Academic and Workforce Report:

Centers of Excellence

Report to the Legislature

Minnesota State Colleges and Universities

January 15, 2015

Minnesota
STATE COLLEGES
& UNIVERSITIES

Centers of Excellence
A Minnesota State Colleges and Universities Initiative

Our Story

Minnesota State Colleges and Universities' Centers of Excellence were created in 2005 as an initiative of the Governor and enacted by the legislature per Minnesota Session Law 2005, Chapter 107, Article 2, Section 31, M.S.136F.31 with initial funding of $5 million per year for the first four years.

MnSCU's Centers of Excellence promote connectivity between Minnesota industry and our colleges and universities. We help students gain access to the latest technologies and work-based learning opportunities, and facilitate education and training for business partners to meet their workforce needs today and into the future. The Centers help keep Minnesota's economy globally competitive in six critical industry sectors:

- Agriculture
- Energy
- Healthcare
- Information Technology
- Manufacturing and engineering
- Transportation

The four Centers formed in 2005 include:

360º Manufacturing and Applied Engineering Center of Excellence
Lead: Bemidji State University

Minnesota Center for Engineering and Manufacturing Excellence (MNCEME)
Lead: Minnesota State University Mankato

Advance IT Minnesota
Lead: Metropolitan State University

HealthForce Minnesota
Lead: Winona State University

The work of the Centers are focused on the system's strategic framework and provide a strong foundation for greater collaboration among our colleges and universities. They are responsive to the rapid changes in industry and employment, and offer innovative teaching and learning strategies.

In 2013, four additional Centers were formed in response to MnSCU's 2012 Workforce Assessment initiative, sponsored collaboratively with the Minnesota Department of Employment and Economic Development and the Minnesota State Chamber of Commerce.

These four Centers are:

Minnesota Energy Center
Leads: Minnesota West Community and Technical College and St. Cloud Technical and Community College

Center for Agriculture – Southern Minnesota
Lead: South Central College

Minnesota Transportation Center
Lead: Dakota County Technical College

Minnesota Agriculture Center for Excellence – North
Lead: Central Lakes College

We are pleased to report that:

1) Outreach work continues to expand in scale and strengthen in effectiveness

The Centers of Excellence sponsor an extensive array of summer and afterschool activities in all six industry sectors. These enrichment programs for middle and high school students exposes young students to future careers. Examples of these programs include: SCRUBS Camps, Vex Robotics, *Dream It! Do It!* and the statewide tour of manufacturing, Future Farmers of America events, Minnesota *Project Lead the Way*, Latino/a Engineering Academic Day and African-American Engineering Day.

2) Centers continue to engage a strong set of industry partners

The Centers have different structures for engaging industry. No single model appears to be most effective, although each of the Centers has an active industry-education advisory committee. Hands-on industry participation to identify needs and help to prioritize, but not design or dictate, solutions appears to be most helpful in maintaining energy for ongoing participation by local, regional or state employers.

3) Centers are helping to increase institutional collaboration across the system

Cross-campus relationships are growing stronger and expanding, and more institutions are becoming involved both as formal and informal partners, bringing more of the resources of the system into play to meet industry needs. Nearly all MnSCU colleges are involved in one or more Center of Excellence.

4) Centers' status are independent of specific college and university programs, which helps them promote innovation

Centers can use funds to promote priorities that are essential to an industry sector but may not rise to the top for any individual institution. Centers function both within and next to institutions. This allows them to act as quasi-peers to promote innovation at the program and

institutional levels, with the partnership of faculty and administrators who help champion the work. An increasing share of Center efforts now have system-wide impact and depend on follow-through at the system level. Many staff in the system office have worked with Centers and their academic partners to support their work.

MnSCU's Centers of Excellence are:

Advance IT Minnesota

AdvanceIT strives to promote information technology (IT) career success for learners and provide employers with the IT talent needed to thrive in the information age. The center has three strategic goals:

1. Increase enrollment of qualified students in MnSCU IT programs by promoting IT career interest and readiness to target populations
2. Enhance alignment of student learning outcomes with IT employer expectations and requirements
3. Foster initial job attainment and career advancement of MnSCU graduates

Advance IT Minnesota provides a variety of resources and programs to support these goals and works directly with IT program faculty.

Key initiatives:

- Curriculum development needed for new programs and integration of workplace skills in IT programs
- Student competitions that simulate "real world" application and promote student-employer connections
- Websites that provide career, program and labor market information needed by faculty and students for decision making

Bruce Lindberg
bruce.lindberg@metrostate.edu
(612) 659-7228
www.AdvanceITMN.org

HealthForce Minnesota

HealthForce Minnesota provides the healthcare industry with a well-trained, flexible workforce; creates ongoing capacity to transform health science education and delivery; and is positioning Minnesota as a global leader in healthcare education, practice, research and innovation. Led by Winona State University, Healthforce Minnesota partners with educators and employers to identify and solve healthcare workforce challenges.

Key Initiatives:

- Healthcare Education Industry Partnership (HEIP) Council, an advisory council of healthcare employers, educators, state agencies, and organizations meet quarterly to focus on Minnesota's healthcare workforce challenges and opportunities
- The Clinical Coordination Partnership (TCCP), an organization that increases clinical site capacity through standardized and transparent processes
- Mental Health Workforce, a convening of statewide mental health practitioners and advocates who created a mental health workforce plan for the Minnesota Legislature
- SCRUBS camps provides high school and middle school students the opportunity to explore healthcare careers

Valerie Defor
vdefor@winona.edu
(507) 429-6652
www.healthforceminnesota.org

360° Manufacturing and Applied Engineering

360º is guided by the vision of a 21st Century education system that prepares individuals to participate fully in rewarding careers in manufacturing and which meets the needs of the region's manufacturing employers. A single goal is pursued: to increase the quantity, quality, and diversity of technicians in the field of manufacturing. To accomplish the goal, 360° advances two objectives:

1. Enhanced Pipeline—Prepare students for rigorous manufacturing programs that entices them to pursue manufacturing careers; and
2. Industry-driven Curriculum- Curriculum that is relevant to today's and tomorrow's manufacturing industry.

Key Initiatives:

- Technology and career events for middle school and high school youth
- VEX Robotics Competition for middle school and high school youth
- Dream !t Do !t Statewide Recruitment Program
- Minnesota Statewide Tour of Manufacturing
- 360º Seamless Career Pathway with the eTECH multi-college, online and hands-on consortium based certificates, AAS degree to university BAS degree

Karen White
kwhite@bemidjistate.edu
(218) 755-2208
www.360mn.org

Minnesota Center for Engineering and Manufacturing Excellence

The Minnesota Center for Engineering and Manufacturing Excellence (MNCEME) is a consortium of two-year colleges located throughout Minnesota, led by Minnesota State University, Mankato. The center's goal is to develop forward-looking engineering and advanced manufacturing talent for industry.

Key Initiatives:

- Foundational engineering associate in science degrees offered by several MNCEME institutions designed to enable students to transfer into 4-year engineering programs
- Iron Range Engineering (IRE) and Twin Cities Engineering (TCE), two project-based engineering degree programs
- Partnership with Smart Software Solutions (3S) to provide training and consultative services in the use of advanced embedded controllers for automation of industrial processes
- Minnesota Project Lead The Way (PLTW) for K-12 students
- Latino Engineering Academic Day (LEAD) and African-American Engineering Day, promoting STEM careers to high school students
- STEM summer camps for middle school students

Kent Carlson, Ph.D.
kent.carlson@mnsu.edu
(507) 389-1309
www.cset.mnsu.edu/mnceme

Center for Agriculture - Southern Minnesota

The Center of Agriculture of Southern Minnesota builds educational and business partnerships at all levels and within industries to fuel innovation, develop research programs, prepare industry professionals, and create opportunities both domestically and internationally. The center provides students, teachers, and citizens broad network resources, career pathway options, and industry education to assist in successful innovation to prepare for the changing future.

Key Initiatives:

- Agricultural Symposium – farmer, industry, student and faculty enhancements
- Internships in the Agriculture, Food and Natural Resources (AFNR) industry
- Educator professional development – Curriculum for Agricultural Science Education (CASE Institutes)
- FFA career development events, sponsorship and enhancement of career pathways in AFNR

- Industry partnerships
- Farm business management education

Brad Schloesser
brad.schloesser@southcentral.edu
(507) 389-7263
www.centerofagriculture.org

Minnesota Agriculture Center for Excellence – North

The Minnesota Agriculture Center for Excellence - North is a consortium of three colleges located in North, Central, and Western Minnesota. The Center is located at Central Lakes College (lead), Ridgewater College, and Northland Community and Technical College. Our goal is to develop and support excellence in agricultural, natural resources, and horticulture programs and career pathways in partnership with K-12, government, other academic institutions and the industry.

Goals are accomplished through secondary outreach, articulated partnership programs, innovative industry partnerships with employment and research, degree and apprentice programs, professional development, customized training, and collaboration between industry and academia.

Key Initiatives:

- Developing articulated career pathways and bridging academies with secondary schools
- Developing agriculture and FFA summer camps for K-12 students
- Hosting FFA regional camps and competitions
- Developing common and shared curriculum offerings in agriculture, natural resources, and horticulture that increases access to more students

Keith Olander
kolander@clcmn.edu
218-894-5163
www.mnscu.edu/business/excellence/index.html

Minnesota Energy Center (MnEC)

The Minnesota Energy Center (MnEC) is a consortium of two-year colleges located throughout Minnesota, led by Minnesota West Community and Technical College and St Cloud Technical and Community College. Our primary focus is development of programming to prepare technicians for the energy production industry. Degree programs cover the broad spectrum of energy production technologies including bio-fuels, ethanol, solar, wind, fossil fuels, and nuclear.

Key Initiatives:

- Workforce Development– the right education and training to support the energy industry
- Pipeline– increased awareness of energy related career opportunities
- Research– education and Industry partnerships that advance research in energy related fields
- Collaboration at national level with the Center for Energy Workforce Development and the Nuclear Energy Institute
- Regional collaboration with Great Lakes States partnership
- Education partner for the Minnesota Energy Consortium

Bruce Peterson
bpeterson@sctcc.edu
(320) 308-6639
www.mnscu.edu/business/excellence/energy.html

Minnesota Transportation Center

The Minnesota Transportation Center of Excellence is a consortium of 12 two-year colleges located throughout Minnesota, led by Dakota County Technical College. The Transportation Center is focused on developing a highly-skilled workforce to meet the current and future needs of the transportation industry in Minnesota. This is accomplished through K-12 outreach, promotion of best practices, professional development, and collaboration between industry, secondary and post-secondary institutions.

Key initiatives:

- Partner with high school automotive and diesel programs to develop academies
- Serve as a central contact point between industry sectors and higher education
- Collaborate with subject matter experts in higher education and industry to develop a "tool box of best practices" to ensure programs are prepared for new and expanding technologies
- Promote awareness of employment opportunities in transportation industry careers including aviation, rail, and marine

Chad Sheets
chad.sheets@dctc.edu
(651) 423-8311
www.minntran.org

Findings on innovation

As part of the 2010-11 evaluation, Wilder Research undertook a mini-case study in each Center. Wilder studied Center initiatives that could be considered an incubator, representing a new approach at a small scale, with the potential for expansion. Case studies explored the process of innovation including its context, challenges encountered, and factors that helped promote success. The following factors were observed by Wilder in multiple Center case studies as helping to promote innovation.

- Relationship building through networking
- Having an "insider" as a leader within the system who is also a neutral point of contact to bypass political issues
- Collecting and using good data to better understand industry needs, partners' attitudes, successful approaches elsewhere, etc.
- Access to additional and/or external resources that can be dedicated to needed areas.

Barriers to innovation

The barriers to innovation were more varied than the supportive factors, and depended more on the specific type and location of the effort. The following factors were observed as slowing or limiting the success of innovative efforts:

Scarcity of resources, particularly staff time

- Difficulty maintaining adequate coordination and momentum of multiple partners over an extended period of time
- Limits to how widely the potential partners share a sense of priority or urgency for the innovation; loss of enthusiasm when the project requires changes in resource allocation or bureaucratic requirements
- In some but not all cases, fear of increased cost or loss of revenue

Adoption of new curriculum or new delivery methods also requires faculty and students – and ultimately employers – to think differently about when and how learning occurs, and the conditions needed for the acquisition of high-quality skills. Change in these attitudes is likely to take considerable time. It will be helped by successful results from initial efforts such as those described in the case studies.

Unique features of Centers that make a difference

The case studies illustrated certain unique features of the Centers that allow them to advance innovations within the system that other entities (institutions or departments) are less well positioned to accomplish on their own:

- Centers have time, resources, and staff dedicated to specific goals related to industry workforce needs and promoting relationships and innovation. Institutions and departments have other primary obligations.
- Center leaders combine knowledge of the higher education system with knowledge of their specific industry sector. This combination helps them facilitate relationships and

information sharing among the different sets of partners.

- Centers can use their own funds when needed to reduce risks in the early stages of new projects. At least two, and possibly more, of the innovations studied would likely have been cancelled early in their development if institutional partners had had to bear the costs or the risk of losing funds on an undersubscribed offering. The Center can use its funds as venture capital to help keep early stage efforts afloat until they reach a tipping point and can operate with only the usual sources of support.

A review of the research literature found that lessons learned from innovation in industry align remarkably well with the work of the Centers of Excellence. These include:

Recognize the importance of innovation

The Centers of Excellence have been an important voice within their associated programs and institutions for collecting information on the needs of industry. They have helped elevate partners' awareness of the urgency of industry's need for innovation in educational programs and processes. They also facilitate the link to economic development efforts called for by many national policy researchers.

Generate new ideas by connecting across groups

All the Centers have created new networks spanning groups not previously in regular contact. Besides within their governing bodies, this is happening through other kinds of regular and ad hoc gatherings. Faculty typically report that such cross-campus gatherings are stimulating and useful.

Separate innovative structures and processes

The research literature recommends separate, parallel processes to facilitate innovation by freeing it from standard control and funding processes. The Centers are hybrid organizations, partially embedded in the system's mainstream institutions but separate from the regular departments and programs. As predicted in the research, this has led to some frictions between new and regular operations. However, it has also generated a number of innovations to date, including significantly increased outreach to potential students, new and updated courses and programs, and increased alignment between programs across campuses.

Manage the tensions between parallel structures

The research finds that frictions can be reduced, and successful innovations more readily be brought to scale, with leadership at a level above the two parallel processes, helping to manage the relationships between them. To date, a number of Center-led innovations have been incorporated into regular department and program operations. The scale of innovations is growing: from courses to entire programs; from linkages between pairs of programs to entire multi- institutional consortiums; and from incorporating new equipment or software into

existing programs to re-thinking the entire model of how courses and programs are delivered to students and the opportunities that students have to experience real-world learning, either in the classroom or in a work setting. As innovations become more ubiquitous, the challenges of bringing innovations into the mainstream operations also increase. This is likely to create additional responsibilities for the leadership of the overall system to manage the scale of change resulting from those challenges.

Prepared by:
Mary Rothchild, Ph.D.
Senior System Director, Workforce Development
Minnesota State Colleges and Universities