



MINNESOTA STATE

DATE: January 12, 2017

TO: Board of Trustees

FROM: Ron Anderson, Vice Chancellor for Academic and Student Affairs


SUBJECT: Academic and Workforce Report: Centers of Excellence

Attached is the *Academic and Workforce Report: Centers of Excellence* report developed in response to 2005 Minnesota Session Law Chapter 107, Article 2, Section 31. This is due to the Governor and legislators on January 13, 2017.

The report provides information on the activities of Minnesota State's eight Centers of Excellence in six industries: healthcare, information technology, agriculture, transportation, manufacturing and engineering, and energy. We are proud of the many innovative programs launched by the Centers and the outreach they engage in to introduce young people to careers in these fields.

Please contact Mary Rothchild, mary.rothchild@so.mnscu.edu if you have any questions.

c: Chancellor Steven Rosenstone
Leadership Council
Mary Rothchild





January 15, 2017

Academic and Student Affairs

Academic and Workforce Report: Centers of Excellence

Minnesota State

Centers of Excellence

A Minnesota State Colleges and Universities Initiative

Background

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.

Minnesota State's Centers of Excellence promote connectivity and alliances between Minnesota industry and the state's colleges and universities. In doing so, the Centers 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 original Centers were formed in 2005:

360 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 is focused on the system's strategic framework and provides a strong foundation for greater collaboration among our colleges and universities. The Centers are responsive to the rapid changes in industry and employment, and offer important strategies that address workforce training for students and incumbent workers.

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

The additional four Centers are:

Minnesota Energy Center

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

Southern Minnesota Center for Agriculture

Lead: South Central College

Minnesota Transportation Center

Lead: Dakota County Technical College

Ag Centric, Center of Excellence for Agriculture – North

Lead: Central Lakes College

Over the past ten years, Centers report that:

1. Outreach work continues to expand in scale and strengthen in effectiveness. The Centers sponsor or co-sponsor an extensive array of summer and afterschool options to learn about career and technical education and occupations in all six industry sectors. These enrichment programs for middle and high school students provide youth with the essential career awareness experiences that are otherwise challenging to provide during a traditional school day. Examples of these programs include: Scrubs Camps, Vex Robotics, Dream It. Do It. and the statewide tour of manufacturing, Future Farmers of America events, 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 and generate new ideas by connecting across groups and new networks not previously in regular contact. In addition to industry-education advisory committees, other types of regular and ad hoc gatherings among faculty are reported to be stimulating and useful in growing connections and creating new program and student engagement opportunities.
3. The Centers have different structures for engaging industry. No single model appears to be most effective, although each of the Centers has an active advisory committee or other representative industry organization that fulfills this essential role. Industry participation in identifying needs and helping to prioritize, but not design or dictate solutions, appears to be most helpful in maintaining energy for ongoing participation by local, regional and state employers.
4. 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 unique resources of each center and of the system into play to meet industry needs. Nearly

all Minnesota State colleges are involved in one or more Center of Excellence and partnerships with new funding sources is increasing. For example, several of the Centers of Excellence projects are funded by the federal Carl D. Perkins Act that supports career and technical education. Examples of mutually-supportive programs include: Statewide Tour of Manufacturing, Health Care Core Curriculum, Career Program Advisory Committee Handbook, Project Lead the Way, conference presentations and coordination of career pathways, technical skill assessments and other aspects of Perkins' career and technical education programming.

Through analysis and evaluation of the Centers, unique features have been identified that allow them to advance within the system in ways that individual colleges and universities, or academic departments, are less well positioned to accomplish on their own. 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 different partners. Centers provide resources and dedicated staff necessary to address goals related to industry workforce needs and promote relationships and innovative solutions to workforce challenges. Institutions and departments often have other primary obligations.

Centers use their own funds when needed to reduce risks in the early stages of new projects. Because Centers are hybrid organizations, partially embedded in the system's mainstream institutions but separate from regular departments and programs, their organizations often promote innovation in educational delivery. Centers may use funds to promote priorities that are essential to an industry sector, but may not rise as a top priority for any individual institution. At least two, and possibly more, of the innovations studied would likely have been canceled early in their development if institutional partners had to bear the costs or risk losing funds on an under-subscribed program 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 the usual sources of support. While this occasionally results in friction between new and regular operations, it also generates innovation, including significantly increasing outreach to potential students, development of new and updated courses and programs, and increased alignment between programs across campuses.

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. An increasing share of Center efforts now have system-wide impact and are supported jointly at the system level. 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 state and national policy researchers.

Overview of Minnesota State's eight Centers of Excellence and their key initiatives:

Advance IT Minnesota

Advance IT 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 Minnesota State 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 Minnesota State graduates.

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

Key initiatives:

- Leading curriculum development and capacity building across institutions in high demand areas such as cybersecurity, development operations, and data analytics.
- Engaging K-12 students and educators with IT curriculum, camps, and awards, such as the "Aspirations for Women in Computing Award," co-sponsored with the National Center for Women and Information Technology. This year's competition attracted 143 young women from over 50 high schools statewide. Approximately 50 percent of competitors were young women of color.
- Developing an extended internship program called the FUSION Residency that gives students hands-on job experience as part of their program and solves a critical recruiting need for employers. The center is expanding the successful pilot at Metropolitan State to include all majors with a plan to add Minnesota State University, Mankato in 2017.
- Promoting critical, non-technical IT workplace skills through courses and IgnITe! workshops that involved more than 250 participants in the academic year 2015 – 2016.
- Supporting initiatives to increase diversity in the IT student pipeline by leading the IT Discovery Network, including courses and camps in partnership with the Black Data Processing Associates (BDPA) with more than 75 participants in 2016.

- Hosting competitions that simulate “real world” applications and promote student-employer connections such as the Cybersecurity Skills Innovation (CSI) Bootcamp and the Collegiate Cybersecurity Defense Competition (CCDC) with teams from nine Minnesota State colleges and universities, with over 90 participants and five participating employers.

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HealthForce Minnesota

HealthForce Minnesota works closely with the healthcare industry to foster a well-trained, flexible workforce; creates ongoing capacity to transform health science education and delivery; and is positioning Minnesota as a 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. Approximately 35 members attend quarterly meetings, including representatives from seven Minnesota state colleges and universities.
- The Clinical Coordination Partnership (TCCP), an organization that increases clinical site capacity through standardized and transparent processes. TCCP has 78 employer partners (clinical site partners) and 52 education partners and is continuing to grow. In 2016, TCCP facilitated scheduling clinical e for almost 18,000 nursing students. TCCP is now a self-sustaining, partner-funded initiative. Consider adding a sentence describing how many campuses participate in this.
- Mental Health Workforce, a convening of statewide mental health practitioners and advocates who created a mental health workforce plan for the Minnesota Legislature. The Mental Health Steering Committee is comprised of more than 35 mental health organizations, educators, legislators, and state agency representatives. The Mental Health Workforce Plan, submitted to the legislature in 2015, contained 24 recommendations; 10 of these have been implemented.
- The Health Care Core Curriculum, developed collaboratively through the Center, is offered by 11 colleges and has seen a 57 percent increase in high school offerings, from 20 in 2015 to 35 in 2016. The program is supported by an “educate the educator” course, which has been completed by 45 high school teachers and 25 college faculty. The program is being developed to be offered online by five high schools and three colleges. Students in the program will be eligible for a national certification examination in 2017.

- Scrubs Camps provides high school and middle school students the opportunity to explore healthcare careers. In 2016, 802 students attended one of 16 camps held throughout Minnesota. Approximately 50 percent of the attendees received a scholarship. Approximately 40 percent of the attendees self-identified as being non-White. Participant numbers continue to grow dramatically as shown in the chart below:

	2014	2016	Percent Growth
Number of Camps	5	16	220 %
Number of Students	326	836	156 %

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360 Manufacturing and Applied Engineering

360 is guided by the vision of a 21st Century education system that prepares individuals to participate fully in rewarding careers in advanced 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. Prepare students for rigorous manufacturing programs that entices them to pursue manufacturing careers; and
2. Develop and offer industry-driven curriculum that is relevant to today and tomorrow’s advanced manufacturing industry.

To further these objectives, in 2015-2016, 360 Manufacturing Center of Excellence funded 17 summer camps and youth outreach events that reached 328 students. Students were surveyed about their experiences, and the results showed that (post-event) 94 percent learned about manufacturing and making things, 85 percent were more interested in manufacturing careers after participating, and 95 percent were more aware of manufacturing careers. In addition, for the coming year, 360 Manufacturing Center of Excellence has provided partner colleges with funding to support 16 youth outreach events, including summer manufacturing camps, VEX and FIRST Robotics, and career expos.

Other notable accomplishments are:

- Through its partner colleges, 360 hosted four Dream It. Do It. Minnesota VEX Robotics tournaments and one skills event during the 2015-2016 season. Faculty from partner colleges also supported six additional tournaments. A total of 118 unique teams competed at the tournaments hosted by 360 partner colleges, reaching an estimated 640 students. From the 2015-2016 survey of youth participants, 85 percent felt more aware of manufacturing careers. Partner colleges raised \$34,000 to support their tournaments, indicating a sustainable funding source for future events, and Minnesota Precision

Manufacturing Association (MPMA) provided a \$10,000 sponsorship to provide kits to approximately 10 teams.

- In June 2016, 360 Manufacturing Center of Excellence provided a two-day VEX Robotics workshop for educators who were interested in the program or who wanted to gain new skills. Approximately 20 people attended. 360 presented and provided Dream It. Do It. Minnesota resources to attendees. Through its new \$2.55 million National Science Foundation grant, 360 plans to continue to support robotics through event training for coaches and teachers, showing how robotics ties to manufacturing careers.
- The Dream It. Do It. Minnesota Statewide Tour of Manufacturing concluded in October 2016 with 105 host businesses opening their doors for tours, reaching an estimated 14,000 individuals throughout Minnesota, including over 2,100 students, and an estimated 114 educators.
- In 2015, 360 eTECH, an online manufacturing education program, and Northwest Technical College partnered with the UPM-Blandin Paper Company of Grand Rapids, MN to incorporate the 16-credit production technologies certificate into their internal training program. The first cohort of 11 students completed the certificate fall 2016, a second cohort started in October 2016, and a third is scheduled to begin in January 2017. 360 is working with additional manufacturing companies to build on the success of this program.

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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:

- Developing foundational engineering associate in science (AS) degrees offered by several institutions designed to enable students to transfer to four-year engineering programs.
- Incorporating "lean" curriculum into the Iron Range Engineering (IRE) program, project-based engineering, meeting industry's need for forward-looking engineers in design, development and product production.
- Partnering with Smart Software Solutions (3S) to provide training and consultative services in the use of advanced embedded controllers for automation of industrial processes.
- Supporting Minnesota Project Lead The Way (PLTW) for K-12 students which is currently offered in more than 400 schools and educating over 100,000 students in the fields of engineering, biomedical and computer science in Minnesota.
- Sponsoring Latino Engineering Academic Day (LEAD), African-American Engineering Day

(A2EAD), and Girls Explore STEM Day giving 450+ under-represented students experiences with engineering pathways, post-secondary exploration, and a representative demographic leadership panel for career exploration.

- Offering STEM/STEAM summer camps exposing 240 middle school students to fields like robotics, engineering, manufacturing, coding, design arts and 3D printing across the state.
- Promoting support through a 15 member advisory council which is comprised of industry, academic partners, Minnesota Department of Education, manufacturer associations and Career and Technical Education (CTE) leaders, meeting semiannually with an intent of addressing industry's needs and academia's abilities to create partner success.

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Southern Minnesota Center for Agriculture

The Southern Minnesota Center for Agriculture builds educational and business partnerships with to fuel innovation, develop research programs, prepare industry professionals and create opportunities for both international and domestic students. The center provides students, teachers, and citizens a broad network of resources, career pathway options, and education to assist in successfully navigating changes in the agricultural industry.

Key initiatives:

- Sponsoring an Agriculture Advisory Council, a 24-person advisory council of southern Minnesota employers, entrepreneurs, educators, state agencies, and collaborators, which meets three times per year to address workforce challenges and opportunities in agriculture.
- Sponsoring the Agricultural Symposium, an annual event of approximately 450 engaged participants to network and learn about opportunities and challenges in agriculture.
- Providing 75 students from three Minnesota State institutions in southern Minnesota with internships in agriculture, food and natural resources.
- Leading high school teacher professional development (29 teachers impacting over 3,400 students in 2016) using the Curriculum for Agricultural Science Education (CASE) curriculum.
- Sponsoring FFA career development events: sponsorship and enhancement of career pathways in agriculture, food and natural resources. In the past year, we guided 780 students in career pathways.
- Coordinating farm business management education for 1,290 farmers in southern Minnesota for training in whole farm business analysis.

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Ag Centric, Minnesota Agriculture Center of Excellence – North

The northern Minnesota agriculture center is a consortium of three colleges located in north, central, and western Minnesota. The Center is hosted by Central Lakes College and its partner colleges are Ridgewater College and Northland Community and Technical College. Our goal is to develop and support excellence in agricultural, food, and natural resources programs and career pathways in partnership with government, K-12, higher education institutions and industry. Goals are accomplished through secondary outreach, articulated partnership programs, innovative industry partnerships with employment and research, degree and internship programs, professional development, customized training, and collaboration.

Key Initiatives:

- Developing articulated career pathways and bridging academies with secondary schools.
- Strategically designing and implementing career awareness campaign within agriculture career education for K-12 students.
- Offering statewide Farm Business Management (FBM) education and database development.
- Developing common and shared curriculum offerings in agriculture, natural resources, and horticulture that increases access to more students.
- Support new and existing agriculture educators through the creation and implementation of a mobile technology simulation lab.
- Advocate for agriculture industry stakeholders, from producers to consumers (“farm to fork”).
- Expand the education in and about Unmanned Aerial Systems (UAS) in agriculture.

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Minnesota Energy Center

The Minnesota Energy Center 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. The center’s primary focus is program development to prepare technicians for the energy production and transmission industry. Degree programs cover the broad spectrum of energy production technologies including bio-fuels, ethanol, solar, wind, fossil fuels, nuclear and natural gas. The Energy Center promotes career awareness and engagement of youth and adults to connect and prepare them for these excellent employment opportunities.

Key initiatives:

- Coordinating workforce development activities for the energy industry, including: assisting new program development in gas service and transmission; establishing the

Minnesota Legacy program in Twin Cities high schools in collaboration with Xcel Energy and Minneapolis and Saint Paul Public Schools; and managing a scholarship program from the Nuclear Regulatory Commission for nuclear technician students.

- Increasing awareness of energy related career opportunities by sponsoring over 100 K-12 teachers to participate in Energy Education for Educators (E3) workshops in 2015 and 2016; facilitating a new energy science mobile training unit (a trailer) with classroom teaching kits being shared in K-12 classrooms around the state; and multiple career fairs and classroom presentations on energy education leading to excellent careers, including Camp EXPLORE summer camp.
- Managing a \$5.5 million grant from Xcel RDF fund for research in capabilities and technologies in renewable electric energy production.
- Partnering at the national level with the Center for Energy Workforce Development and the Nuclear Energy Institute and at the regional level with Great Lakes States partnership and Midwest States energy consortia.
- Co-sponsoring, as education partner, the Minnesota Energy Consortium, an industry advisory group that combines representatives of Minnesota's major utilities, state construction associations, state agencies such as DEED, Labor and Industry, and Commerce, private industry, rural electric cooperatives, and education providers.

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Minnesota Transportation Center

The Minnesota Transportation Center of Excellence is a consortium of 20 two-year colleges and two four-year universities 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 a coordinated network of industry and education partnering to perform K-12 outreach, promotion of best practices, professional development, and collaboration between industry, secondary and post-secondary institutions.

The Transportation Center of Excellence is a collaboration of industry and education. The Center's advisory committee is comprised of 50 percent educators and 50 percent industry representatives with each of the six sector committees co-chaired by an educator and an industry representative. Industry representatives include leaders from statewide transportation associations and organizations, such as the Minnesota Automobile Dealers Association, the Minnesota Trucking Association, the Automotive Association of Service Providers-MN, the Duluth International Airport, Polaris, Caterpillar, and others.

Key initiatives:

- Partnering with high school automotive and diesel programs to develop transportation career “academies,” rigorous programs of study, and career pathways within the region that align with industry certifications, industry standards, and regional hiring needs.
- Promoting and coordinating national industry accreditation standards as a way of connecting higher education with employers and providing significant assistance to achieve a distinguished level of excellence in program design and instruction.
- Serving as the central contact point between industry sectors and education, both statewide and nationally.
- Collaborating 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 in transportation and logistics.
- Working with statewide industry and teacher associations, as well as employers and manufacturers, to provide coordinated, top-notch, professional development activities for high school teachers and college faculty.
- Promoting awareness of employment opportunities and career pathways in transportation industry careers including: aviation, rail, marine, small engine, construction and agriculture equipment, automotive, collision repair, trucking, and diesel engines.
- Collaborating with industry and post-secondary partners to develop a mobile lab/learning environment for K-12 students to have a hands-on experience with careers in transportation and a staff of regional industry employees who are Minnesota State alumni.

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