

Journal_{of}
INNOVATION & TRANSFORMATION

S O U T H E R N M A I N E C O M M U N I T Y C O L L E G E



Southern Maine Community College

The Southern Maine Community College *Journal of Innovation and Transformation* is dedicated to advancing and acknowledging the important role community colleges play in ensuring access in higher education and driving economic development in Maine.

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President Obama has set a goal for the country to, once again, have the “best educated, most competitive workforce in the world” by 2020. Community colleges are central to meeting that goal. In an increasingly global economy, employers need workers with postsecondary skills, credentials, and degrees. Community colleges are already educating close to half of all college students—and more than half of all minority and first-generation students. We welcome the new *Journal of Innovation and Transformation* to the discussion on how community colleges can help meet our national goals and grow our economy.

Community colleges enroll adults of all ages. These institutions are the gateway to higher education for millions of recent high school graduates and serve as a resource for adults who

seek career and technical education programs to advance them in their jobs or help them enter a new profession. Community colleges have done, and are doing, a great deal of the heavy lifting to ensure that all who want a postsecondary education can receive it. They are delivering a workforce that is well prepared for multi-faceted employment opportunities. Simply put, they are creating the innovation needed to drive the present and future economy.

The primary mission of community colleges today is to prepare students to compete successfully in the twenty-first century knowledge economy and participate meaningfully in civic society. More than ever, community colleges are being asked to educate students preparing for the workforce of the future—radiologic technicians, registered nurses, installation experts in solar and wind power, IT and cyber-security technicians, scientists, engineers—these are the types of professionals who will advance the competitiveness

INTRODUCTION

EDUCATING OUR WAY TO A BETTER ECONOMY



by Arne Duncan

“The higher education system, from community colleges to research universities, needs to work with our K-12 schools to streamline policies and practices to ensure that college-bound and career-ready students move seamlessly from high school to college, and then on to the workforce with the preparation and skills that employers need and that society wants.”

of our nation. To ensure a strong economy, the United States needs a robust system of education that is well aligned with our workforce needs. Many of the articles in this inaugural issue of the Journal of Innovation and Transformation underscore a message that I’ve said many times: We have to educate our way to a better economy.

There is a great deal of work to be done to reform America’s educational system. We need an education system where all levels work together to ensure that students advance from early learning programs all the way through high school graduation. The higher education system, from community colleges to research universities, needs to work with our K-12 schools to streamline policies and practices to ensure that college-bound and career-ready students move seamlessly from high school to college, and then on to the workforce with the preparation and skills that employers need and that society wants. Institutional, system, and state leadership, along with coordination and alignment, is critical to creating a premiere education system that will enable the United States, once again, to have the best educated, most competitive workforce in the world.

Arne Duncan is U.S. Secretary of Education. Secretary Duncan previously served as the chief executive officer of the Chicago Public Schools.

Welcome to the inaugural issue of the Journal of Innovation and Transformation, a publication of Southern Maine Community College (SMCC). Over the last two decades all of us involved with higher education and the economy in Maine have, with our colleagues and citizens across the country, understood that the United States economy was moving from an industrial base to a knowledge base. That transformation was ameliorated by the consumption-based economy America generated in the early 2000s. One of the lingering effects of The Great Recession of 2008 is that consumption is no longer a sustainable basis for future prosperity. The wake-up call of the deep recession speaks to our country and state's need to hasten our transformation to an economy grounded in twenty-first century markets, businesses, products, services, occupations,

and skills. We are in a time of economic transformation that calls for innovation at all levels of society and in individual lives. The name of this journal is appropriate to this time.

The name of this journal is also appropriate to the mission of Southern Maine Community College. Our state's ability to energize and revitalize the economy in southern Maine is key to statewide prosperity. In the emerging new economy, the higher education attainment of our residents is more important than ever before, and the opportunity provided by community colleges for Maine people to gain needed skills for workplace or further educational success is crucial.

In this first issue of the Journal of Innovation and Transformation, Southern Maine Community College presents seven pieces that will advance our knowledge about transforming work in Maine.

A Foreword by George Boggs of the American Association of Community Colleges and

WELCOME

EDUCATION
TO ENERGIZE
AND
REVITALIZE
THE ECONOMY



by Glenn Cummings, Ed.D.

Palomar College notes the important changes to the role of community colleges in the United States in the present day. U.S. Secretary of Education Arne Duncan's Commentary describes the current and future challenge community colleges have in educating for a better economy. Jane Oates, an Assistant Secretary in the U.S. Department of Labor, discusses the pressing need to maximize resources and leverage partnerships in the effort of community colleges to assist employers and employees.

These first articles set the wider context for the modern role of Southern Maine Community College. Jean Moon, Founder and Principal of Tidemark Institute—which works at the national level and in Maine to strengthen all levels of STEM learning through strong collaborations on

“SMCC will continue to do its part—in collaboration with other sectors of Maine society—to meet the needs of Maine’s transforming businesses and current and future skilled workers. Innovation in workplaces and higher education, as well as the aspirations of students, will inform SMCC’s development and promote Maine’s prosperity.”

policy issues, redesign of schools, alignment between schools and workforce needs, and innovative professional development—describes the viability of economic clusters through wise use of resources and creation of partnerships, as illustrated by Maine's developing composite materials cluster. An interview with University of Maine President Robert Kennedy and Southern Maine Community College President James Ortiz details their institutions' partnership in the composites

cluster. Charles Lawton, Chief Economist for Planning Decisions, Inc., digs down into industrial sector, occupational, and skill data to illuminate how other economic clusters in midcoast Maine might be identified and guide SMCC's new efforts in that region. Finally, John Dorrer, now with Jobs for the Future (previously Director, Center for Workforce Research and Information, Maine Department of Labor) illustrates the power of linking student data with wage records to determine employment and earnings outcomes for SMCC graduates. This approach is now used by SMCC to determine, in part, whether a community college education leads its students to their career goals.

All of these pieces speak to lifetime skill development as the foundation for economic success in the twenty-first century. SMCC will continue to do its part—in collaboration with other sectors of Maine society—to meet the needs of Maine's transforming businesses and current and future skilled workers. Innovation in workplaces and higher education, as well as the aspirations of students, will inform SMCC's development and promote Maine's prosperity.

This issue will be but the first installment of what I hope will be a long and productive conversation for the people of Maine and for all of higher education.

Glenn Cummings is President and Executive Director of Good Will-Hinckley. He was awarded his doctorate in Higher Education from the University of Pennsylvania.

Originally developed at the turn of the twentieth century as open-admissions junior colleges offering the first two years of a baccalaureate education, community colleges have evolved into comprehensive institutions.

Today they serve the postsecondary educational needs of communities in many ways, in particular preparing students to transfer to upper-division universities or to enter an ever-changing workforce directly. Driven primarily by the economic recession, credit student enrollment in community colleges increased from fall 2007 to fall 2009 by a remarkable 16.9%, to eight million per term.¹ Student enrollment in noncredit basic skills, short-term workforce, or avocational courses is

conservatively estimated at an additional five million.²

The Truman Commission report of 1947 marked the first general use of the term “community college” and recommended that they expand nationally to provide universal access to postsecondary education.³ Expanding to every state—and shaped by such forces as a focus on educational and training needs of returning veterans, the anticipated economic impact of the Baby Boom Generation, and a growing need for skilled workers in a shifting economy—community colleges have changed the paradigm for higher education in the United States from one where students had to “go away” to college to one that provides access to high quality and affordable higher education and training available in local communities. These institutions now prepare over half of the nation’s registered nurses and the majority of other healthcare workers, over 80% of the first responders (paramedics, EMTs,

FOREWARD

COMMUNITY COLLEGES AND THE CHANGING PARADIGM OF HIGHER EDUCATION



by George Boggs, Ph.D.

“Community colleges also develop curricula and programs to respond to the needs of local economies by working closely with industry, government, and other education sectors.”

firefighters, and police officers), and a growing percentage of the nation’s technological workforce.⁴ Community colleges have also become the institutions of choice for workers upgrading their skills and for displaced workers preparing to reenter the workforce.

Community colleges also develop curricula and programs to respond to the needs of local economies by working closely with industry, government, and other education sectors. During the current economic downturn, stories of community colleges sending staff into factories to counsel displaced workers or offering courses at midnight to meet the needs of students made national news.

The National Science Foundation (NSF) has identified public community colleges as the main source of postsecondary education for technicians. NSF’s Advanced Technological Education (ATE) program utilizes community college educators to lead programs that involve universities, secondary schools, and business to prepare and strengthen the skills of the nation’s technological workforce. ATE programs prepare technicians in strategic areas including agriculture, environmental technology, biotechnology, engineering technology, manufacturing, information technology, telecommunications, cybersecurity, and process technology.⁵

In July 2009, President Obama called on community colleges to increase the number of graduates and program completers by five million students over a ten-year period, a 50% increase over current numbers.⁶ Although Congress was not able to deliver federal funding support to the colleges through the American Graduation Initiative as proposed, the federal administration has stated its continued commitment to increasing

the educational attainment levels of Americans, challenging community colleges to bear a significant part of the burden. On March 30, 2010, at a ceremony at Northern Virginia Community College, President Obama signed H.R. 4872, the Health Care and Education Affordability Reconciliation Act, into law. The Act provides two billion dollars for the Community College and Career Training Grant Program, a new Trade Adjustment and Assistance Community College and Career Training (TAACCCT) program focused on workforce preparation.⁷

In an earlier address to a joint session of Congress, President Obama asked every American to commit to at least one year of higher education or career training so that the United States would once again have the highest proportion of college graduates in the world. The president made the point that, in an increasingly competitive world economy, America’s economic strength depends on the education and skills of its workers. The Obama Administration has pointed out that, in the coming years, jobs requiring at least an associate degree are projected to grow twice as fast as those requiring no college experience. In its report of the Springboard Project, the Business Roundtable⁸ echoed President Obama’s challenge to increase education attainment levels to build a competitive workforce. The report recommends unlocking the value of community colleges, stating that these institutions have the potential to play a dominant role in strengthening local economies.

In April 2010, six national community college organizations—representing trustees, administrators, faculty, and students—signed a call to action to commit member institutions to match President Obama’s 2020 goal.⁹ The organizations

are seeking foundation funding to develop strategies to move ahead. Challenges presented by the current economic climate could very well inhibit early progress. In the face of a surge of enrollment pressure, states have cut funding to public higher education, including community colleges. If the United States is to meet the challenges of the future, policy makers must provide needed support to colleges and universities and their students. Education, at all levels, must be seen as an important state and federal investment in our future, and policies must be put in place to ensure maximum return on that investment.

Support from policy makers and foundations is important, but goals of improving educational attainment in the United States can best be met if educators take the lead in implementing needed transformations. College and university faculty and administrators need to work together to improve completion rates; to facilitate the transfer of students from community colleges into upper-division course work, through better course articulation and improved student advising; and to ensure that students are provided with rigorous and relevant curricula and needed support programs. Higher education in the United States is exemplary in many ways, but it can be much stronger if community colleges are appropriately recognized as equal partners, and if educators work together to break down barriers to student success and build curricula and programs that prepare students for the future.

In an increasingly global society and economy, education and training beyond customary compulsory primary and secondary education is essential to a nation's competitiveness and the standard of living of its people. The need to open the doors of higher or further educa-

tion beyond the relatively limited enrollments in selective universities has spawned an international movement to develop and expand institutions that are generally less expensive, more accessible, more flexible, and tied more closely to business and industry.

Community colleges today are important to economic strength and recovery and are being challenged to increase student success and completion significantly while increasing both access and quality. If we are to meet the ten-year challenge issued by President Obama and make good on the commitment to increase the numbers of successful student completers, educators must build on and expand programs and practices that reduce student barriers and be sure that curricula and services are aligned with the needs of employers. I commend Southern Maine Community College for its foresight in providing a needed forum by publishing the *Journal of Innovation and Transformation*, and I am proud to write the foreword to this inaugural issue.

George R. Boggs, Ph.D. is President and CEO Emeritus of the American Association of Community Colleges, Superintendent/President Emeritus of Palomar College in California, and a former community college faculty member.

“Community colleges today are important to economic strength and recovery and are being challenged to increase student success and completion significantly while increasing both access and quality.”

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Emerging Industries Drive New Partnerships Between Colleges and Business Sectors



by Jane Oates

For decades, community colleges have been the gateway to opportunity for millions of Americans: high school students have been able to accelerate their post-secondary education through dual enrollment, graduates have begun their college careers, and workers have received the academic and technical training to put them on a new or improved path to a better job. By offering degrees, industry recognized credentials, and discrete courses designed around self improvement, our colleges have kept the communities that they serve more vibrant.

In 2007, community colleges enrolled 6.8 million students, or forty-four percent of all undergraduates in the United States. We know that minorities are more likely to enroll at community colleges than at four-year institutions. Community college students are also more likely to be first

generation college students, and they are more likely to be supporting themselves financially. According to the American Association of Community Colleges, community colleges prepare more than half of new nurses and other health-care professionals. They certify eighty percent of first responders, and between twenty and forty percent of the nation's teachers got their start at a community college.¹

But unfortunately, our colleges have suffered in the last decade. Despite increasing community college enrollment during eight of the past ten years, state budgets have often fallen short of the increased demand. In 2010, the number of students enrolled in Maine's community colleges increased by 9.6 percent over the previous year. Across the country, colleges are straining to meet this increased demand.²

Congress created a unique opportunity by authorizing two billion dollars in grant funds through the Trade Adjustment Assistance Com-

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munity College and Career Training Grant Program (TAACCC) to build the capacity of community colleges to serve workers who have lost their jobs because of the trade imbalance. Trade-impacted workers face unique obstacles when trying to navigate their path back to post-secondary education, and these grants will allow colleges to create or expand curriculum; design innovative delivery strategies; and explore new ways for technology to link employers to potential new hires and to accelerate working students' access to credentials, degrees and good jobs.

The recession and ensuing recovery have made it increasingly difficult for our colleges to match their course offerings to the needs of employers, particularly in emerging industries. Our colleges in partnership with the local public workforce system have to use real-time, local labor market information along with personal relationships with the business community to make direct links between classroom learning and workplace needs. As the economic churning continues, relying on the expertise of our partners at the Workforce Investment Boards will mean that we concentrate the scarce dollars at the colleges on what they do best—provide world class instruction.

The economic recovery has taught us the importance of learning to maximize our resources to the best of our ability including: solidifying strong regional partnerships, working within sectoral partnerships to support the needs of small business, and using every opportunity to link academic and occupational skills. Students coming to community college campuses in the twenty-first century will see how time spent in the classroom will lead to better earnings, more choices, and a competitive edge in the workplace.

This fall the U.S. Department of Labor launched two new online tools to help students see how their interests and experience can lead to employment in growing occupations, and to help link both their skills and interests to real job openings available in their local areas. The newly launched “My Next Move” electronic tool is intended to assist all job seekers. It may be especially useful for students, young adults, and other first-time workers as they explore potential careers based on their interests. The second tool, “mySkills myFuture,” is designed to help those with previous work experience match their existing skills to new occupations. Each occupation that a user selects has an easy-to-read, one-page online profile, including information about what knowledge, skills, and abilities are needed; the occupation's outlook; the level of education required; technologies used within the occupation; and a list of other, similar jobs. In addition, each occupation page includes direct links to local salary information, training opportunities and relevant job openings.

But back to the importance of colleges: I believe our colleges need to tell their stories. They need to look to the business partners that depend on them in cities and rural areas and let the public know that our community colleges are planning for their linked future. And while our K-12 systems maintain their focus on the “Three Rs,” our community colleges are focused on the “Three Es,”—educate, employ, and empower. Community colleges are important partners for the U.S. Department of Labor, and we look forward to continuing to work with them as we continue to help strengthen our workforce and prepare workers for the good and safe jobs of tomorrow.

Jane Oates is Assistant Secretary for the Employment and Training Administration, U.S. Department of Labor. She previously served as Executive Director of the New Jersey Commission on Higher Education and as a Senior Policy Advisor to Senator Edward Kennedy.

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Education, the Economy, and the States: Critical Collaborators



by Jean Moon, Ph.D.

In this era of economic and social upheaval the role of community colleges is being redefined. The exact blueprint for and scope of this change is not altogether clear, but that change is on the way is more than a reasonable bet. Individual states like Maine, as well as the country as a whole, need community colleges as part of a strategy to realign and create the education and skills needed to fill the demands of the next economy's jobs and occupations. This article is an effort to describe the outlines of the current vision of transformation to this "next" economy, most particularly as it relies on state-based economic and educational alliances.

Resetting after the Economic Jolt

The last three years have produced seismic gyrations in our state and national economies. Over and over again we hear, read, and experience

that long-standing responses to similar economic scenarios are not working—or are not working at an effective pace. Collective anxieties are palpable. Institutions we count on, including education, reveal more and more stress fractures as resources shrink. The so-called Great Recession that began in 2007 has been one of the worst periods since the Great Depression for American families, for states, and for institutions of all types. Just where is the proverbial light at the end of what appears to be a long and dark tunnel?

William Galston from the Brookings Institution provides some illumination in a September 2009 article, wherein he describes the notion of "the new normal" for the U.S. economy. He writes, "Once the dust settles from the economic crisis of 2007-2009, we are likely to enter a period of new normality, with lower household debt, higher personal savings, and less consumption as a share of Gross Domestic Product." The overall source of economic activity, Galston tells us, will come with

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“Individual states like Maine, as well as the country as a whole, need community colleges as part of a strategy to realign and create the education and skills needed to fill the demands of the next economy’s jobs and occupations.”

an increase in the amount of goods and services that America exports to other countries, especially those with greater consumptive capacities than we have—countries such as China, Brazil, and India. These exported goods and services will be a mix of things yet to be invented and produced, along with existing goods and services such as medical devices, components for alternative energy sources, agriculture and aquaculture products, electronic components, pharmaceuticals, and ongoing knowledge creation. Galston’s analysis is shared by many others (Altman, et al, 2010; Katz, et al, 2010).

Forecasters identify our decreasing capacity to support a consumption-based economy as perhaps the biggest factor in the “new normal” for the American economy. Our accumulated individual, family, state, and national debt makes it unlikely that our appetite for consumption will keep pace with the trends of the last thirty or forty years. Rather, efforts to reset our economy are tied to our collective innovative capacities coupled with strategic investments to create a wealth of needed exports. To grow and restructure, the U.S. policies at the federal and state level must incentivize changes in the current economy to serve developing and urbanizing nations with a growing capacity for goods and services. With current U.S. export levels at only eleven percent of GDP, compared to forty percent in Europe and China, our work is cut out for us. Currently, only four percent of U.S. companies export goods and services.

But there is more to the story of the next economy. Policy analysts Bruce Katz, Jennifer Bradley, and Amy Liu, writing in their November 2010 report for the Brookings Institution and Rockefeller Institute, identify exports as but one

of three necessary economic pillars. The second is a targeted investment strategy in research and development, which makes innovations possible. The third is for states and metropolitan areas to become new hubs for innovation, and for economic development to fuel our export capacity. A direct corollary to state and regionally-based economic leadership is investment in human capital. States must stay the course on workforce development. Key to this development will be a variety of programs and partnerships to equip new and returning students with the right skills to support and advance innovation, manufacture new products, get those products to the right markets, and carry on productive lines of research that will result in new and promising products and services.

While it may seem counterintuitive in an era of global interconnectedness, analysts and policy makers at the federal level identify the states as the best hope for restarting our ailing economy.¹ The evidence is growing that state and regionally-based economic clusters are proving to be economic success stories. For Maine, and the other forty-nine states, this is profoundly important news.

Regional Economic Clusters as the Clarion Call

Discussions about the next economy are populated with such terms as “economic cluster,” “skill-based clusters,” “state and regional innovation clusters,” and “economic ecosystems.” It is a vocabulary that may be helpful in drawing useful distinctions between the organization of the current economy and the next economy.

For example, by and large our current economy is based almost exclusively on mass production of goods and services by large corporations, with elaborate networks of suppliers of necessary components, labor, and R&D located around the globe. If you have ever called your computer manufacturer for help with a problem and found yourself talking with a technician in India, you have firsthand experience with this model. On the other hand, if predictions hold, the next economy will be based on regional clusters of interdependent companies, educational institutions, organizations, and a labor force in geographical proximity to one another, all leveraging regional assets but also developing conduits to strategic markets around the globe.

These economic clusters are built from the bottom up, not the top down, with the purpose of developing a common sector of the economy such as biofuels, composite materials, electronics, medical and biomedical devices, specialty foods, beverages, media, or wind energies. Michael Por-

ter (1998) calls these place-based strengths “local things,” and they include trade associations, suppliers, specialized training programs, community colleges, college and university departments, out-of-school learning environments such as science and technology centers, tech-transfer offices, financial institutions, and local governments. If brought together in strategic and thoughtful ways, these “local things” become the sustaining infrastructure of an economic cluster.

Where developed and sustained over a period of time, clusters have proven to yield significant advantages to local and state economies (Munro & Katz, 2010). Increased regional prosperity, higher wages for employees, less likelihood for outsourcing of labor, and an increased number of business spin-offs, which, in turn, yield more regional jobs, are at the top of the list.

Regional economic or innovation clusters are not new: Michael Porter and others have been bringing them to our attention for some time.² Likewise, different sections of the United States—including the State of Maine—have been working at developing and learning about cluster-based economies since the late 1990s. So what have we learned from our experience in Maine?

Maine and Economic Clusters

The concept of “clusters” has been a part of Maine’s economic development strategy for almost a decade. Beginning in 2002, the Maine Science & Technology Foundation released a study that identified seven technology sectors.³ These sectors were identified as promising economic areas in Maine for increased investment in research and development. In 2006, the Brookings Institution’s report *Charting Maine’s Future* affirmed the sectors identified in the 2002 Maine Science & Technology Foundation report, and added two more. Each sector was identified for its significant potential to encourage economic development in Maine:

- Forest products
- Agriculture, organic farming, and specialty foods
- Cold water aquaculture
- Marine research
- Information technology
- Biotech
- Toxicology
- Advanced composite materials
- Outdoor recreation and tourism

More recently, the Office of Innovation, as part of the Maine Department of Economic and Community Development, and the Maine Technology Institute released their report, *Maine’s Technology Sector and Clusters: Status and Strategy* (2008). This report also calls out the promise of regional economic clusters as part of a comprehensive and transformative economic development strategy for Maine.

The Brookings report and the Sector and Clusters report affirmed that economic clusters are a promising strategy to grow economic capacity. At the same time, each acknowledged that cluster growth in Maine has been uneven. Those that have endured have not in fact produced significant economic gains for the state. *Charting Maine’s Future* concludes, “Despite much ongoing achievement in growing an interesting collection of distinctive, innovative sectors and clusters, the state has much more work to do to ensure that these mostly very small networks of companies grow into significant producers of good-paying jobs in the future.”

Both reports agree that weakness in the readiness of the Maine workforce is a major culprit. The current skill profile of Maine’s workforce does not support growth or a return on investment among existing clusters, with the exception of the composites cluster (explored below). Simply put, among many Maine-based sectors and clusters there has been a mismatch between available skill sets and the needs of many of the firms, start-ups, and industries populating Maine.

By contrast, in several other states the return on investment in economic clusters has arrived more quickly, in large part because of early inclusion of regional education institutions, especially community colleges and undergraduate institu-

“Southern Maine Community College’s Maine Advanced Technology & Engineering Center (MATEC), has played and will continue to play an important role in meeting the composites cluster’s critical workforce needs.”

tions, in a comprehensive plan to address workforce development. Below are some examples (Muro & Katz, 2010).

“It is critical for businesses to have a talent pool that aligns well with the technical, research, administrative, and educational needs of specific economic clusters.”

Puget Sound Interactive Media Cluster. Built off the Seattle area’s talent base in art and design software, the region’s video game industry cluster boasts over 15,000 well-paying, high-skilled jobs across 150 companies, generates \$4.2 billion in annual output, and supports an additional 50,000 to 68,000 jobs throughout the Washington State economy. Region-wide, jobs at established employers grew by fourteen percent (or over 5,000 workers) between 2006 and 2008, and eleven educational institutions offering curriculum around video game development continue to supply the sector with needed new talent.

Vermont Artisanal Cheese Industry. Growing from roughly a dozen members in the mid-1990s to nearly fifty today, the growth trajectory of the Vermont Cheese Council represents the great strides that the state’s small but fast-growing and award-winning cheesemakers have made in this value-added niche market. Since 2003, the cluster has posted double-digit growth in production, and continued expansion is supported by industry-organized collaborative marketing and distribution efforts. This regional economic cluster developed an Institute for Artisan Cheese at the University of Vermont,⁴ the nation’s first and only center for education, research, and technical transfer services devoted to expanding and advancing the artisanal cheese industry. The Institute contributes to the latest scientific research and expertise related to dairy and cheese products, and encourages the sus-

tainability of the small-farm culture in Vermont and other rural landscapes nationally and internationally.

The Dan River Region in Virginia. The Future of the Piedmont Foundation, a regional group of private business leaders formed in 2000 to address the economic crisis facing the Danville/Pittsylvania Community (the Dan River Region) of Virginia, produced Learning, Working, Winning: Bringing the New Economy to the Dan River Region, a strategic plan to resurrect the economy of the area. It resulted in the creation of the Institute for Advanced Learning and Research (IALR). IALR⁵ is developing a new economic base for the region using state-based educational institutions to prepare a workforce that matches the needs of regional economic clusters. IALR serves as a development umbrella. The Institute also houses four research and innovation centers in robotics, motor sports, horticulture, and forestry and polymers, which are linked to existing industry, agribusiness, and other regional assets.

These examples from Vermont, Puget Sound, and Virginia, suggest the centrality of education as an explicit and transformative strategy in growing and sustaining regional economic clusters. It is critical for businesses to have a talent pool that aligns well with the technical, research, administrative, and educational needs of specific economic clusters.

The Transformative Role of Education in a Cluster-Based Economic Strategy

If the Great Recession has had any positive effects, one of the unexpected benefits is this: those not currently in the workforce have received an opportunity to inventory their skill-set in relationship to what the current job market is seeking, and to discover ways they can retool to fill those new jobs. It is also providing educational institutions with the same opportunity to rethink their relationship with the local economy—and this is especially true for community colleges. Times of economic and social transformation do indeed upset lives and institutions, but they are also opportunities to be more strategic in planning for the future, allowing new economic structures to develop that are transformative rather than diminishing. Maine has a case in point—the promise of the composites cluster.⁶

Composites are engineered materials (wood, fibers, fabric, and polymers are examples) put together in particular and unique ways to meet emerging

demands for new products. The business of mixing up new “stuff” may sound simple, but it is a very research-intensive process. Without creative collaborations between engineers and scientists, especially chemists, during the last fifteen years or so, Maine would not have a cluster strategy built around composites.

Composites are used in many contexts: boat building, recreational and defense applications; aerospace; alternative energies sources, such as the large blades for wind turbines; hybrid composite concrete bridges; composites that utilize recycled materials; materials used to manufacture automobiles; and countless materials used in defense industries, such as high impact wood composites for blast-resistant structures. In general, composites are characterized by their flexibility, yet durability, and their strength without added weight.

Midcoast Maine has become a hub for the composites industry because of a broad range of composite-based companies in the area, product distributors and users, conduits in research and development, strategic redevelopment work, and workforce education and training—the “local things” that make it much more likely that a cluster forms and prospers over time.

Notably, Brunswick, Maine, which is home to Southern Maine Community College’s (SMCC) Maine Advanced Technology & Engineering Center (MATEC), has played and will continue to play an important role in meeting the composites cluster’s critical workforce needs. MATEC is dedicated to working directly with composite-based companies in Maine to develop specific training programs based on industry needs. It is a very promising scenario, but not one that happened by chance. On the contrary, over the years systemic and strategic ingredients were brought together to advance composites as a sector around which state-based resources, educational institutions, communications strategies, research and development, and investment strategies could “cluster.” Some of the particular systemic and strategic ingredients are:

- Significant growth and diversification of research is taking place at the University of Maine’s Advanced Engineered Wood Composites Center at Orono, including high levels of patent and spin-off activities. There, specific composites that support alternative energies will be further enhanced through the 2011 launch of the University’s new Off Shore Wind Laboratory.
- Well-functioning trade associations are coming together, including the Maine Composites Alliance,⁷ Maine Built Boats, and the Maine Marine

Trades Association along with the Midcoast Regional Redevelopment Authority (MRRRA) and North Star Alliance.

- There is growth in the diversification of composite markets, and the ongoing development of products in high need areas and emerging national and international markets, including the defense industry.
- The U.S. Department of Labor WIRED grant awarded to Maine (2006) brought together industry, university research, and workforce training through community colleges and education resources, developing a networked and integrated approach that furthered composites as an economic cluster in Maine and leveraged additional funding.
- Expansion of SMCC includes plans for its new Midcoast Campus and the MATEC, to be located on property formerly part of the Brunswick Naval Air Station. The campus will focus on high-growth fields of study that support economic development such as composites.⁸ This expansion came about through a partnership between SMCC, government, industry, and the University of Maine System, which is expanded on in the Journal’s following article, “Collaboration and Transformation: A Conversation with Two Innovators.”

These five concepts condense and oversimplify a very interesting story worthy of telling in greater detail. Even in this abbreviated version, however, is the centrality of workforce readiness, and of workforce training and education being necessary to sustain the growth of the composites cluster. Without education as a full partner in a cluster strategy, quality of workforce too easily becomes a second tier concern, as is suggested in Charting Maine’s Future.

“Without education as a full partner in a cluster strategy, quality of workforce too easily becomes a second tier concern...”

A study of the ecology of enduring economic clusters reveals that they are found in regions of the country or in states in which education—especially community colleges on their own and in partnership with four-year colleges and universities—are active partners in workforce development, economic growth, and overall quality of place. Community college and four-year-college partnerships provide the opportunity to consider workforce readiness as integral to future transformation and innovation in multiple sectors—research, manufacturing, communications, alternative energies, education, healthcare—the list is long. If the call for states to assume a greater role in generating national and international economic activity is the right one to make, then education, the economy, and the states are critical collaborators.

“Community college and four-year-college partnerships provide the opportunity to consider workforce readiness as integral to future transformation and innovation.”

Jean Moon, Ph.D. is the Founder and Principal for Tidemark Institute, in Damariscotta, Maine. She has had an extensive career in the arenas of education policy, research, and practice. Prior to founding Tidemark Institute, Dr. Moon was at the National Academy of Sciences in Washington, D.C.

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Dr. Robert Kennedy

Earlier this spring, we sat down with Southern Maine Community College President James Ortiz and University of Maine President Robert Kennedy to discuss the collaboration and economic impact of the Maine Advanced Technology & Engineering Center (MATEC). Located at the site of the former Brunswick Naval Air Station, MATEC is a partnership between SMCC and the University of Maine that will drive economic development by fostering innovation in the areas of engineering, composites, and manufacturing.

Collaboration and Transformation:

Describe the partnership that you have developed at MATEC. How did it begin and what inspired the connection?

Robert Kennedy: Hopefully some of the comments I make will resonate with Jim. It really is a true partnership. I think although we were somewhat on parallel tracks—SMCC and Jim, and UMO and myself—we came to this concept independently.

It sort of crystallized when we were both seeking state support through the Governor's office and the legislature. That is why it has as much potential as it does, and why we are as excited about it as we are: it is really a good idea that fits both institutions as well as one of the greater needs of the Brunswick area and the State of Maine.

It's a natural collaboration that came to us both quite independently but simultaneously.

James Ortiz: I agree with that. SMCC sought a campus for the Midcoast area, the Brunswick area, initially because we had reached capacity in South Portland. Last year we had over 7,000 students, and we turned away quite a few applicants. So we were searching for a place to go. Then, when the Brunswick Naval Air Station announced it was going to close, it was a natural area for us.

A Conversation with Two Innovators

Recognizing that the naval base was an economic opportunity for the State of Maine, even though it was a big loss for the state, the Governor sought to make use of the base to increase economic opportunity and change the economy of Maine. The thought was that having a higher education institution on the base would be an attraction to companies and we would help the companies advance.

We were trying to figure out how we could work with the University and provide a full-fledged opportunity for companies. Last summer, on a Saturday morning, Bob gave me a call and said, “We really need to work together to provide that opportunity.”

Bob Kennedy has been a wonderful partner and a great leader. We had a couple of telephone calls and came up with the name, Maine Advanced Technology and Engineering Center, which really would meet the need of Maine because, at this point, the lack of engineers creates a barrier to economic development.

It is so important to the population of Maine to obtain the skills that today’s companies need. These companies are looking for a new workforce and this new workforce really has to have strong skills. That is where the partnership with the University came in: to provide people with the opportunity of becoming engineers, not only at the associate degree level, but also at bachelor and master’s degree levels.

Kennedy: I am really glad that Jim talked about the collaboration in terms of producing engineers. The combination of the two institutions will be able to do that at the bachelor and graduate levels. At the bachelor level, the University produces probably 90% of the engineers in Maine, and yet we are in an area not accessible to the greater part of the population of the state.

Collaborating with SMCC in the Brunswick area and utilizing the facilities that are already there is really wonderful for the state. I think we are seeing the success of that, even with the ribbon cutting that was held a few days ago. Jumping ahead just a little bit, the proof of concept is already materializing.

Ortiz: Very much so, Bob. We already have been working with Bob’s people in designing a new type of educational environment. I am not that up on high technology, but the only way I can describe it is what I call Starbucks class-



Dr. James O. Ortiz

rooms. Rather than having traditional seating, the students will have their own computers and sit in comfortable areas with the faculty member—whether they come from Orono through distance learning or are physically next to them—mentoring the students as they go through special labs.

This will be a model for all other colleges and universities. Not only are we working



together in this environment to produce more engineers, but it is also an environment that is different, new, and will serve as a model for other institutions.

Does being on a former naval air base, with businesses right there, and the two institutions collaborating, provide unique opportunities for students?

Ortiz: Let me take a shot at it. Quite a few companies are coming to us and chatting. They are expanding or developing. There is a company that is going to build brand new aircraft there. There are high-end companies coming in; some that focus on composites, but all that need people with engineering backgrounds. Right now, they are having a difficult time finding that population. They need individuals at the entry level, and they are looking for a different type of individual than in the past.

Then, it was people who are loyal, hardworking; which Mainers are. But now they want people who are loyal, hardworking, and also who are problem solvers and entrepreneurs. They want people who have the skills but can also serve as middle managers right away. One thing that the recession has produced is people who have strong backgrounds, a lot of them in finance, who because of the recession are looking to move into new areas.

We are modifying our curriculum to the extent of finding out what skills people have already and helping them to move over to upcoming opportunities—aircraft, composites, wind power.

Employees all need to have very strong backgrounds in math and engineering. We are being forced to look at things differently, and we are. I think the University really is expanding its efforts. The University of Maine is already working with Bath Iron Works and will be able to expand that relationship.

It is going to be exciting—a different way of looking at things and doing things. But I think it is what the State of Maine needs. And the University and the College are ready to jump in.

Kennedy: I certainly support and agree with everything that Jim just said. I will expand just a little bit. One of the real benefits of the collaboration is that the two-year and the four-year programs can lead to graduate training. Sixty percent of the state's engineers are within sixty miles of Portland, which includes Brunswick. So the target market really is included within the Brunswick area.

BIW, one of the largest employers in the state, would like to have many of their engineers who are trained currently at the BA level receive graduate training. So this is an entrée to provide additional education to the engineering workforce at BIW, for example, or those sixty percent of engineers in the southern Maine area.

Just looking at a statistic here, manufacturing jobs add \$200,000 per employee, per year to Maine's GDP. It really is a top of the line factor in

terms of economic development for the state.

To emphasize one of Jim's points, Maine ranks 49th in per capita graduation rates for students with engineering BAs.

The other thing I would say is that through a NASA grant that SMCC and UMO got, we have already collaborated on developing the first two-year degree program. It will have all the requisite math and background courses that will allow students to go on for the next two years or a bachelor's degree. So it's a pathway for students in a two-year program of study to complete their BS degree.

To show this is real and is happening already, we have been offering graduate level courses through MATEC since the fall of 2009. And so far, ten courses have been offered toward a master's degree in various engineering courses of study.

So it is happening, the collaboration is very good, and the facilities and the leadership that SMCC has played in developing those facilities is really what is permitting this collaboration to work. Just to emphasize again, a lot of the graduate courses will be online. So it will be people from within that fixed area but other areas as well.

Ortiz: That is going to be a strong point.

One thing I am extremely pleased about is that the University of Maine, which is the land grant institution of the state, is research oriented, and we are looking forward to working with the initiative the University has with offshore windmills. There are now conversations with Habib Dagher focused on bringing two wind blades, one for the University of Maine to work on, and one for the Midcoast campus.

We will put it in a nice place that will be very obvious and will allow our students to learn how to repair blades, which is critical to the State of Maine. I don't know if you were aware of that type of discussion, Bob, which certainly demonstrates that, as the University does its research, the College will be there to support the training required if the state is to take full advantage of the research it is doing.

One of the interesting things that Bob and I have chatted about, and I am pleased with the conversation, is that both institutions have a history of following the American tradition of pragmatism. That we provide higher education, but we do it in a manner that helps the economy. That was the whole idea of land grants and the whole idea of community colleges. It is a natural fit that allows both institutions to fulfill our missions and do it in a

complementary way, creating that new model.

Kennedy: Jim, I did not know about the two blades issue with Habib and the composite center providing a blade for SMCC at Brunswick—it's fabulous! That really illustrates the comprehensive and integrated way we are approaching this. As much potential as alternative energy and offshore wind have, there is also a dire need for



the maintenance and service industry. It shows a unique partnership that can develop out of this as well. Thank you, Jim.

Where you are collaborating not just with each other, but with the wind industry, or the boat building industry, or some entity in the private sector, how do you go about approaching them? What has been the reaction? Or do they

approach you and say we have an idea that we think it might work with your collaboration?

Kennedy: I think it probably goes both ways. The University of Maine has formal working relationships with 2,500 business and organizations across the state. So in some cases we might approach them; in other cases they might approach us, even a business that we have not worked with in the past.

As Jim pointed out, both of our institu-



“What you see is that where there is a need, we are asked to participate, and the relationship is so good that we don’t need to discuss it very much.”

tions have very practical, pragmatic orientations to our work. So when approached with a good idea we think we can help with, we are certainly happy to do that.

Ortiz: What has been happening here is that as companies are moving in, they are reaching out to us. Just as an example, the authority that is developing the base, MRRRA [Midcoast Regional Redevelopment Authority], asked to meet with a University representative. The dean from the University, Dana Humphrey, and I went and met with them. The issue came up that there was a school at the base when the navy was there, teaching aeronautics, and when the navy left they decided to leave also, essentially leaving a void because the Authority is seeking aeronautics companies for economic development. So they asked both the University and SMCC, will you jump in and take over developing an aeronautics program? The University already has several courses in aeronautics; at this point we don’t.

We looked at each other, Dana and I, and said, “Why not? We are already working on several things.” So very quickly we agreed that we would proceed and provide an aeronautics program. Dana said that he would be very supportive to the college initiating our program, just like he was in developing the engineering program.

What you see is that where there is a need, we are asked to participate, and the relationship is so good that we don’t need to discuss it very much. Very quickly we said sure, we would provide any support to aeronautic companies that come in.

And there is already one there, Kestrel Air?

Ortiz: Yes, they are already there. And they are in conversation with the University and they are having conversations with us.

Kennedy: One of their executives was here recently and I had the opportunity to talk with him. I think some of the press from the ribbon cutting a few days ago said they have plans to hire about 300 people and add significantly to the Maine economy. The executive who was here said one of the motivational forces behind them moving to Maine from Minnesota was the collaboration of the two institutions. I think that really shows the evidence of what this kind of collaboration can mean.

You have both mentioned that the collaboration will pay dividends quickly. Do you have a way to measure the fruits of the collaboration over the long term? Either by using statistics or by tracking students after graduation?

Kennedy: I mentioned earlier the added value for employees that manufacturing has. I think two thirds of engineers that graduate with bachelor's degrees from the University of Maine stay in the state for their first job. If you assume they are in the manufacturing sector, that adds about \$200,000 per year, per employee. By comparison, the food service or hospitality industry adds about \$45,000 per year, per employee. So it's more than double the economic benefit to the State of Maine if we can keep them in the state. Kestrel alone is going to be adding about 300 people. It doesn't take many firms to move in and collaborate with the two institutions to have a significant impact on the economy.

Ortiz: Both institutions work with the DOL. Essentially we give them information about our graduates and they are able to follow people throughout their lives and give us feedback and information as to what their income is and what field they are in.

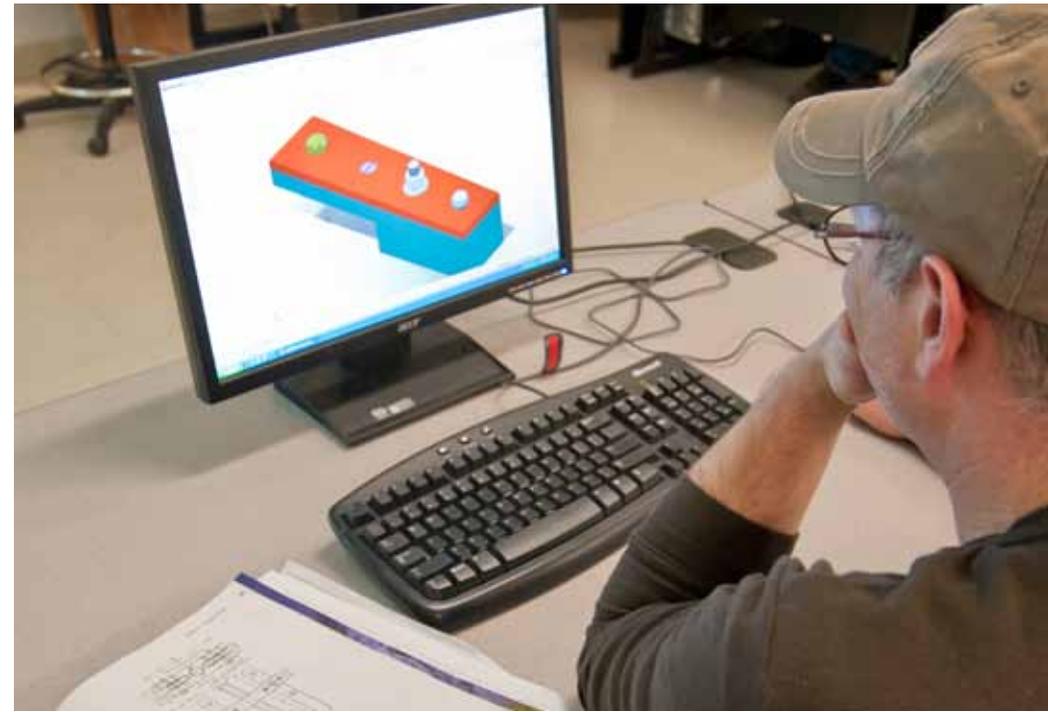
And it is amazing, much more than I expected, but our graduates, very quickly, are able to pay back their investment. Within one year they earn enough money to cover the investment they made to get their degree.

Something exciting that is happening is the turnaround to how people view the entire field of engineering. It has been our experience that one of the problems we have in our population, and I think this is national, is the fear of math. Very few people take math, which is so fundamental to all of our careers.

What I am finding in conversations with high school superintendents and principals is that the mere fact of having the engineering program at the Midcoast campus, which is a reasonable commute for people in this area, means that schools are beginning to develop engineering prep programs. Also, students are taking more math and more science, in preparation for going into a field that will create a life for them that will be much better than if they did not go into that field.

So the State of Maine is developing a base to become more math friendly and allow people to go into engineering programs and other disciplines that require very heavy mathematics. We will be producing a population that is not afraid of math and will enter these programs quickly.

Kennedy: That is a really good point. We are tending to concentrate on the engineering side, but the curriculum at both institutions will cover areas other than just engineering. For example, math and science; and those areas, the so-called STEM areas, are really necessary for the future workforce and economic development of the state. So while the focus is on technology and engineering, it really extends beyond that.



“We will be producing a population that is not afraid of math and will enter these programs quickly.”

Well, there are a lot of really good things going on here; the strength of the partnership is part of that. But what else do you attribute the success to and what do you see next? Long term?

Kennedy: I will speak from my perspective. Through Jim's leadership, and that is an awful



“SMCC has expanded and grown and really met the needs of the region.”

lot of it, SMCC has expanded and grown and really met the needs of the region. Jim and the culture he has developed really have provided an entrepreneurial, creative environment. Because of that, it was really easy for us to partner, and to want to partner in a way that we could not have accomplished by ourselves.

That culture really permeates the whole institution, and SMCC is just overwhelmed with student demand. It allows resources to be deployed very efficiently. I would certainly compliment Jim's leadership and what has happened at SMCC over the past few years and hopefully some parallel tracks are happening here at the University.

I think it is a partnership that, if not unique, at least is very special and very much needed here in the state. And, quite frankly, it might be unique in how the two institutions are collaborating, if you look across the country.

Ortiz: In the State of Maine there have been some difficult relationships between various colleges and universities. It has to do with the old tradition of silos; some universities and colleges have their missions and they have not been able to cooperate very well. But our economy has changed so much that it demands partnerships just like any other new development.

We have been able to develop this partnership because of Bob's vision. He was the one who took the lead. It was a big jump because we are both responsible for our internal operations. People have different ways of looking at it. But Bob just said, this is what is necessary and important for the State of Maine, and took that leap.

It has worked out perfectly, and I think what is happening now is that other institutions are looking at what has gone on and are saying, we want to be at the Midcoast campus. Because of this initiative we are seeing that we are going to have a collaboration of various colleges and universities in the Midcoast area, each with their own expertise that will be a fantastic critical element to the economic development that the State of Maine needs.

To have any type of movement you need a leader who will take a risk and jump in with vision; and Bob is ours. When I heard Bob is retiring, I had an anxiety attack!

Kennedy: I appreciate Jim's comments tremendously. The other part of the leadership and vision was Governor Baldacci. He supported this and really saw the value of the two institutions working together in a unique

way. He supported a budget proposal before the legislature for a bond referendum of \$5 million, which ended up being \$4.75 million. The legislature supported that. Then it was sent to referendum before the voters of Maine. And I believe that of all the referenda that were considered at that time, it passed with the highest margin.

So, while Jim and I worked with others on our campuses to put this program together, for whatever reason—and I think it was because of careful planning, collaboration, and the uniqueness of the opportunity—the Governor, the legislature, and the people of Maine supported it.

This would not be happening without that. Despite some initial skepticism, and there was some in various quarters, I think people saw the value and were willing to give it a try; and the fruits of their labor will be richly rewarded.

Ortiz: Bob is very right. When we had the initial conversation the economy was in good shape. For the bond issue and the establishment of the Midcoast campus, we had to go to the legislature. By that time we were in the recession and the reaction of the legislature was, you are asking for money at the worst possible time. But they approved the bond and the establishment of these programs with the expectation that we will develop an economic development vehicle for the State of Maine.

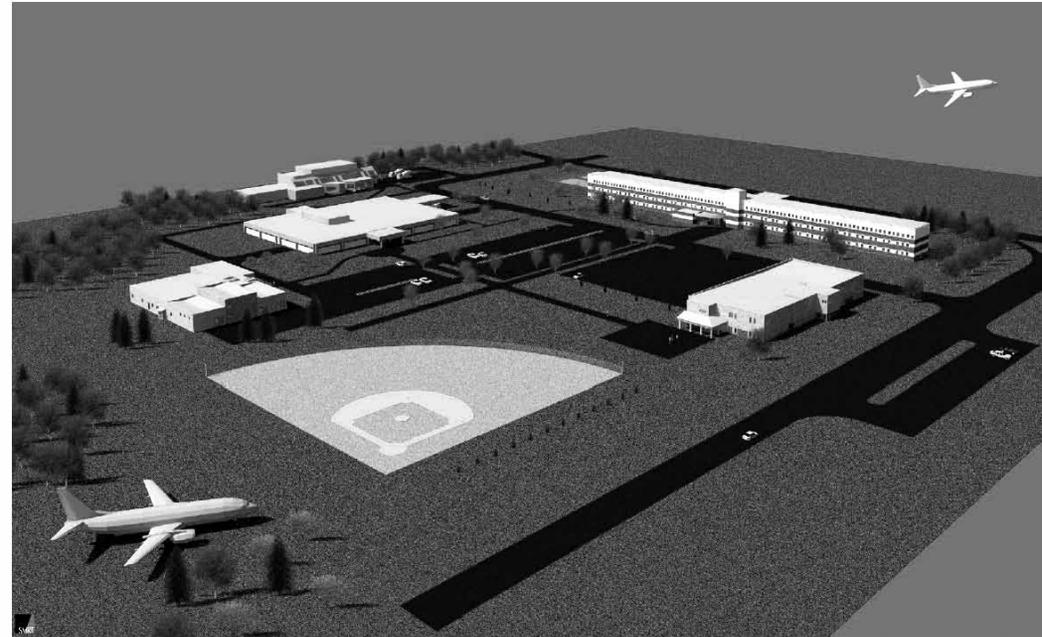
It passed unanimously through the Appropriations Committee, the Governor signed the bond, and, as Bob indicated, the public supported it, as does the current governor. That has allowed us to take the five buildings at the Midcoast campus that the navy provided us and make them accessible to all students, which they were not before. These buildings will also be high-end classrooms and labs that we need for the programs we have in place.

The college is now going through the process of having our trustees approve the new programs, and that is going to happen very shortly. We have not even advertised them yet, and we have people applying for engineering programs. We have to speak to them and tell them that they will be in place, they will start in September, but it's just moving forward as Bob indicated

Kennedy: As a side bar, I was at a meeting in Boston of the SBA a couple of weeks ago, and Karen Mills—the Administrator of the SBA who was appointed by President Obama and just happens to live in Brunswick—

she opened her remarks to several hundred people by talking about the exciting collaboration between our institutions and what it can mean to businesses and economic development. I felt very good sitting there in the audience, hearing that.

Ortiz: Yes, she has been very supportive.



“...we are seeing that we are going to have a collaboration of various colleges and universities in the Midcoast area.”

Has the success so far, and the obvious potential, attracted interest from others in the region or nationally? Or is Maine still the only one blazing this trail?

Ortiz: Now that Karen Mills spoke, we may get some. I am not aware of states jumping in right now.

Kennedy: On a national scale, perhaps it's a little early yet for others to be aware of what is happening until it is further developed. I do know that in my home state of Minnesota they know about this. They are also the state that lost Kestrel Aircraft, so they are well aware of that company moving from Minnesota to Maine. They are looking at this partnership and considering options that they might do to have collaboration in higher education in a similar fashion.

Is there anything else you would like to add?

Ortiz: I think that what has gone on, just in conversations with people I have met and the staff here, all of this is very exciting. At a time when the economy is in bad shape and people feel uncertain about what is going to be happening, we are developing an opportunity not only for the state of Maine, but also for the people of Maine.

One of the things that will help the state is to bring in jobs that are high end. These will allow people to earn good salaries. Consequently, the state will have more revenue.

Rather than being viewed as a state off the main road and mostly dependent on tourism, this effort will bring a different way of looking at Maine: as a state that is advanced in the technical fields, engineering in particular. I think the people of Maine will be very proud of that.

I think SMCC's relationship with the University of Maine will create a different way of looking at education, that education is very important to the state.

Right now, when you compare Maine to other states in New England, we have the lowest rate of people with degrees. I think that we are starting to move, and in the near future we are going to be up there with other states; we are not going to be behind.

For my career, and me, as I plan to retire, it is a very exciting experience and my relationship with Bob has been exceptional.

Kennedy: Thanks, Jim. I feel the same way. This is very, very exciting. This has developed, and, as exciting as it is, it has resulted from a confluence of factors. There is no one factor. But it's very exciting. Our economy and the challenges we face as a society and as a nation require a little bit of calculated risk taking, and I think that is what all of us have done in this.

It has enormous potential and we are already starting to see it pay off.

Dr. James Ortiz became president of what was then Southern Maine Technical College in February of 2002. Under his leadership, the college transitioned to a comprehensive community college and became the fastest growing community college in New England. Before coming to SMCC, Dr. Ortiz served as vice president of academic and student affairs at Bunker Hill Community College in Boston. He holds a doctorate of education in policy and administration from Boston University.

Dr. Robert Kennedy became the University of Maine's eighteenth president on April 15, 2005. He arrived at UMO in 2000, first serving as vice president for academic affairs and provost, followed by an eight-month stint as interim president. He holds a Ph.D. in Botany from the University of California, Berkeley.

Interview was conducted by David Loughran in coordination with Glenn Cummings.

The Midcoast Campus: A Model in Education & Economic Development



by Charles Lawton, Ph.D.

In June 2010, Maine voters approved a \$23.75 million bond to create jobs and promote economic development. Of that amount, \$4.75 million was allocated to Southern Maine Community College to develop a new campus at the former Brunswick Naval Air Station. The challenge presented to SMCC by its Midcoast Campus is extraordinary—“an entirely new model of higher education in Maine.”¹ To meet this challenge SMCC undertook an effort to:

- Identify the industries most likely to grow in Maine over the next decade, particularly those targeted by the Midcoast Regional Redevelopment Authority (MRRA) for the Brunswick Landing Research and Development Center at the former naval air station;
- Translate industrial development job targets into occupational job targets;

- Identify gaps in Maine’s current educational offerings, i.e., areas where the growth of demand for skilled workers exceeds the growth of supply of qualified trainees and graduates; and,
- Investigate ways to design, equip, and organize an educational curriculum and delivery system that brings educators, employers, and employees (both current and potential) into an effective partnership committed to filling the skills gaps and thus achieving job growth targets.

Target Industries

The Midcoast Regional Redevelopment Authority (MRRA) will soon take title to the former Brunswick Naval Air Station. This facility has over two million square feet of commercial and industrial space, a world-class aviation complex, and 1,000 acres of open space. MRRA intends to develop the facility as an industrial-research-education complex focused on aviation, renewable energy research, and high-skill, high-growth manufactur-

THE CHALLENGE
AND OPPORTUNITY
OF BUILDING A
NEW APPROACH
TO HIGHER
EDUCATION
BASED ON
RIGOROUS DATA
ANALYSIS

“SMCC’s Midcoast Campus will be designed to serve that mission by supporting the training needs of the businesses that are now located in the greater Portland metropolitan region.”

ing.² SMCC’s Midcoast Campus will be designed to serve that mission by supporting the training needs of the businesses that are now located in the greater Portland metropolitan region or that will come to the region, especially those seeking to locate at the former naval air station, now called Brunswick Landing.

While the SMCC campus is located in Brunswick, it should not restrict its scope of service just to businesses now in the Midcoast area. As has been regularly documented, most recently in the State of Metropolitan America report by the Brookings Institution, the greater Portland area is home to a far greater proportion of the state’s jobs and earnings than of its population.³ Greater Portland is the economic engine for the state as a whole, creating jobs for workers who commute from all over the state. To serve its region, therefore, it makes sense to include in this investigation any industry with a reasonable prospect for growth in Maine, even (or perhaps particularly) if it does not now have a sizeable presence in the state.

The most recent industry and occupational projections published by the U.S. Department of Labor are for the 2008 to 2018 period.⁴ They indicate nearly 21,000 additional jobs in Maine by 2018. For the purposes of guiding SMCC’s program development, several adjustments to these projections can be made. Declines in transportation equipment are dropped as an overstated effect of trends in the national auto industry and a failure to account for the potential growth of the aeronautics industry at Brunswick Landing. The projected employment loss in computer and electronics and electrical equipment manufacturing can be discounted, as being offset by known expansions in Maine’s electrical transmission grid

and ongoing development in the state’s renewable energy components industry. It’s also possible to add another 4,000 jobs for successful attraction and development of new companies at Brunswick Landing, bringing the total projected job growth to approximately 26,000.

A total of 26,000 new jobs over a ten-year period may not seem a large number in a state economy with over 600,000 jobs. It is less than the number of jobs lost during the Great Recession that began in 2007. It is important to remember, however, that these are targeted jobs in high growth sectors. If Maine can succeed in filling these jobs, the wages they pay and the supply chain linkages to suppliers they will generate will create sales for many existing Maine businesses, and thus many more jobs that are not specifically targeted as the focus for SMCC’s program development. Table 1 presents a summary of this targeted job growth by industrial sector.

Target Occupations

Having determined the target industrial sectors on which the SMCC Midcoast Campus should focus, the next step is to estimate the occupational breakdown of the new jobs in these sectors. Just as the NAICS Code system categorizes businesses according to the primary type of product or service made by a company—food, electrical components, telephone network repair, a hotel room—so the Standard Occupational Code (SOC) system categorizes workers within businesses according to what they know and do. The U.S. Department of Labor groups workers with similar job duties and in some cases skills, education, and/or training into one of 840 detailed occupational categories.⁵

The task for SMCC’s program development,

Table 1. Target Sectors for SMCC Midcoast Campus Program Development

TARGET INDUSTRIES	NAICS	Average # of Employees, ME		Employment Change, ME		U.S. Percent	Target Growth
		2008	2018	Net	Percent		
Hospitals	622	30,879	35,204	4,325	14.00%	11.90%	4,500
Ambulatory Healthcare Services	621	25,944	29,013	3,069	11.80%	35.60%	3,200
Accommodation and Food Services	720	51,800	54,142	2,342	4.50%	8.70%	2,400
ISPs, Search Portals, and Information Services	518	25,449	27,145	2,709	10.60%	47.30%	3,000
Professional, Scientific, and Tech Services	541	24,436	26,132	1,696	6.90%	44.30%	2,000
Administrative and Support Services	561	23,445	24,921	1,476	6.30%	19.30%	1,500
Construction	230	29,375	30,644	1,269	4.30%	18.50%	1,500
Nursing and Residential Care Facilities	623	22,919	23,995	1,076	4.70%	21.20%	1,200
Social Assistance	624	18,425	19,442	1,017	5.50%	31.60%	1,200
Sightseeing Transportation and Transport Services	487	8,509	9,011	776	9.10%	20.70%	700
Arts, Entertainment, and Recreation	710	8,235	8,737	502	6.10%	18.50%	500
Chemical Manufacturing	325	1,986	2,341	355	17.90%	-6.70%	500
Motion Picture and Sound Recording Industries	512	1,385	1,728	343	24.80%	12.40%	500
Fabricated Metal Product Manufacturing	332	5,671	5,859	188	3.30%	-8.50%	400
Transit and Ground Passenger Transportation	485	1,432	1,566	134	9.40%	14.70%	150
Miscellaneous Manufacturing	339	2,005	2,132	127	6.30%	20.30%	250
Plastics and Rubber Products Manufacturing	326	2,669	2,793	124	4.60%	-7.70%	250
Beverage and Tobacco Product Manufacturing	312	1,230	1,309	79	6.40%	-9.10%	100
Waste Management and Remediation Services	562	1,711	1,781	70	4.10%	25.20%	100
Air Transportation	481	336	396	60	17.90%	6.50%	500
Machinery Manufacturing	333	2,193	2,241	48	2.20%	-7.60%	250
Utilities	221	1,865	1,905	40	2.10%	-9.60%	200
Truck Transportation	484	5,951	5,990	39	0.70%	10.60%	100
Computer and electronic product manufacturing	334	3,147	3,125	-22	-0.70%	-19.30%	250
Electrical equipment and appliance mfg.	335	614	563	-51	-8.30%	-13.50%	250
Transportation equipment manufacturing	336	9,300	8,323	-977	-10.50%	-10.50%	500
Total for 26 Target Industries				20,814			26,000

Source: DOL adjusted by Planning Decisions, Inc.

Table 2. Maine Occupational Demand

Occupational Code	Description	Jobs
11-0000	Management	1,261
13-0000	Business and Financial Operations	954
15-0000	Computer and Mathematical	1,518
17-0000	Architecture and Engineering	543
19-0000	Life, Physical, and Social Science	264
21-0000	Community and Social Services	512
23-0000	Legal	177
25-0000	Education, Training, and Library	292
27-0000	Arts, Design, Entertainment, Sports, Media	382
29-0000	Healthcare Practitioners and Technical	3,837
31-0000	Healthcare Support	1,904
33-0000	Protective Service	246
35-0000	Food Preparation and Serving Related	2,428
37-0000	Building/Grounds/Cleaning/Maintenance	836
39-0000	Personal Care and Service	1,057
41-0000	Sales and Related	711
43-0000	Office and Administrative Support	4,495
45-0000	Farming, Fishing, and Forestry	12
47-0000	Construction and Extraction	1,118
49-0000	Installation, Maintenance, and Repair	615
51-0000	Production	1,687
53-0000	Transportation and Material Moving	1,155
	Total, All	26,000

Source: Bureau of Labor Statistics, Standard Occupational Classification Policy Committee (SOCPC).

therefore, is to identify the SOC classifications for the target industries, add them up across all the industries, sort out those occupations requiring some degree of higher education, compare those education requirements to those already offered in Maine, calculate any gaps between skills needed and education programs offered, and use that gap as a guide for curriculum and program development.

After extensive examination of DOL sites and a discussion with Maine's Occupational Employment Statistics (OES) program manager, it was clear that we needed a common matrix across all industries allowing us to add the number of occupations required in one industry with the same occupation in another industry. We constructed a cross matrix of target industries consisting of 635 rows (one for each of the occupations covered) and twenty-six columns (one for each of the targeted growth industries).⁶ Table 2 presents the results of this analysis in order of Standard Occupational Code by major (two-digit) occupational category.

Skill Gaps

Having identified target industries with potential for significant growth in Maine, and having translated this potential job growth from industry to occupation, the next step in building the most appropriate educational program for the SMCC Midcoast Campus is to identify skill gaps. We needed to identify the education and training required to produce workers qualified for the 26,000 jobs identified above and compare that listing to the number of graduates currently leaving Maine's post-secondary institutions. Table 3 makes a first cut at this task by grouping the 26,000 targeted jobs by level of education/training required.

The jobs requiring education Levels 2 through 7 are appropriate as targets for SMCC. Level 7, Bachelor's degree, is included because SMCC should aim to provide a beginning pathway to such degrees in target occupations where there may be a skills gap. Jobs at these educational levels cover 406 specific occupations and total nearly 16,000 jobs.

The next step in the program development process is to link each of the 16,000 target jobs as they are divided over their constituent 406 occupations to specific educational programs, as categorized by the U.S. Department of Education's Classification of Instructional Program (CIP) Code.⁷ This will constitute the ten-year demand for whatever skill set each of these occupations requires. It is then possible to compare this demand to the ten-year supply of graduates from each associated program, and thus to identify skills gaps.

Occupations where the ten-year demand for workers exceeds ten times the most recent year's total number of graduates would appear to be instructional areas on which SMCC ought to focus in developing programs for its Midcoast Campus. Conversely, occupations where ten times the most recent year's number of graduates exceeds the projected ten-year demand

Table 3. Target Occupations by Level of Education/Training Required

Level	Education/Training Requirement	Definition	2008-2018 jobs
11	First professional degree	6-year academic program	571
10	Doctoral degree	3-year academic program beyond a bachelor's degree	75
9	Master's degree	1- to 2-year academic program beyond a bachelor's degree	436
8	Bachelor's degree plus work experience	4-year degree beyond high school, plus related experience	1,227
7	Bachelor's degree	4-year academic program beyond high school	3,085
6	Associate degree	2-year academic program beyond high school	2,948
5	Post-Secondary vocational training	Vocational training program	2,139
4	Work experience in a related occupation	Related experience leading to development of skills	1,770
3	Long-term on-the-job training	More than 1 year of on-the-job training or instruction	1,203
2	Moderate-term on-the-job training	1 to 12 months of on-the-job training	4,850
1	Short-term on-the-job training	Up to 1 month of on-the-job training	7,805
	All Levels		26,109
	Levels 2 through 7		15,995

Source: Maine Department of Labor, Labor Force Projections, 2008-2018.

Table 4. Supply-Demand Totals for Selected Educational Programs, 2008-18

Code	Field of Study	10 Year. Supply Assoc.	10 Year Supply Bach.	10 Year Demand Assoc.	Surplus or (Shortage) Assoc. Only	Surplus or (Shortage) Assoc. & Bach.
11	Computer and information sciences and support services	210	590	1,777	-1,567	-977
48	Precision production	570	0	1,625	-1,055	-1,055
49	Transportation materials moving	50	470	532	-482	-12
46	Construction trades	730	0	1,033	-303	-303
12	Personal and culinary services	380	0	660	-280	-280
41	Science technologies/technicians	70	80	246	-176	-96
42-44-45	Psychology, Public Administration, Social Sciences	280	10,220	413	-133	10,087
31	Parks, recreation, leisure, and fitness studies	60	1,220	138	-78	1,142
50	Visual and performing arts	90	2,950	146	-56	2,894
9	Communication, journalism, and related programs	310	2,260	250	60	2,320
01-03	Agriculture, natural resources and conservation	160	2,640	35	125	2,765
10	Communications technologies/technicians and support services	240	260	105	135	395
22	Legal professions and studies	510	40	118	392	432
47	Mechanic and repair technologies/technicians	1,370	0	398	972	972
43	Security and protective services	1,400	940	89	1,311	2,251
15	Engineering technologies/technicians	1,650	1,530	204	1,446	2,976
52	Business, management, marketing and related support services	4,140	7,370	2,325	1,815	9,185
51	Health professions & related biological & clinical sciences	9,000	8,160	4,373	4,627	12,639
27	Mathematics and statistics	0	610	416	n.a.	194
14	Engineering	0	2,220	330	n.a.	1,890
	Total	21,220	41,560	15,213	6,007	47,567

Sources: Department of Labor, Department of Educations and PDI analysis.

for workers would appear to be areas where SMCC could redirect its resources.

One problem with this approach is that not every one of the 406 specific occupations required by the targeted industries has one and only one appropriate education/training entry-way. Workers come to jobs in a variety of ways.

A technical writer, editor, or translator may come to his/her position from a program in CIP #09 Communications and Journalism, or through CIP #45 Social Sciences. A daycare provider or social service worker may come to his/her position through CIP #42 Psychology, CIP #44 Public Administration & Social Services, or CIP #45 So-

cial Sciences. To make at least an initial attempt to account for this phenomenon, each of the 406 target occupations could be evaluated and assigned a primary and a secondary CIP code. Then the ten-year demand total is allocated across the related CIP codes in proportion to the number of jobs involved.

For most occupations, one primary CIP code seemed to apply. For electricians, for example, CIP #46 Construction Trades applied. For semiconductor processors, CIP #48 Precision Production applied. The one area where precise assignment to a particular CIP code was not completely satisfactory was in the area of production or management supervisors where both precise technical skills and some level of management training seemed to be called for. Of the 1,625 jobs projected in the Precision Production field, 282, or 17%, were first line supervisors. These jobs would seem, therefore, to require some level of business management training, CIP #52.

Table 4 presents a picture of the supply-demand balance (and imbalances) over the ten-year projection period. It shows the supply of graduates Maine would have if it continued to produce graduates over the next ten years at the same level and in the same programs as it did in 2009. It then presents the number of graduates it will need in each of these programs if it is to meet the job growth targets presented above. With these two numbers, it is possible to identify surpluses and shortages that can serve as a guide to future program development.

There are several significant points to be drawn from Table 4. First, if the current supply-demand imbalance persists, Maine will suffer a severe shortage of workers in computer, infor-

mation, and related support services and in precision production occupations.⁸ If Maine does not reallocate education and training resources to address this existing and potentially growing labor supply gap, the state's economic prosperity will be threatened and the hopes for development of Brunswick Landing as a major industrial and research center will be jeopardized. A second, although less severe, skills gap exists in CIP #49 Transportation and Materials Moving occupations, CIP #46 Construction Trades, CIP #12 Personal and Culinary Services, and CIP #41 Science Technologies and Technicians.

A second important point concerns CIP #04 Architecture & Related Services, CIP #27 Mathematics and Statistics, and CIP #14 Engineering. All of these fields offer only bachelor's (or higher) degrees, and, at current graduation rates, Maine should be able to cover the number of graduates required in the targeted industries. However, because of their importance and the need to maintain clear pathways into these fields, SMCC should consider the importance of ensuring coursework in these fields as a way to open entry to students in associate degree programs. This is particularly important for the pre-engineering curriculum developed for the Midcoast Campus.

A third important point needs to be made about CIP #15 Engineering Technologies and Technicians, CIP #52 Business Management, and CIP #51 Health Professions. In all three, the current rate of graduates exceeds the target industry demand. This indicates a need to look carefully at the individual components of these fields to see where true excess supply may be building up and to consider ways to reorient these programs to meet other urgent needs.

“If Maine does not reallocate education and training resources to address this existing and potentially growing labor supply gap, the state’s economic prosperity will be threatened and the hopes for development of Brunswick Landing as a major industrial and research center will be jeopardized.”

Program Organization and Delivery

Having identified areas of need critical for achieving the state's job growth targets, the next step for development of SMCC's Midcoast Campus is to consider how to design and offer specific instructional programs. To help guide this process, over twenty interviews with business owners, representatives of trade associations, educators, federal, state, regional and municipal government officials, managers of nonprofit agencies, and interested citizens were conducted. Interviews were open ended and conversational, designed to elicit opinions about what sort of education and training Maine needs, how it can best be designed and delivered, and what suggestions respondents would offer to SMCC to ensure the greatest possible success for its Midcoast Campus.⁹

“There is a tremendous need for training programs for all of the skills necessary for modern manufacturing.”

While the interviews were wide ranging, they did reveal several common themes. With regard to the current supply-demand situation, interviewers generally confirmed the needs identified in the analysis presented above. There is a tremendous need for training programs for all of the skills necessary for modern manufacturing. What the CIP system calls “Precision Production” and “Computer and Information Sciences” have generally been reaffirmed by respondents as the areas of greatest need. Several respondents decried the general perception that “manufacturing is dead” and said that in fact manufacturing is thriving. Several cited the misperception that manufacturing is “dirty” and “dangerous,” or

that it is a “dead-end.” In fact, the greatest need Maine's manufacturers have today is to employ and keep workers who have the capability and willingness to learn new skills and who know how to operate new machinery as part of an ongoing career development process.

The second observation common to many respondents was a frustration with the higher education system's responsiveness to this need. Many stated that while formal degree and certificate programs were important, their greatest need was for shorter term, job specific training—to



meet established certificate programs and even non-certificate company-specific needs. At the same time, respondents noted that such programs did not need to be one-time, one-size-fits-all programs, but could instead be ongoing and varied learning/training “experiences” designed to meet the needs of individual companies and workers.

In short, respondents generally agreed with the skill gaps identified and expressed a frustration that the higher education system was not addressing these needs, at least not adequately.

In fact, the Maine Manufacturers Association is seeking funding to create its own training system based on a model developed by the Manufacturers Association of South Central Pennsylvania.¹⁰

It is natural for businesses—with their own specific, ever-changing, training needs—to view an educational establishment with an apparently cumbersome system of curriculum development and a bias toward filling its own classrooms as unresponsive. By the same token, it is understandable for a public institution—with a limited budget, widely varied demands, and its own costs



to cover—to see business demands as unrealistic. Each enterprise unavoidably operates within its own constraints.

The great opportunity presented by the charge to develop the Midcoast Campus, therefore, is, at the same time, SMCC's greatest challenge—how to bridge this gap between employers and educators. Based on a combination of skills gap analysis and interviews, there are five steps necessary for bridging this gap: establish a relatively narrow focus; establish an effective

employer-educator collaborative process; develop clearly articulated career pathways; break educational/learning experiences into small components; and, establish an ongoing, third party review process.

Establish a relatively narrow focus. Meeting the needs of the “industries of the future” is a hopelessly vague assignment. Finding a core of skills and attitudes common to the manufacturing industries—the specific “precision production” skills needed by Maine’s growing manufacturers and those that could grow in Maine (particularly at Brunswick Landing)—is a more achievable goal. The products of composites firms, machine shops, and avionics companies are vastly different, but many of the skills—foresight, problem solving, clear communication as well as specific

“The great opportunity presented by the charge to develop the Midcoast Campus, therefore, is, at the same time, SMCC’s greatest challenge—how to bridge this gap between employers and educators.”

manual capabilities and experience—needed for their production are common across all. For manufacturing in general, the Midcoast Campus should establish a common and basic curriculum. In addition, it should focus on CIP #11 Computer and information Sciences and Support Services, CIP #41 Science Technologies/Technicians, CIP #49 Transportation and Materials Moving, and CIP #46 Construction Trades.

Establish an effective employer-educator collaborative process. Wags say that cooperation is an unnatural act. Employers and educators each have their own fundamental needs and, while

paying lip service to cooperation, revert to meeting their own needs when the going gets tough. Respondents all agreed that industry-education advisory committees were necessary, but gave them mixed reviews in practice. Some worked, some didn't. The keys to success for those that were successful included:

“The greatest challenge to educators today is trying to keep abreast of the constantly changing training needs of growing businesses.”

- Established and consistent membership; the same people with the same interests and commitment belong and participate;
- Regular but not overly frequent meetings—two or three times per semester;
- Iterative feedback—What did and didn't work? What new knowledge is required? What has been tried elsewhere?; and,
- Clear evidence of authority and impact—What we do matters; it affects instruction and production/work activity.

Develop clearly articulated career pathways.

One of the most frequently voiced criticisms of the labor market today is that entrants have very unclear (if any) pictures of how one job can lead to another. If one enters field X, what future opportunities open up? One of the most positively received elements of the proposed Midcoast Campus is that it will have formal links with the University of Maine College of Engineering and the Maine Advanced Technology & Engineering Center (MATEC). The key to the success of these elements of the campus is that they interact with other instructional activities and be part

of the employer-educator collaborative process noted above.

The greatest challenge to educators today is trying to keep abreast of the constantly changing training needs of growing businesses. Brunswick Landing envisions itself as becoming a renewable energy research center. This will require being able to serve industries that don't even have formal definitions today—advanced battery production, hydrogen fuel cell production, solar power, more efficient wind turbines, and more efficient electric transmission grids. At the same time, Maine is rolling out a fiber-based infrastructure for faster, more efficient Internet connections. As this digital infrastructure becomes available, Maine will be able to develop and use more devices, software applications, network connecting, and switching machinery, and more Maine citizens and businesses will be able to find more ways to use the Internet. What new jobs will these developments make available for Maine?

Fortunately the same technologies that are changing the labor market so radically are also making it possible to understand it better. Newly established companies such as Monster.com and Burning Glass technologies gather millions of job postings and resumes on a daily basis. Analysis of these data—called Real-Time Labor Market Information (RTLMI)—enable both employers and educators to understand changing job requirements on a day-to-day basis. The Midcoast Campus should incorporate this technology into its efforts to build career pathway pictures for both its students and for their prospective employers. Building industry-educator program committees and articulating career pathways should constitute a mutually reinforcing interactive process that merits ongoing effort from both partners.

Break educational/learning experiences into small components. The most common criticism of educational institutions by employers is “lack of flexibility.” The most common criticism of employers by educators is failure to understand the cost structure of education. To use a manufacturing analogy, a school can’t afford to make individual samples in constantly changing shapes, sizes and colors. It needs some minimum level of production volume to cover its overhead and set up time.

One way to address this problem is the collaborative program development model noted above. A second is to break learning activities into smaller components at least some of which can be shared across different industry sectors. A third is to offer these individual learning components at various times and places, including online, so that students have a variety of access points to the needed information and schools have a wider net for gathering students and thus covering set-up costs.

Establish an ongoing, third party review

process. One final suggestion for designing an educational program for the Midcoast Campus is to establish a regular review procedure. Given the wide ranging demands being placed on this initiative—new industries, new instructional methods, new organizational procedures—it is important that the effort be documented and evaluated in a formal and ongoing way. Such an evaluation should be conducted by a non-involved third party and should include two components—outcome results and procedural lessons.

The employment and earnings of its graduates will determine the fundamental success of the Midcoast Campus. Fortunately, Maine is in

an ideal position to measure that success. The Maine Department of Labor Center for Workforce Research and Information (CWRI) has an already established relationship with SMCC for longterm monitoring of the labor market outcomes of its graduates, which is expanded on in the Journal’s following article, “Tracking

“The most common criticism of employers by educators is failure to understand the cost structure of education.”

Student Labor Market Outcomes at SMCC: A Cost Effective and Sustainable Accountability System.” By anonymously linking individual education records with individual wage records, CWRI can monitor the longterm employment and earnings of those workers who have gone through the various educational programs envisioned here. By reporting outcome results on an annual basis, the Midcoast Campus can achieve three things:

- It can demonstrate to potential enrollees and their prospective employers the employment and earning outcomes of previous graduates;
- It can, over time, build patterns of career paths that will feed back into its curriculum development process in a fashion that is far more regular and rigorous than the current, largely anecdotal, information available through individual contact information or irregular and expensive surveys; and finally,
- It can help the ongoing employer-educator program advisory councils refine the definitions of skills and certifications that constitute their most fundamental responsibility.

The second part of the third party evaluation—procedural lessons—involves process evaluation. It will address issues related to how programs are carried out. It will seek to identify impressions of participants about what is working, what is not, and why. Participants should include administrators, educators, businesses and trainees. Responses should be collected through a combination of individual interviews, online surveys and focus groups. Actual job growth by sector could be compared to the projections presented in Table 3 above.

All five of these suggestions go together, each reinforcing both the need for and the importance of the others. The fundamental point to be made here is that designing a means for determining success should be an integral part of designing the actual content of the program itself.

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Tracking Student Labor Market Outcomes at SMCC: A Cost Effective and Sustainable Accountability System



by John Dorrer

“**T**oday, the value of skilled, complex and creative work is growing fast. As a result, economic success for countries and for individuals relies increasingly on human capital—our knowledge, skills, learning, talents, and abilities.” (Human Capital: How What You Know Shapes Your Life, Organization for Economic Cooperation and Development [OECD] 2007.)

The Context for Accountability

Most students who graduate from high school go on to some form of post secondary education and training on the assumption that it is a path to a good job with higher earnings. Increasingly, larger numbers of adults who already have some labor market experience are returning to school to acquire new skills and credentials that will enhance their employability and career success. Our education and training institutions are challenged by

designing programs of study and curricula that keep pace with dynamic workplaces constantly being reshaped by globalization and technological innovation.

Among the largest public investments we make are those in education and training.

K-12 education, community colleges and our public higher education system demand a sizeable share of state and local tax dollars annually. Furthermore, we sponsor loan and student aid programs that enable college attendance. Besides home mortgages, most of us have student loans that contribute to debt burdens we carry through a good part of our working lives. Investing public dollars in education and incurring private debt by owning a home and enrolling in college are acts driven by an abiding belief that these investments will generate benefits in excess of costs. The evidence that this is true is abundantly clear; investments in human capital do generate attractive personal returns as well as prosperity and

REVIEWING
EMPLOYMENT
AND WAGE
RECORDS TO
ENSURE
WORKFORCE
SUCCESS AND
PROGRAM
ACCOUNTABILITY

“Investments in human capital do generate attractive personal returns as well as prosperity and economic progress for states and nations.”

economic progress for states and nations.

Personal and social investments, however, must be held accountable to ensure that we optimize the allocation of scarce dollars. Knowing that a particular program of study will yield a good paying job can be reassuring to students who are sensitive to how they spend their limited time and money. Education and training institutions that invest limited public dollars in programs of study should be guided by evidence of labor market outcomes. Accordingly, a firm commitment to outcomes-centered accountability caused administrators for Southern Maine Community College to explore alternatives for tracking their graduates' employment and earnings experiences over time.

Methods of Securing the Data

Southern Maine Community College (SMCC) has been engaged with the Maine Department of Labor, Center for Workforce Research and Information (CWRI), in piloting cost effective methods to track graduates' employment, earnings, and education experiences. Beginning with an initial pilot study, SMCC administrators and CWRI staff formulated projects designed to link student data; i.e. period of attendance and course of study with wage records maintained by the Maine Department of Labor. The key to linking student data with wage records was the use of the social security number. This number serves as the student identifier for student records maintained by Maine community colleges. The social security number is also used as the identifier by Maine employers who report on a quarterly basis to the Maine Department of Labor on the employment status and earnings of individuals in their employ under requirements of the Maine Employment

Security law. Confidentiality of individual data is assured as results from matching student and employment records are aggregated and used for research purposes only.

In addition to the examination of wage records generated by Maine employers, CWRI participates through the U.S. Department of Labor in the Wage Records Interchange System (WRIS). This national system facilitates the exchange of wage data among participating states for the purpose of assessing and reporting on state and local employment and training program performance, evaluating training provider performance, and for other purposes allowed under the WRIS Data Sharing Agreement. The exchange permits state workforce program performance agencies to secure wage data of individuals who have participated in workforce investment programs in one state, then subsequently secured employment in another. By participating in WRIS, states have a more robust picture of the effectiveness of their workforce investment programs, and are able to generate more comprehensive outcomes for comparison against their performance measures.

CWRI also consults the Federal Employment Data Exchange System, or FEDES. This is a pilot initiative that provides information on federal employment to participating states to help them meet their reporting requirements. Quarterly data exchanges are conducted with three federal agencies: the Office of Personnel Management (OPM); the Department of Defense, Defense Manpower Data Center (DMDC); and the U.S. Postal Service (USPS). FEDES is particularly important as many graduates enter the military or secure employment with the federal government.

Because many students continue their education upon graduation, sometimes while holding

down a full time job, CWRI attempts to track graduate enrollment in further education by using the National Student Clearinghouse (NSC). This nonprofit organization is a trusted source for student degree and enrollment verification.

Together, Maine wage records, WRIS, FEDES, and NSC provide one of the most comprehensive and most cost effective means to track graduates of community colleges. Through each source, data is independently acquired and verified raising confidence and trust levels. While mail and telephone surveys of graduates might yield more detail about occupations and relatedness of training received to employment, they typically are much more costly on a unit basis and historically have yielded low response rates.

What the Data Show

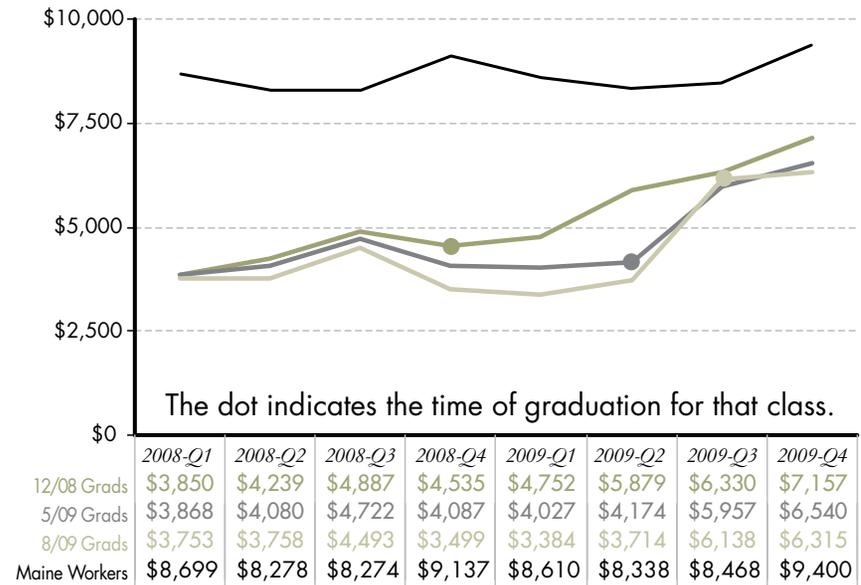
Based upon 603 graduates who completed their SMCC programs between December of 2008 and August of 2009, 509 or 84 % reported earning wages in Maine, working in other states, serving in the military, or were employed by the federal government after graduating from SMCC. Also, contrary to popular beliefs that Maine students leave the state in large numbers to secure good jobs, the data shows that 486 students, or 95% of all those reporting employment, are working in the State of Maine. Also 239 students, or nearly 40% of the 603 graduates, enrolled in further education after graduating. Most of the graduates also continued working while attending school. Mean quarterly wages stood between \$6,000 and \$7,500 depending upon graduation date (later graduates reported slightly lower mean wages).

Employment and earnings outcomes reported are displayed in the table to the right. Clearly, most graduates show evidence of employment

and earnings upon graduation. Earnings data can be quite variable, reflecting limited employment during the quarter, or part time employment held in conjunction with attending further schooling.

While the data provides a useful snapshot of SMCC graduate employment and earnings experiences, there is a richer story unfolding about how SMCC graduates fare in the labor market. One perspective depicts the earnings of the graduates beginning in the first quarter of 2008 when they were all enrolled in school and likely holding down part time employment. The quarter of graduation, depicted by the dot on the colored lines in the chart to the right, shows relatively rapid rise in earnings as most of these graduates entered the labor market in full time employment. There is also a tendency not only to gain in quarterly earnings but also to approach the mean quarterly earnings for all Maine workers.

Follow up analysis of wage records can now be readily conducted to determine how each graduating class cohort performs in the labor market, including any additional efforts they make to further their education and training. Southern Maine Community College has chosen to continue to rely on wage records and its relationship with the Center for Workforce Research and Information to assess student and employment and



earnings outcomes. SMCC administrators reported higher levels of confidence in earnings data using wage records over earnings self reported by graduates contacted through surveys.

There are limitations of the wage records matching approach. While highly accurate as a means to determine employment status and earnings, this approach lacks occupational detail. Consequently, it becomes much more difficult to establish how closely related graduates' employment might be to their field of study. To fill this important gap, SMCC could periodically draw a sample of employers from the wage records files and administer employer surveys to gather critical information about occupational detail and performance readiness of graduates.

“There is a richer story unfolding about how SMCC graduates fare in the labor market.”

The Future of Longitudinal Data Systems and Post Secondary Outcomes Measurement in Maine

A more comprehensive effort is underway in Maine to design and implement a state longitudinal data system, including K-12 education, community colleges, and higher education institutions. Funded with federal funds through the American Recovery and Reinvestment Act of 2009, these systems are intended to enhance the ability of states to manage, analyze, and use education data efficiently and accurately, including individual student records. These new data systems are intended to help states, districts, schools, and teachers make data-driven decisions to improve student learning, as well as facilitate research to increase student achievement and outcomes.

Under this grant, the State of Maine has committed to implement the following for adult education, post secondary education, and workforce development programs:

Adult Education

- Track and monitor individual student progress toward degree programs and into postsecondary programs and the workforce
- Meet requirements for the National Reporting System for Adult Education and the Workforce Investment Act of 1998
- Establish linkages to the Department of Labor data system and career centers through state student identifiers and social security numbers
- Monitor GED attainment and outcomes

Post Secondary Education

- Align student identifiers
- Utilize National Student Clearinghouse data for degree attainment and majors
- Monitor college readiness, remedial course taking, and college preparedness programs
- Analyze transitions from high school and retention
- Track student progress from secondary through post secondary education and into the workforce
- Examine STEM majors in college

Workforce Programs

- Establish the Wage Records Matching Center to track earnings of secondary and postsecondary graduates
- Develop Maine education and economic analytics
- Report employment and earnings outcomes of graduates from Maine high schools, community colleges, and state university systems

Institutions expecting to use the results of such analyses for planning and decision-making must work closely with technical and systems developers to shape what these systems do and how they perform. It will take considerable time, resources, and commitment to build a comprehensive labor market analysis system. Southern Maine Community College has taken a bold step to demonstrate what such a system might look like. The early success at SMCC is attributable to the vision and commitment of administrators at the college who have learned important lessons along the way. Most importantly, if outcomes and accountability systems are to gain broad-based institutional support, they must be developed collaboratively.

“The early success at SMCC is attributable to the vision and commitment of administrators at the college who have learned important lessons along the way.”

John Dorrer is Program Director, Jobs for the Future, Boston, MA. He previously served as the Acting Commissioner of the Maine Department of Labor.

Assistance for this article was provided by Diane Vickrey, Dean of Students, SMCC, and Bruce Peel, formerly Economic Research Analyst, Maine Department of Labor, Center for Workforce Research.

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This Journal could have not been possible with out the contributions of our authors and particularly Glenn Cummings, who served as an advisor to the project, as well as Jean Moon, Laura Fortman, and Martha Freeman.