesota Measures marks the state's progress in meeting five goals, which were developed along with key indicators through a process involving educators, policymakers, employers, and other leaders. It also provides information on how Minnesota compares with other states, the national average, and other countries. Two of the five goals address the student end of the education pipeline, focusing mainly on college access rather than college completion, and three address the market end of the pipeline. The three goals that address the market end (Goals 2, 3, and 4) are discussed below.

Goal 2 in *Minnesota Measures* is as follows: "Create a responsive system that produces graduates at all levels who meet the demands of the economy." Examples of the metrics used to track progress toward this goal are the following:

■ Programs of study:

- Are Minnesota's students choosing programs and majors that lead to high-demand occupations?
- Are Minnesota students from all racial and ethnic backgrounds choosing programs that lead to high demand?

■ Occupational demand:

- Are Minnesota's colleges producing graduates to fill high-demand and high-paying jobs?

Goal 3 in *Minnesota Measures* is this: "Increase student learning and improve skill levels of students so they can compete effectively in the global marketplace." Among the metrics to track progress toward this goal are these:

■ Preparation for employment:

- How satisfied are Minnesota employers with postsecondary institutions preparing their graduates for further study?

Goal 4 is as follows: "Contribute to the development of a state economy that is competitive in the global market through research, workforce training and other appropriate means." Metrics to track progress toward this goal include the following:

Workforce development:

- What is the activity at Minnesota State Colleges and Universities in customized and contract training?
- How are Minnesota postsecondary institutions meeting the workforce training needs of employers in the state?

Table 4 on page 27 and Table 5 on page 32 show some results from *Minnesota Measures*. Table 5 reveals that Minnesota's higher education system may be producing too few degrees to meet the annual demand for information technology (IT) jobs in Minnesota. Comparing the 2,902 job openings in information technology in the state per year (a figure based on occupational projections data from the Minnesota Department of Employment and Economic Development) with the 1,646 annual postsecondary awards in IT at the bachelor's degree level or below in the 2006-2007 academic year indicates a troublesome gap in the supply of skilled IT workers.⁴⁸

Table 4, presented earlier, speaks to employer satisfaction with recent graduates. Employers' responses to a mail survey of 1,500 employers with 20 or more employees representing all major industries throughout the state suggest that employers believe that Minnesota institutions are doing a "good" or "very good" job of preparing graduates to work in businesses. At the same time, employers "expressed concerns about the level of workforce training they

TABLE 5: Too Few Degrees in 2006-2007 for High Paying Information Technology Jobs in Minnesota...

Occupation	Estimated Employment 2006	Projected Annual Openings* 2006-2016	Annual Academic Awards Granted, 2006-2007
Information Technology (See Specific IT Occupations Below)	57,674	2,909	1,646

...Despite Employment and Wage Opportunities

Information Technology Occupations	Estimated Employment 2006	Median Annual Salary
Computer Software Engineers, Applications	16,096	\$84,279
Computer Support Specialists	10,679	\$46,003
Computer Systems Analysts	8,982	\$74,551
Network Systems and Data Communications Analysts	5,723	\$80,405
Network and Computer Systems Administrators	8,690	\$67,979
Computer Specialists, All Other	7,504	\$69,833

*Total annual openings represents the sum of new jobs and replacements

Source: Minnesota Office of Higher Education, Minnesota Measures: 2009 Report on Higher Education Performance.

must provide to recent graduates in their organizations” (e.g., 67 percent who indicated they “sometimes” or “almost always” have to train employees in areas they feel should have been part of their undergraduate education).

Ohio’s Accountability System for Higher Education

Ohio’s accountability system for higher education includes several alignment measures. Ohio’s strategic plan defines 20 specific metrics around four key topics, with each measurement of success indicating a current level and a 2017 target:

- *Access* includes measures on total postsecondary enrollment, total science, technology, engineering, and math (STEM) degrees awarded, total enrollees age 25 and older, total degrees awarded to first-generation college students, and total degrees awarded to Black and Hispanic students;
- *Quality* includes the improvement in actual graduation rate compared to expected graduation rate and an assessment of the Ohio University System’s reputation;
- *Affordability and efficiency* includes measures to calculate the percent of first-time enrollees below age 21 with the equivalent of one semester or more of college credit earned during high school, and percent of bachelor’s degree recipients with at least one year of credit from a community college; and
- *Economic leadership* includes measures on industrially financed research spending; globalization, including total international students and Ohio students studying abroad annually; invention disclosures and university start-ups attracting over \$1,000,000; business satisfaction; and number of students engaged in internships and co-ops.

Washington State's GMAP Economic Vitality Dashboard

In 2006, **Washington** State Governor Chris Gregoire created the Government Management and Accountability Program (GMAP)—a dashboard system that includes an amalgam of measures looking at how state agencies are performing as well as how the state is doing overall. GMAP was set up as an approach for the governor and her cabinet agencies to track spending and tie it to performance.

Washington State's GMAP Economic Vitality Dashboard includes three categories:

- *Open for Business*, which includes measures such as job creation, help for job seekers, help for employers, and assisted export sales;
- *Foundation for Success*, which includes measures such as infrastructure projects and commercialization of university research; and
- *Skills for a Changing Economy*, which includes measures such as high-demand degrees, completion of job training, employment and earnings of job training students, and meeting employer demand for trained workers.

These three categories align what Washington entities—institutions of higher education, the Higher Education Coordinating Board, Washington Economic Development Commission, Washington Department of Commerce, and the Washington State Board for Community & Technical Colleges—do with the goals of the Next Washington economic development agenda and the higher education 2009 System Design Plan of the Higher Education Coordinating Board.⁴⁹ The third category in the GMAP Economic Vitality Dashboard—*Skills for a Changing Economy*—tallies the number of high-demand degrees and certificates awarded in an academic year by two- and four-year public systems over time.

As shown in Table 6, the total number of high-demand degrees and certificates awarded by public institutions in Washington State grew by 22 percent from 2002-2003 to 2008-2009—at a rate more than double the rate of growth for total degree production by all Washington State institutions of higher education.⁵⁰ An updated analysis of employer demand by the Higher Education Coordinating Board and the State Board for Community & Technical Colleges in March 2009 led to the addition to the progress measures of degree production for math, and biological and physical sciences.

Just how seriously Washington State takes the issues of accountability and transparency in higher education is apparent in Table 7, which shows three measures of student and economic outcomes with reference to state-identified goals: (1) degree production; (2) high-demand degrees and certificates; and (3) training and participant earnings. For each measure, the responsible state agencies are identified, and a green circle is used if the outcome meets or exceeds the target goal. Importantly, a drill-down in each of these three performance measures will reveal an action plan that includes next steps, responsible agency, and due date for completion. The governor reviews GMAP with agency heads during public forums.

Florida's Longitudinal Data System Linking Education and Employment Outcomes

Florida has assembled a longitudinal data system that combines data from K-12, higher education, and employment to create a wealth of data on student outcomes. Colleges and universities—and state leaders—can use this data to better understand the connections between higher education efforts and student employment outcomes.

TABLE 6: Increase in Production of Degrees in Program Areas of High Employer Demand in Washington State from Academic Year 2003-2003 to 2008-2009

Academic Year							
High Demand Instructional Program Areas	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
Allied Health & Health Sciences	5,766	6,820	7,217	7,898	7,805	8,072	8,393
Computer & Information Sciences	1,877	1,899	1,516	1,222	1,191	1,188	1,212
Engineering Technologies & Technicians	2,137	2,362	2,012	2,013	2,030	2,046	2,429
Engineering, 4-Year Only	1,264	1,255	1,262	1,293	1,347	1,343	1,375
Math, Biological & Physical Sciences, 4-Year Only	1,974	1,949	2,133	2,215	2,396	2,374	2,537
Transfer High Demand (STEM), 2-Year Only	1,056	1,281	1,111	1,059	1,013	1,129	1,051
Construction Management, 2-Year Only	44	84	94	125	253	306	270
Public Higher Education Total	14,118	15,650	15,345	15,825	16,035	16,458	17,267

Source: Washington State, Government Management Accountability and Performance (GMAP) Report.


The Florida Education and Training Placement Information Program (FETPIP) calculates and disseminates labor market outcomes for graduates of high schools, community colleges, and universities. FETPIP was developed by Workforce Florida (the state’s workforce development agency) but is currently administered by the Florida Department of Education. Students’ records for programs at higher education institutions in Florida are matched with unemployment insurance wage records and other data sets to determine the outcomes (employment rate and wages) of completers. FETPIP is also

used to identify the percentage of completers who obtain employment in an occupation related to the training and education they received.

Florida uses a website to disseminate data from FETPIP summarized at the institution and program level. In addition, policymakers in Florida and higher education institutions use the data to inform programmatic and policy decisions. For example, Workforce Florida staff are currently using the data from FETPIP to track the labor market experiences of individuals who obtain education and training at Florida’s Banner Centers, Florida’s version of centers of excellence.

TABLE 7: Example of Three Measures of Student and Economic Outcomes Associated with Postsecondary Education in Washington State

3. Student and Economic Outcomes

Measure	Target	Actual	Status	Agency*	Notes
3.1 Degree Production	40,344 degrees	41,509 degrees		HECB, SBCTC**	Over 41,000 baccalaureate and graduate degrees were conferred in 2008-09 by public and private institutions, exceeding the goal for the year, but not increasing fast enough to meet the 2018 goals. In addition, almost 22,000 associate degrees were awarded.
3.2 High Demand Degrees & Certificates		17,267 degrees & certificates		HECB, SBCTC	Students received over 17,000 degrees and certificates in high demand fields in 2008-09, the most since 2002-03. The growth rate of high demand fields outpaced overall degree growth. (For CTCs, data is only for programs funded by the high demand program.)
3.3 Training Participant Earnings		\$24,555 per year		WTECB, SBCTC	The median 2009 earnings of participants that left workforce training in the preceding year have increased compared to those earned by recent participants the year before. The rise in post-training wages may be halted by the recession.

*Targets for measures 3.1 and 3.2 were not available at publication.

**HECB = Higher Education Coordinating Board; SBCTC = State Board for Community & Technical Colleges; WTECB = Workforce Training and Education Coordinating Board.

Source: Washington State, *Government Management Accountability and Performance (GMAP) Report, Student and Economic Outcomes, 08-17-10.*

ACTION 5

Emphasize Performance as an Essential Factor in Funding

Use performance-based funding for institutions of higher education to get—and reward—outcomes aligned with state strategic goals. Plus, award funds on a competitive basis to develop industry-oriented curricula and create new efforts to meet the workforce needs of specific key sectors.

The primary support for public postsecondary educational institutions in the United States comes from state and local funding.⁵¹ Such funding is available to states to use as a lever to encourage the

alignment of higher education with industry needs and state economic priorities. Currently, however, such funding is typically not used as a lever. In general, such funding has been provided by states in

a “reactive” rather than “proactive” manner—based on number of individuals enrolled in higher education, not whether they complete a program or even whether the program they have completed is in an area in demand by the state’s employers. Moreover, higher education is relatively low on the priority list of state budget items, so higher education often receives what is left over after funds for K-12 education, Medicaid, corrections, transportation, and other items have been designated.

At least 14 states have performance-based funding for their institutions of higher learning.⁵² As discussed below, a few states have refined their performance-based funding systems to incorporate measures of the alignment of higher education with the state’s economic priorities. Some states have developed competitive programs that provide additional funds to postsecondary institutions for specific alignment activities. Increasingly, incentives to connect to industry are included in formula funding and competitive grants, as well as student financial aid.

Aligning State Higher Education Funding with State Economic Priorities

As part of its 2008 strategic plan, **Ohio** adopted a new funding formula for its public universities in 2009 to “reward education outcomes that are better aligned with Ohio’s economic priorities.”⁵³ Four goals guide the strategic plan and the metrics by which progress towards the plan are assessed. These goals are:

- Enroll and graduate more Ohioans;
- Increase state aid, improve efficiency, and lower out-of-pocket expenses for undergraduates;
- Increase participation and success by first-generation students;
- Increase participation and success by adult students.⁵⁴

The state adopted three separate funding formulas for university main campuses, regional campuses, and community colleges. Beginning in 2010, four-year universities are now rewarded financially for students who complete classes and who graduate, as opposed to the number of students who enroll. During the next few years, performance-based funding will grow incrementally, and eventually 100 percent of base funding will be tied to course completion and other performance indicators instead of course enrollment.⁵⁵ Similarly, regional campuses are rewarded for course completion and will move towards being rewarded for degree completion. Community colleges now receive 5 percent of their funding based on the number of students taking “significant steps,” such as progressing from remedial courses to college-level ones.⁵⁶ The formula provides additional weighting for students who are academically or socioeconomically at-risk and includes incentives for science, technology, engineering, and math (STEM) graduates, nursing graduates, or other immediate priority fields. The state’s data system captures these costs, and the formula reimburses campuses at differential rates, based on these cost differences.⁵⁷

In 2006, the **Washington** State Board for Community & Technical Colleges introduced a funding formula that rewards two-year community colleges based on a system of “momentum points” they receive when students achieve key points.⁵⁸ The Student Achievement Initiative rewards community colleges for increasing the number of students who reach critical benchmarks in degree completion in the following four categories:

- Gaining college-level skills (basic skills gains, passing precollege writing or math);
- Completing first-year coursework and gateway math classes (earning 15, then 30 college-level credits);

- Completing college-level math (passing math courses required for either technical or academic associate degrees); and
- Earning degrees and certificates or completing apprenticeship programs.

Washington’s two-year community college system used 2007-2008 as a learning year—each college received \$52,000, in addition to its base allocation, as seed money for new or expanded student success strategies. The following year, 2008-2009, was the first performance year and served as the basis of the first round of financial rewards to be distributed to colleges in fall 2009, after the close of the current academic year. The measures focus students and institutions on shorter term, intermediate outcomes—and there are no targets. Colleges compete with themselves rather than each other. Colleges will earn a set increment of reward for each achievement point achieved above their 2006-2007 baseline in any of the four categories. Once earned, the reward will be added to the college’s base budget. These momentum points are also recorded in the state’s performance accountability dashboard.⁵⁹

As shown in Table 8, Washington State’s community and technical colleges have improved across all student achievement categories between the 2007 baseline year and 2009. Overall, the

college achieved one-third point of the growth in momentum points due to more students and two-thirds of the growth in momentum points because of more points per student.

To help institutions in Washington State establish permanent funding for high-demand, high-cost programs that would not have been otherwise started or expanded, the state has created a high-demand enrollment fund.⁶⁰ High-demand enrollment funding is added to an institution’s base funding once it is allocated. As shown in Figure 5, cumulative previous and new funding for programs in high-demand fields reached a total of \$81.5 million in the 2007-2009 biennium. Institutions have combined this funding with a reallocation of existing resources to create new programs, and nearly half of the new programs created by public four-year institutions have been in STEM or health sciences fields.

In **Minnesota**, the state’s higher education system is eligible to receive 1 percent of its appropriation only after it has achieved at least three of the following five goals:

1. Increase the number of students who take college-level courses in science, technology, engineering, and math by at least 3 percent, compared to fiscal 2005.

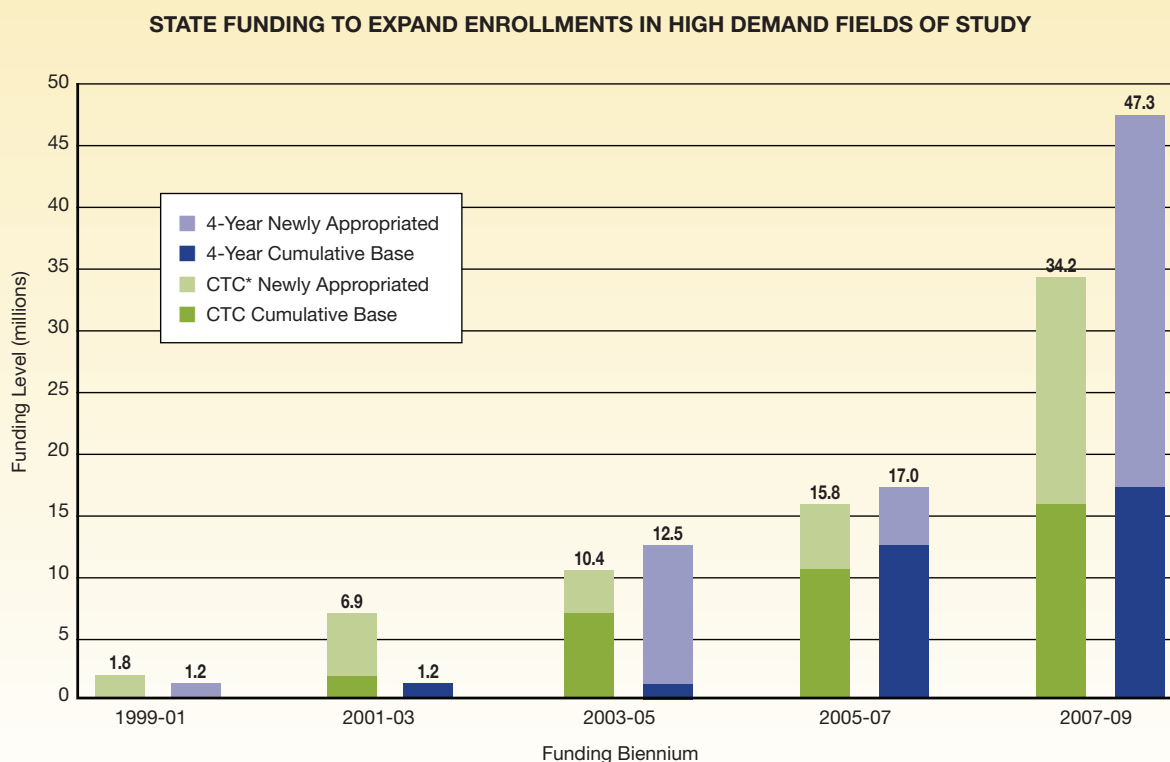
TABLE 8: Gains in Student Achievement Sparked by Performance-Based Funding in Washington State

	Students	Increase Basic Skills	Become College Ready	Earn 1st 15 College Credits	Earn 1st 30 College Credits	Earn 5 College Math Credits	Complete Certificate, Degree, Apprenticeship	Total Points
2006-07 Baseline	467,809	70,950	61,581	60,422	45,385	33,989	22,932	295,259
2008-09 Performance Year	486,927	94,796	73,652	70,127	52,300	36,000	25,544	352,419
% Change	4%	34%	20%	16%	15%	6%	11%	19%

Colleges are rewarded for increasing the number of students who reach critical benchmarks in degree completion and credits earned.

Source: David Prince, Director of Research and Analysis, Washington State Board for Community and Technical Colleges, August 2010.

FIGURE 5: Growth in Washington State Funding for New Programs in High-Demand Fields, 1999-2001 to 2007-2009



*CTC=Community and Technical Colleges.

Source: Washington Higher Education Coordinating Board and Washington State Board for Community & Technical Colleges.

2. Increase enrollment in courses at the four existing center of excellence programs by at least 2 percent compared to fiscal 2005.
3. Increase the number of students trained on the use of electronic medical record technology by at least 700 compared to fiscal 2007.
4. Increase the number of students taking online courses or the number of online courses offered by at least 10 percent, compared to fiscal 2007.
5. Expand the use of “awards of excellence” or other initiatives that reward member institutions, faculty, administrators, or staff for innovations designed to advance excellence and efficiency by at least 10 percent compared to calendar year 2006.⁶¹

Using State Competitive Funding for Specific Alignment Activities

Some states have developed competitive programs that provide additional funds to postsecondary institutions for specific alignment activities. In some cases (e.g., in the case of several centers for excellence), this funding has come from the state’s workforce development agency rather than from traditional resources for higher education.

The **Minnesota** system awards competitive funding to colleges when they undertake strategic, sector-based initiatives. Minnesota is currently setting aside small amounts of American Recovery and Reinvestment Act (ARRA) funding (\$4,000) for colleges to incentivize collaboration and the

formation of a consortium around green building. The goal is to create partnerships that are then well positioned to compete for larger federal and other sums.

In **North Carolina**, as set forth in the UNC Tomorrow document issued in December 2007, a restructured budgeting process for UNC colleges and universities requires all budget requests be aligned with the seven challenge areas facing the state that could be addressed by colleges and universities. In addition, the UNC system's approval process for new programs now requires colleges and universities to consider the demand for graduates.


Aligning Student Financial Aid Programs to High-Demand, High-Wage Job Needs

Student financial assistance can be used to increase the demand for certain educational programs, thus encouraging higher education institutions to respond to that demand by offering more programs and/or courses in critical areas. In **Ohio**, for example, the \$100 million Choose Ohio First Scholarship program provides funds to recruit talented students to science, technology, engineering, and math (STEM) disciplines.

Aligning Federal and Other Funding Streams

Michigan's "No Worker Left Behind" initiative provides free tuition at any of the state's public post-secondary institutions (up to \$5,000 a year for two years) to unemployed or underemployed adults for programs tied to the state's employer and regional economic development needs. Under Michigan's "No Worker Left Behind" program, the state has simplified the maze of federal funding streams for worker education and training, including resources from Workforce Investment Act, Temporary Assistance for Needy Families, Vocational Education, Wagner-Peyser, Trade Adjustment Assistance, and other sources. The state has standardized the criteria for funding and the benefits across all regions of the state.

VI. Conclusion



In the 21st century knowledge-driven, global economy, the education and skills of a state's workforce are critical to a state's economic progress and prosperity. Governors and state policymakers are increasingly recognizing the importance of ensuring that students who graduate from institutions of higher education, including community colleges, four-year colleges, and research universities, are equipped with the skills to fill good, high-paying jobs that are in high demand by employers, thereby boosting the state's economic growth.

In **Minnesota, North Carolina, Ohio, and Washington**, higher education institutions are expected to contribute to the economic prosperity of their states and regions through the education of students who possess the skills needed to contribute to the state's economic growth. Governors and policymakers in these states have begun to redefine the role of higher education in their states and have taken concrete steps to align the efforts of their higher education systems and institutions with the skill needs of key industries in the state.

The five action steps taken in the four states highlighted in this report are not enough individually. There is nothing unique in expanding a mission to include new goals, establishing priorities based on trends and needs, revising programs and services based on customers' needs, creating metrics to track progress, and using financial incentives to reward success. What is important, however, is knowing how to combine these steps effectively to reform an often-hidebound system of postsecondary education. The governors and other leaders in these states have articulated a new vision for higher education that is built on increased focus on the talent and skill needs of key industries in their states and of the knowledge-based economy, as well as on increased interaction between administrators, faculty, students, and employers. The governors and other policymakers in these states are demonstrating how leadership, policy decisions, and state funding strategies can assist higher education institutions to recognize and embrace their critical role in equipping workers with the skills they and their states need to thrive in the 21st century.



In the 21st century knowledge-driven, global economy, the education and skills of a state's workforce are critical to a state's economic progress and prosperity.

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NGA Center Divisions

The NGA Center is organized into five divisions with some collaborative projects across all divisions.

- **Economic, Human Services & Workforce** focuses on best practices, policy options, and service delivery improvements across a range of current and emerging issues, including economic development and innovation, workforce development, employment services, research and development policies, and human services for children, youth, low-income families, and people with disabilities.
- **Health** covers a broad range of health financing, service delivery, and coverage issues, including implementation of federal health reforms, quality initiatives, cost-containment policies, health information technology, state public health initiatives, and Medicaid.
- **Education** provides information on best practices in early childhood, elementary, secondary, and postsecondary education. Specific issues include common core state standards and assessments; teacher effectiveness; high school redesign; science, technology, engineering and math (STEM) education; postsecondary education attainment, productivity, and accountability; extra learning opportunities; and school readiness.
- **Environment, Energy & Transportation** identifies best practices and provides technical assistance on issues including clean energy for the electricity and transportation sectors, energy and infrastructure financing, green economic development, transportation and land use planning, and clean up and stewardship of nuclear weapons sites.
- **Homeland Security & Public Safety** supports governors' homeland security and criminal justice policy advisors. This work includes supporting the Governors Homeland Security Advisors Council (GHSAC) and providing technical assistance to a network of governors' criminal justice policy advisors. Issues include emergency preparedness, interoperability, cyber-crime and cyber-security, intelligence coordination, emergency management, sentencing and corrections, forensics, and justice information technology.



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