INCREASING THE CAPACITY OF MICHIGAN COMMUNITY COLLEGES TO ADDRESS THE ADVANCED MANUFACTURING SKILLS GAP IN MICHIGAN

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M-CAM
Michigan Coalition
for Advanced Manufacturing

ABOUT THIS DOCUMENT

This report was prepared by Susan Lupo, Senior Policy Associate at Corporation for a Skilled Workforce. It reflects input received through interviews with M-CAM leads and other key staff at the eight participating colleges.

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THE CONTEXT

During the first decade of the 21st Century, the United States auto industry experienced the worst recession in 70 years. Ongoing global competitive pressures and the danger of bankruptcy and closure for two major auto manufacturers resulted in instability throughout industry supply chains which led to substantial layoffs and restructuring of the auto industry.

In response to rapid downsizing experienced in manufacturing communities across the United States, Dr. James Jacobs, president of Macomb Community College, reached out to his colleagues bringing them together to discuss a collective response to the needs of their respective communities. This group of community college presidents and workforce leaders across the country joined forces as the Auto Communities Community College Consortium (ACC) recognizing the need for a collaborative strategy to address changing needs of manufacturing.

The purpose of the group was to develop strategies for worker retraining, both to help unemployed auto workers transition into new jobs and to help auto workers gain the skills required to succeed in advanced manufacturing. The ACC, which has evolved into a broader-based Community College Workforce Consortium managed by Jobs for the Future, operated on three key principles: 1) peer learning; 2) presidential involvement and leadership; and 3) joint approaches to address the skills gap as the auto industry began to rebound.

Consortium members concluded that community colleges working with manufacturing needed to increase their capacity to deliver training that meets workplace standards in order to fully address the needs of employers within their respective communities. The new jobs in manufacturing rely on effective use of technology, requiring development of multi-skilled workers (a concept that became known as mechatronics) as well as increasing the depth and quality of training in computer numeric control machining, production operations, and welding/fabrication.

These training areas were determined to be in demand with area employers validating their need for skilled workers to fill vacant positions.

When the federal government launched the multi-year Trade Adjustment Assistance Community College and Career Training (TAACCCT) program in 2011, it provided an opportunity for community colleges to simultaneously build their capacity and transform their approaches to workforce development while also training thousands of workers for new careers. Multi-state consortia from within the Auto Communities Consortium applied for funding during rounds one and two of TAACCCT but were turned down.

During the third round of TAACCCT funding, a group of Michigan community colleges led by Macomb

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Community College which had been working together as part of the Auto Communities Consortium banded together to secure $24.9 million to address the skills gap in advanced manufacturing in Michigan.

The award came in 2013 when Michigan was rebounding from the nation's Great Recession (and in fact a state recession that had lasted nearly a decade). According to the Bureau of Labor Statistics, in 2013 (when funds were initially received) the jobless rate had fallen from a high of 14.9% to 9.2%. Employers were hiring, orders were being processed, and manufacturing as a whole was regaining prominence in a state that had helped build the manufacturing economy in the first place. But with that comeback came profound questions about how best to rebuild and even sustain Michigan's manufacturing economy. Dramatic changes in production methods resulted in workers needing to possess more advanced skills than in the past. M-CAM was designed to build a talent pipeline of workers who possessed the skills and competencies needed to secure and retain good advanced manufacturing jobs in four areas – CNC/Machining, Multi-Skilled/Mechatronics, Production Operation, and Welding/ Fabrication. These training areas were determined to be in demand with area employers validating their need for skilled workers to fill vacant positions.

The resulting initiative, the Michigan Coalition for Advanced Manufacturing (M-CAM), served as a vehicle for eight colleges -- Bay College, Grand Rapids Community College, Kellogg Community College, Lake Michigan College, Lansing Community College, Macomb Community College, Mott Community College and Schoolcraft College -- to secure the resources needed to collaboratively tackle the big systemic issues involved in producing an advanced manufacturing talent pipeline in Michigan. The M-CAM strategy reflected crucial ideas that had been developed and nurtured through several years of conversations and partnerships among Auto Community Consortium college presidents and workforce development leaders who wanted to create significant and sustainable change within their institutions, for job seekers and employers, and for the communities which they serve on a daily basis. The M-CAM presidents committed to more cooperation within and among their institutions, better and more technologically advanced tools to serve job seekers; and deeper relationships with local employers to help build a stronger and more secure local economy.

The guiding principles from the Auto Communities Consortium were translated into the assumptions behind M-CAM:

- First, M-CAM would be a vehicle for peer learning. The eight colleges entered the partnership with varied areas of manufacturing curriculum, approaches to student supports, and use of types of equipment and online tools. The intent was that the colleges could help each other advance their practice in advanced manufacturing. Macomb had the most comprehensive advanced manufacturing program at the start of M-CAM. The other seven colleges brought specific strengths to the partnership and gaps they wanted to fill.
- Second, M-CAM would be strongly led by the college presidents. The level of systems change required to make the aspirations of M-CAM a reality would require presidential support at key points in each institution.
- Third, M-CAM offered an opportunity for the eight colleges to collaboratively develop shared tools, strategies, and practices in their advanced manufacturing programs. In a state with highly decentralized community colleges, this multi-year vehicle offered a rare opportunity for in-depth joint development work.

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The vision for M-CAM was to take advantage of the capacity building features of the TAACCCT grant to build a new advanced manufacturing curriculum that could be utilized state-wide to reduce unemployed Michigan residents and deal with the skills gap that many manufacturing firms articulated. The intent was to increase the ability of M-CAM colleges to serve the needs of their local communities and the State of Michigan well into the future.

This was based around two important assumptions. First, that the skills gap which firms perceived could be filled by the current workforce with relatively short term strategic training that combined hands-on learning and foundational skills. In other words, workers needed some post-secondary training, but not four-year degrees and diverse learners, including displaced adults, returning citizens, and veterans could master these skills. Second, the partnering colleges believed that there needed to be a conscious collaboration between community colleges to overcome the fragmented approaches resulting from Michigan's highly decentralized community colleges, and this needed to be developed and led through the presidents of the organizations.

Envisioning ***a system of seamless, responsive pathways*** within and across institutions, the M-CAM colleges and their partners (including employers, workforce agencies, community-based organizations, and credentialing agencies), worked together to ***rethink, redesign and improve*** two critical components of the colleges' systems: 1) educational/training programs in four in-demand manufacturing areas and 2) student support services.

M-CAM's approach was holistic and promoted development of job readiness skills, basic skills, and flexible pathways to credentials and degrees. Three overarching priorities (displayed in Figure 1) anchored the work. Interrelated deliverables embedded in each priority (illustrated in Figures 1 and 2) served as the catalyst for capacity building and growth, system transformation and in some instances, profound change.

The idea for eight community colleges to collaboratively tackle the big systemic issues involved in producing an advanced manufacturing talent pipeline in Michigan began long before M-CAM became a reality. A dream of Macomb Community College's President, the concept was nurtured, developed and articulated through conversations and partnerships with other college presidents for four years in advance of receiving TAACCCT funding. Leadership support and perseverance before and after funding paid off as borne out in the preceding M-CAM stories. But for the people involved in M-CAM — students, employers, colleges and communities the story goes deeper. It reflects people's values, aspirations, and behaviors as they worked to rethink, redesign and improve their respective and collective processes, strategies, practices and systems. And by engaging in new ways of thinking, M-CAM stakeholders created the capacity for long-term sustainable change.

The TAACCCT grant provided these eight colleges with resources that helped them build their capacity to serve their communities into the future. M-CAM set out a path that's resulting in improved training, student supports and facility updating that ensure the participating colleges will be strongly positioned to prepare the workforce Michigan manufacturers need to succeed.

THE CONTEXT

Priorities and Activities Figure 1

Priority 1

Develop Intrusive Pathways Training Model

- Delivering a Student Orientation, Gather Intake Data, Conduct Assessments
- Provide Career Coaching Services
- Deliver Competency-Based, Contextualized Foundation Skills in Four Programmatic Areas

Priority 2

Develop Technical Manufacturing Training Programs

- Develop Common Learning Objectives That Match Workplace Competencies
- Develop Stacked and Latticed Training Programs
- Develop Work-Based Learning Opportunities
- Develop Articulated Pathways to Other Education and Training Programs
- Develop M-CAM Community College Articulation Agreements
- Develop Technology-Enabled Course Resources, Methodology, Delivery Platforms

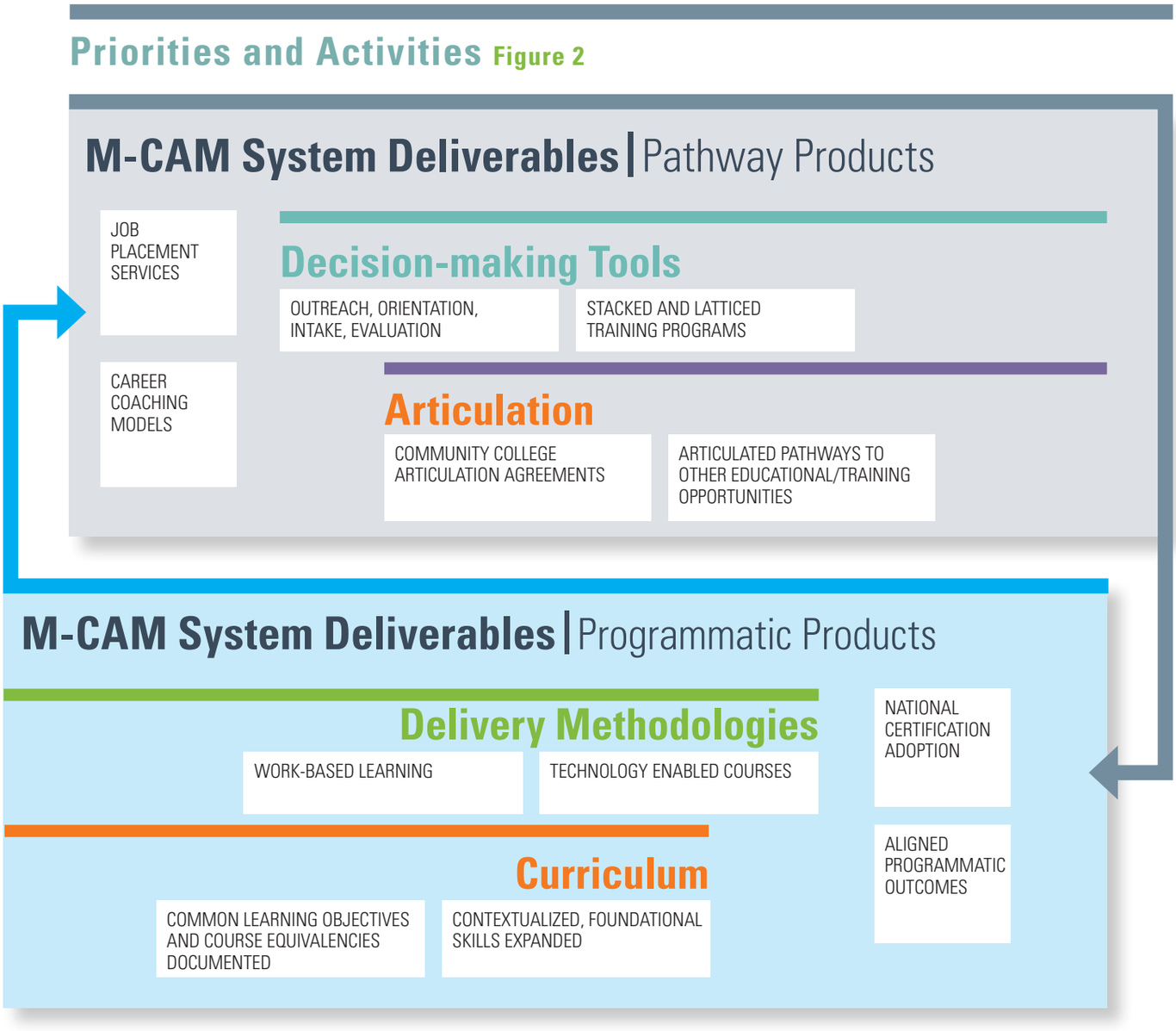
Priority 3

Develop Job Search and Placement Programs

- Develop an Intrusive Job Placement Service Model

THE CONTEXT

Priorities and Activities Figure 2



THE CHANGE PROCESS

The depth and breadth of work undertaken by M-CAM colleges, individually and collectively, was complex by any standard. The eight colleges are diverse — in terms of geography, communities of students, economic needs, size and resources. At the time of the grant's launch, each college had a solid foundation in one or more of the areas targeted for development or improvement through the initiative. Each had been working independently to change manufacturing curriculum and delivery, reduce silos between credit and non-credit offerings, upgrade equipment, improve classrooms and buildings, better align and intensify student support services, and enhance critical relationships with employers, community-based organizations, and workforce agencies. The M-CAM partnership provided the framework for collaboration, innovation, and best practice development. Most importantly, M-CAM provided a structure to expand and sustain meaningful organizational change within and across institutions. This change would have a direct impact on the communities each college serves, the way each M-CAM institution functions and on how M-CAM colleges work together to produce a qualified talent pool of people who can contribute to the growth and success of Michigan's advanced manufacturing sector, which now requires workers with increased skills and education.

Goals, priorities, and activities described in the grant were aspirational. They defined the "what" but not the "how" — how to work together as a collaborative, how to engage key stakeholders in the work, how to monitor and assess progress, how to marshal resources, how to engender trust, how to disseminate information, and how to learn and apply learning.

Macomb Community College provided grant management support and oversight, playing a critical role in ensuring all of M-CAM's moving parts were focused, coordinated, synthesized, and tracked while striking a balance between productivity, experimentation, and innovation. Each college designated a representative to lead the institution's work on the M-CAM initiative. M-CAM leads committed to achieving goals, managing and leveraging resources, thinking strategically, and reducing resistance. Deliverables were produced by workgroups — 10 in total — each led by an M-CAM college lead (see Figure 3).

Although workgroups were distinct in nature, each meeting fostered a sense of shared purpose, values, and goals. An earned trust emerged, helping members navigate what were often difficult barriers to success. Over time M-CAM established a culture of balanced action centered in reflection and inquiry. The M-CAM leads and the project managers at each college functioned as the "heart and memory" of the consortium — tasked to align institutional goals and processes with M-CAM work, garner the support of people empowered to take action, tackle fundamental issues, bridge boundaries and increase the capacity of people, individually and collectively to make a difference.

With support from the college presidents, M-CAM's core group of leads and project managers were able to engage other key stakeholders increasingly over the life of the grant. Faculty teams were formed around each of the four M-CAM programmatic areas (CNC/Machining, Multi-Skilled/Mechatronics, Production Operations and Welding/Fabrication) to think through what changes in curriculum would be required to use new equipment and integrate online instruction, simulation technology and foundational skills into manufacturing programs. Most importantly, the program area teams focused on how to align curriculum to national industry credentials. Outreach to employers and key stakeholders like the Michigan Works agencies (local workforce development

THE CHANGE PROCESS

boards) provided the means for conversation, idea exchange and renewed commitment to mutually beneficial initiatives. Barriers between credit and non-credit instruction and student support services began to dissipate as career coaches and job developers were brought onboard to work with students, employers and traditional student support systems. Each respective group of stakeholders, as appropriate, expanded influence to produce tools, including 33 Career Pathway Models, a Learning Community, four Massive Open Online Courses (MOOC's) focused on career exploration, and ultimately the means to reach an agreement to articulate national industry credentials for credit across all eight M-CAM colleges — a first for Michigan!

In essence, M-CAM set into motion growth processes leading to exciting and profound change. The following narratives, collected through interviews with M-CAM stakeholders, are intended to illustrate how that change occurred, what impact the change had, and the legacy of M-CAM work that will live beyond the grant.

M-CAM Workgroups Figure 3

Workgroup	Lead College
1. Orientation, Intake, and Assessment	Mott Community College
2. Career Coaching Services	Mott Community College
3. Competency-Based, Conceptualized Foundational Skills	Grand Rapids Community College
4. Common Core of Learning Objectives ■ CNC/Machining ■ Multi-Skilled/Mechatronics ■ Production Operations ■ Welding/Fabrication	By Program Focus ■ Schoolcraft College ■ Macomb Community College ■ Lansing Community College ■ Grand Rapids Community College
5. Stacked and Latticed Training Programs	All
6. Work-based Learning Opportunities	All
7. Articulate Pathways to Other Education/Training Programs	Lake Michigan College
8. M-CAM Articulation Agreement	Lake Michigan College
9. Technology Enabled Courses	Kellogg Community College
10. Intrusive Job Placement	Lansing Community College

BUILDING FROM A STRONG FOUNDATION

Macomb Community College and Mott Community College came to the table with two mature systems that gave the consortium a starting place for collaborative work.

Macomb brought its leadership in advanced manufacturing education as a core asset for the consortium partners to build upon. At the start of M-CAM, Macomb already had a well-developed Multi-Skilled/Mechatronics program which several other colleges used as a starting point for developing their own programs with resources from the M-CAM grant.

In addition, Macomb's Michigan Technology Education Center (M-TEC) offers extensive training for manufacturing careers, working in close partnership with a large, strong base of employer partners. Macomb used M-CAM resources to add equipment and bolster training opportunities at the M-TEC.

Macomb also brought extensive experience in managing federal grants, positioning them well to undertake the extensive coordinating and tracking required with TAACCCT grants.

Although community colleges strive to offer clear and accessible services, program requirements and regulations can often muddy the water, forcing students to navigate complexity in order to receive services. In response, over a number of years Mott created a student support model that braided together multiple programs and aligned them to meet diverse student needs including transportation, child care, books and supplies, clothing, food and shelter. Mott's student-centric system has helped each individual student acquire the most comprehensive package of services possible. M-CAM colleges, aware of Mott's success, chose to adopt the system as the architecture needed to meet TAACCCT's Orientation/Intake and Career Coaching deliverables.

During M-CAM's first six months, Mott took the lead in working with the colleges individually and collectively to develop M-CAM's orientation/intake and coaching model. Mott first met with consortium deans to introduce and share the pathway model, tools, and data collection systems. Several M-CAM colleges visited Mott for first hand demonstrations. Mott's team produced a series of guides so colleges could more readily adopt, adapt, and scale the model. In addition, Mott's team reviewed M-CAM colleges' existing practices to help find synergies and common ground. And because most M-CAM colleges had not yet hired career coaches to take on the task of implementing the system, the transfer of knowledge was, at times, overwhelming. The effort paid off giving the consortium not only an early win, but methods to work together to tackle other complex deliverables.

THE FACULTY CONNECTION

Curriculum development, redesign and alignment of CNC/Machining, Multi-Skilled/ Mechatronics, Production Operation and Welding/ Fabrication instruction was central to M-CAM achieving all programmatic deliverables. In most M-CAM colleges, credit and non-credit instruction have operated as wholly separate areas for many years. Lansing Community College described this pre-M-CAM state as working in "parallel universes" — something confusing to students and employers alike and a barrier to people making progress. At Mott, organizational convention reinforced the notion that the workforce side of the house delivered training not instruction. Even though Macomb's credit and non-credit programs operated under the same division and had made great progress integrating and leveraging services and offerings, lingering misperceptions between the two areas endured.

Since instruction is at the center of all M-CAM work, faculty played a key part in overcoming institutional barriers by developing and implementing strategies to realize M-CAM deliverables. Under the guidance of M-CAM leads, faculty were asked to engage in a series of activities including defining programmatic learning objectives, selecting equipment, adjusting instruction, building new courses and programs, integrating foundational skills into design and delivery, adopting and adapting technology platforms, and aligning, adopting and integrating programmatic credit to industry recognized credentials — all in collaboration with "competitor" institutions. To M-CAM faculty, this was a tough sell, and with good reason. Through work with employer advisory committees, faculty were clear that employers were not asking for industry credentials in CNC Machining, Multi-Skilled/ Mechatronics or Production Operations. Welding's American Welding Society (AWS) certification was the exception. When M-CAM began, changing culturally embedded values, behaviors, systems, and processes that had been resistant to widespread change was a daunting undertaking. At times, needed change seemed impossible, yet faculty and leads persevered resulting in enriched learning, leveraged knowledge, and ultimately new ways for students to succeed.

Building Bridges, Breaking Down Silos

For some M-CAM faculty, the new equipment purchased through grant funding required updating curriculum and learning new skills. For others, the equipment provided the ability to develop programs that had been on wish lists for many years. At some colleges, the influx of funding enabled hiring new faculty to inject fresh ideas and expand the college's capacity to meet existing and emerging student and employer needs — to stay relevant as the manufacturing technology landscape rapidly changed.

Over the course of three years, faculty met numerous times to talk about their challenges, to ask each other questions, to exchange knowledge and expertise, and to collectively design a way to talk about each other's curriculum as standalone products and in relationship to industry credentials. As one lead said, "It took a long time to get going — to develop a level of trust." A faculty member said, "It was a slow start. We tried to find out what we had in common and to map those commonalities. Eventually, we discovered we share a lot, we could ask each other "why", could question one another and found great support." Workgroups produced project plans, analyzed and aligned curriculum, examined the pros and cons of industry credentials and agreed to adopt them in three programmatic areas, creating the foundation for M-CAM's historic community college articulation agreement.

As faculty worked to build M-CAM programs, they examined industry credentials through a whole new lens,

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changing faculty perspective of the credentials' value. Aligning programs and courses to credentials required a deep-dive into the credentials' required underlying competencies. This process of analysis opened the door to expanded opportunity for students and faculty alike. Instead of seeing the credential from an employer's point of view alone, faculty began to see the credential as an underpinning of student learning – a way to develop competency and system-based instruction as the means to deliver, validate, and understand student learning.

For example, as lead in the Multi-Skilled/Mechatronics program area, Macomb invited credit and non-credit faculty and staff from all eight M-CAM colleges to take the certification tests being considered by the work group (Siemens and six Packaging Machinery Manufacturing Institute (PMMI) certification tests). This helped faculty understand how their curriculum aligned, or didn't align, to the certifications. Offering students the opportunity to take industry driven tests reinforced the relevance of programs to employment.

Embracing Learning

For faculty with full training or teaching loads, remaining current can be a challenge — particularly in a field where equipment, processes and technology are rapidly in flux.The movement toward attainment of industry recognized credentials is based on the notion that credentials should not only describe what the learner knows but what that learner can do within the context of specific work. This helps faculty find a direct alignment of program competencies to specific job tasks. M-CAM offered an opportunity for faculty to acquire new skills and certifications, demonstrating a stronger connection to current and emerging manufacturing practices. Lansing, Macomb, Mott, and Schoolcraft faculty undertook the arduous training to become Siemens Level 1 certified instructors. Schoolcraft has earned Accredited Test Facility (ATF) status from the American Welding Society (AWS), becoming one of five ATF's in the state of Michigan. Schoolcraft is preparing for site accreditation by the National Institute for Metalworking Skills (NIMS). Macomb led the effort to get NIMS certification for M-CAM instructors, hosting a five-day workshop, resulting in 91 NIMS certifications being awarded during the workshop week.

Incentivized by the purchase of new equipment, Mott's faculty developed new curriculum in all four programmatic areas. For Mott, working with industry partners to identify what equipment mirrored current practices in the field was essential to ensure the use of equipment and the subsequent curriculum could immediately satisfy the needs of local employers. The process of exploration led to deeper conversations between credit and non-credit faculty about competencies and the notion of a full system of integrated manufacturing programs at Mott. Faculty are now using industry credentials to define competencies "breaking down walls to streamline advanced placement" and creating new models of mobility for students. Greater integration of credit and non-credit faculty is reducing the impact of faculty turnover. Faculty talk about "the great gains from sharing."

Cross-college program area meetings were the vehicle for conversations

"M-CAM provided a neutral place to stand and evaluate what we were doing for students—credit and non-credit—it didn't matter. There was a minimum of judgment and eventually free-flowing sharing. We learned so much from all M-CAM faculty."

Mott Community College Faculty Member

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"The M-CAM Learning Community has created an accessible space for grant staff and faculty to share ideas and connect across colleges. The inclusion of specific program communities has allowed faculty to interact with ease, sparking discussion and creating important resources of information for the consortium."

Grand Rapids M-CAM Staff Member

about the value of new technologies like welding and production simulation. Lansing Community College's faculty enthusiasm about welding simulators profoundly influenced other faculty and changed attitudes about the value of simulation technology as a means of instruction. Today, Grand Rapids has fully integrated virtual welders in their welding program. Kellogg worked with faculty to make major changes to the college's production simulation line leading to a whole new configuration of that line. A Kellogg partner employer noted the line looked like one in their facility — a huge gain for students and employers alike. Conversely, Mott and Lansing acknowledge Kellogg's Industrial Trades program model as a major influence on their faculty's embrace of modularized curriculum and for Lansing, the tipping point for major college-wide instructional transformation. Kellogg's Advanced Manufacturing Assembly (KAMA) model is a four-week program that can be customized based on the cohort needs (days per week, hours per day) — another form of modularized curriculum — creating multiple pathways and opportunities for students to customize time spent to earn credit, credentials, and certifications — creating a flexible instructional delivery system that meets the needs of students who may have limited time to attend college.

Today, Lansing's credit and non-credit faculty are driving the adoption of modularized and flexible delivery systems for all technology courses. Every program is tied to a credential. Students can move easily between credit and non-credit instruction. All pathways are connected. Performance-based outcomes are being aligned with industry job profiles (tasks), emphasizing what students can demonstrate as well as what they know. New programs in Production Technician, Welding

From Lansing Community College Student to Manufacturing Employee to M-CAM Faculty

As a student, Nate felt there was a huge disconnect between school and "the real world". After graduating from Lansing Community College as a technician, Nate went to work in a local manufacturing facility. He began his job believing he was woefully inexperienced, thinking the "old timers" knew more than he did. Over 5 years that changed. Nate found that what he'd learned in school combined with experience actually gave him an edge. He began to take it upon himself to "fix issues" before they got out of hand. To his fellow employees, he became "Natenance" — the go-to-guy who "knew" more. Nate learned pneumatics inside and out. Eventually, he took his skills and expertise to a new job where he helps maintain the particle physics accelerator at MSU. Today, along with his MSU gig, Nate is one of Lansing's mechatronics instructors helping to develop a systems approach to teaching. He was one of several faculty and administrators who traveled to Berlin for Siemens training and certification. Nate has a dogged dedication to process, procedures and documentation. Nate doesn't believe in "flying from the hip" when it comes to technical work. He does believe, however, that creativity has a critical place in helping people learn how to learn and that in order to truly fly, learning is a life-long exercise.

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Basics and modularized and flexible hybrid format for Mechatronics with open entry/open exit launched in January 2017. Simulation technology is fully integrated helping create a customized, student-driven learning experience. Lansing's new Center for Manufacturing Excellence will deliver a seamless pathway for students and employers combining manufacturing technologies, customized and corporate training, and apprenticeships and experiential learning under one roof and one system.

M-CAM's Learning Community

As part of the consortium's technology enabled learning deliverable, M-CAM colleges agreed to build a community learning virtual platform for faculty to continue to exchange information, share ideas, co-create instructional material, and identify best practices given the benefit realized through cross-college collaboration. Taking the lead, Kellogg worked with a team to identify specifications for the community, create an inventory of potential platforms, and select and secure a vendor which created a pilot that led to the launch of the M-CAM Learning Community in September 2016. The site allows visitors to engage in discussion boards, develop and join communities, post announcements and events, share articles, and more.

Before M-CAM, Mott Community College's faculty worked in relative isolation. As an example, Mott faculty's primary contact with other instructors had been at state-wide conferences. After M-CAM, Mott faculty, and their peers at the other M-CAM colleges now have access to a rich network of credit and non-credit faculty across M-CAM colleges. Through meetings, email exchanges, and other platforms like the M-CAM Learning Community, faculty continue to challenge one another's assumptions, to collectively explore opportunities to improve teaching and learning, and to stand as champions of quality and advocates for change.

EQUIPMENT, FACILITIES, AND TECHNOLOGY: TOOLS FOR TRANSFORMATION

Keeping Pace

Community colleges strive to offer students equipment and facilities that replicate the manufacturing work environment. In recent years that goal has become more and more challenging. For the most part, the cost of keeping pace with rapidly changing advanced technologies used in manufacturing is prohibitive. Colleges have been creative in deploying federal funding sources, such as those from the Carl D. Perkins Career and Technical Education Act, and leveraging additional state and local financial support to deliver incremental improvements in technology and facilities used by students and employers alike. And because equipment used in the learning environment often dictates curriculum design, faculty, although creative, often struggle to deliver up to date instruction that accurately reflects the work experience. M-CAM's eight colleges were no exception. With the arrival of M-CAM funding came an opportunity for colleges to not only purchase new equipment but to approach equipment purchases as a means to redesign or develop entire manufacturing programs, to rethink the learning environment, to upgrade current labs, to inform the design of new facilities, to initiate delivery of new programs, and to ensure M-CAM programmatic deliverables were met. In other words, M-CAM equipment purchases changed the game by ensuring training and programs met industry standards.

Boot Camps: A Fast-Track to Learn and Earn

Schoolcraft College's Welding/ Fabrication and CNC Machining programs had long been recognized by the college as key to Schoolcraft's manufacturing instruction capabilities. However, limited resources to update equipment meant changes to programmatic offerings were delayed. With M-CAM funding came the opportunity for faculty to explore new instructional territory, to offer new ways for students to be trained, and to increase student capacity overall — accelerating the development of Michigan's manufacturing talent pipeline.

Schoolcraft installed 14 new CNC Machining student workstations, each equipped with control simulators and seven software programs (MasterCam, WorkNC, CATIA, SolidWorks, AutoCAD, Edit CNC and Office 2013), a master controller with networked mini-mills and lathe machines, and an instructor podium and faculty workstation. CNC Machining instructors were certified at NIMS Level I. With this combination of changes, CNC Machining faculty repositioned the program to offer a new instructional model — boot camps — as an alternative to traditional credit and non-credit programs. Boot camps are designed to help students acquire knowledge, skills and abilities in an immersive, hands-on, intensive experience enabling learners to fast-track into well-paying manufacturing jobs – a first step toward a more advanced credential and/or manufacturing career.

The addition of five welding stations (supported by leveraged funds and built off-site by students) gave welding faculty the ability to revise existing programs, offer new ones and acquire accreditation from the American Welding Society (AWS) as an Accredited Test Facility (ATF). In

"Boot camps are a Cinderella story. One boot camp included 2 company sponsored employees, 1 person on public assistance, 1 youth and 1 individual student. One student said, You could put us on an island and we could build anything."

Schoolcraft M-CAM Project Lead

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concert with their CNC counterparts, welding faculty embraced the boot camp concept and are now delivering more blended and varied instruction to meet the needs of all learners at any stage of an individual's career development including testing and certifying students each semester. This includes offering pre-apprenticeship certificates — created in partnership with Iron Workers Union Local 25 — allowing students to advance into the Iron Work apprenticeship, welding fabrication certificates, and AWS level 1 certification.

Schoolcraft now offers two levels of CNC Boot Camp training. Level 1 is 90 hours and level 2 is 130 hours, for a total of 11 weeks and offers students opportunities to acquire multiple industry certifications including OSHA 30, NIMS Level I and Level II and College certifications. Welding Boot Camp can be completed in five weeks. Students completing the Boot Camp exit with entry level welding fabrication and safety skills and competencies. In addition, Schoolcraft Boot Camps provide wrap-around services for participants. This means students receive coaching in resume writing, interviewing, and job skill development along with instruction. Job developers make sure potential employers are aware of the boot camp talent pool. Employers are often an integral part of M-CAM job readiness skills preparation activities. They participate in plant tours and are invited to interview completers in a "round robin" format, often hiring students immediately after completion of the program.

New Facilities: A Whole New World

Located in Michigan's Upper Peninsula, Bay College's Welding program on the college's Iron Mountain west campus had a waiting list of 70+ individuals eager to get skills that would help them find repair and maintenance work in the area's railroad and shipping industries. Welding instruction on the college's Escanaba campus was delivered to learners in an outmoded, outdated lab. At Bay West, instruction was supplemented through the area's high school career and technical education program.

M-CAM changed all of that. By combining and leveraging funds, Bay upgraded the Escanaba campus lab and built, in collaboration with the Dickinson-Iron Intermediate School District, a new welding facility in Iron Mountain. The facility holds 40 new welding booths, 20 new welders, a mobile weld station (important in providing remote instruction in the sparsely populated Upper Peninsula), gas carts, curtain risers, consumables, floor-mounted vertical drill presses, air compressors and plug kits. Both facilities now house state-of-the-art equipment and have enabled Bay to double the number of students served from 40 to 80, providing instruction to meet the needs of both high school students and adults. In addition to having access to much needed training, welding students are taking great pride that their building represents a high-tech manufacturing environment – the most impressive on campus. As Bay's lead said, "These rugged individuals now think of themselves as campus rock stars. The building allowed them to literally move from across the tracks into the limelight."

Bay also leveraged M-CAM funds to develop a new Mechatronics program, purchasing six Festo Learnline Trainers, three Festo Compact PCS Trainers, and two Motor Control Trainers which allow students to wire AC/DC motors and control circuits. Bay now offers a new associate's degree in Mechatronics and Robotics Systems — essential to the development of an end-to-end manufacturing pipeline critical to the region. In addition, the College has become an Educational Certified Training Institution for FANUC America's Certified Education Robotics Training (CERT) Program.

EQUIPMENT, FACILITIES, AND TECHNOLOGY: TOOLS FOR TRANSFORMATION

New Facilities: Open Space/ Open Possibilities

Lake Michigan College's new Hanson Technology Center's interior and exterior were designed to engage people. From the lobby to the labs, the utilization of glass visually invites visitors and students to the Center's high-tech environment. Housing state-of-the art equipment, some purchased through M-CAM, the Center creates the capacity to configure manufacturing's building blocks, the FAB lab, Robotics, CNC, Welding, Engineering Tech, Mechatronics, and Simulation Labs, singularly and systemically to address every aspect of the manufacturing process. The Center's flexible design not only models the 21st century manufacturing space, it lends itself to modeling flexible, student-centered and student-driven instruction as well.

As Lake Michigan was developing the center, it was concurrently rethinking instruction. M-CAM's focus on programmatic design with aligned outcomes, career pathways, contextualized learning, integration of technology-enabled instruction, industry credentials, and wrap-around services, provided Lake Michigan faculty and administrators with a collaborative platform to focus energies on significant instructional change at the same time the new building was being designed.

As a result, Lake Michigan merged the physical and instructional building blocks to produce students ready to meet employers' needs. The result is a self-paced, flipped class model centered on individual and customized student learning. In the flipped model, students have access to learning content/modules 24/7 through online instruction like Tooling U.

In this model, learning time can be tracked by students and instructors alike with emphasis on achieving outcomes. When students enter the program, they are coached by instructors and career coaches. At the front-end of their journey, students are introduced to the tools needed to work independently, in cohorts and with the instructor.

In this instructional model, lab time concentrates on each student's level of need. Instruction is less generic and less time driven. Using technology-enabled instruction, students are given multiple opportunities to pass an assessment until "the material sinks in." Self-paced learning reduces the learning curve, requiring less remediation in the lab.

Lake Michigan students are tracked by faculty through the technology. Students can't move from module to module until receiving a score of 100 on the assessment. Faculty can assess whether a student has mastered the material in each module, can provide support and remediation in real time and can determine where issues with progression might be found. Some students move quickly through content, others require multiple attempts. For instance, it might take one student a single attempt to understand the rake edge of a cutting tool on a saw. Another student might need extra modules and extra lab time for the concept and application of the knowledge to stick. When Lake Michigan's center is in full operation, combined wrap-around services and new instruction will provide a scalable model to develop and deliver instruction college-wide.

Macomb's Michigan Technical Education Center (M-TEC) works with businesses from small startups through large corporations, providing consulting services, and workforce training and education solutions. M-TEC is a 40,600-square foot facility providing education and training in advanced integrated manufacturing, automated systems and robotics. M-TEC works across multiple industry sectors and in collaboration with employers to develop and deliver customized solutions addressing the technical talent pipeline at every level of an organization or industry sector.

Macomb has undertaken a major upgrade of M-TEC, supported by

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a $2.6 million investment by the Department of Labor (the M-CAM grant), the Michigan Community College Skilled Trades Equipment Program, and other College resources. With the changes, Macomb has advanced its capabilities in advanced integrated manufacturing, automated systems and robotics, and replicating what is found in companies across Macomb's service area. M-TEC offers training on the latest industry-specific equipment in body-shop, paint, general assembly, and powertrain. In addition, they offer automated systems training that includes FANUC and ABB robots, laser alignment, CMM, RFID, FANUC CNC Robodrill, robot load/unload and vision system, VFD training stations, AB and Siemens PLC training stations, and more.

This equipment has been used in all M-CAM program offerings to support the employer identified knowledge, skills and abilities required for their available positions. National credentials have been embedded in both credit and non-credit areas and as of March 20, 2017, Macomb has awarded 571 AWS Qualifications and the following Certifications: 90 FANUC CERT Handling Tool Operations & Programming, 68 Siemens Level 1, 58 PMMI, 284 NIMS, 25 MSSC CPT and 263 OSHA 10. Staff and faculty representing both credit and non-credit participated in the decision-making process, which reduced duplication of effort and ensured resources and outcomes were shared.

M-TEC has been transitioning to a Workforce Development open enrollment format and will sustain most of the M-CAM deliverables. Existing and new courses resulting from the equipment upgrade have been sequenced into shorter programs integrating all funding sources with clear and stackable career pathways. National credentials have been aligned for each program. The new format allows any student greater flexibility in when they take individual classes and the pace at which programs are completed.

Concurrently, Macomb has embedded the use of Tooling U and Amatrol (online instructional products) into credit and non-credit programs. For students, this helps broaden their learning environment by providing 24/7 access to instruction 365 days a year. Instructors integrate modules and assign homework to prepare students for industry certification testing, as well as in support of self-directed study.

At Mott, equipment was purchased for the FABLAB — a product development prototyping facility that serves entrepreneurs, businesses and students — many of whom ultimately move into one of the four M-CAM programmatic areas. The FABLAB at Mott has been in existence since 2011, but was significantly enhanced with new 3D printing and laser cutting/etching equipment. Additional equipment enhanced an existing Electrical/Electronics program for Multi-Skilled/Mechatronics, while virtual welders and CNC equipment upgraded capacity for AWS and NIMS credentials respectively. Mott also viewed KAMA's simulated production platform used to blend theory and practice at Kellogg Community College and was able to secure a similar platform using funds offered through the Michigan Community College Skilled Trades Equipment Program.

"All pathways are connected. Non-credit to credit programs are now seamless. Every program is tied to a credential. Faculty are driving the change. We have one voice about manufacturing."

Lansing's M-CAM Lead

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It's All Connected

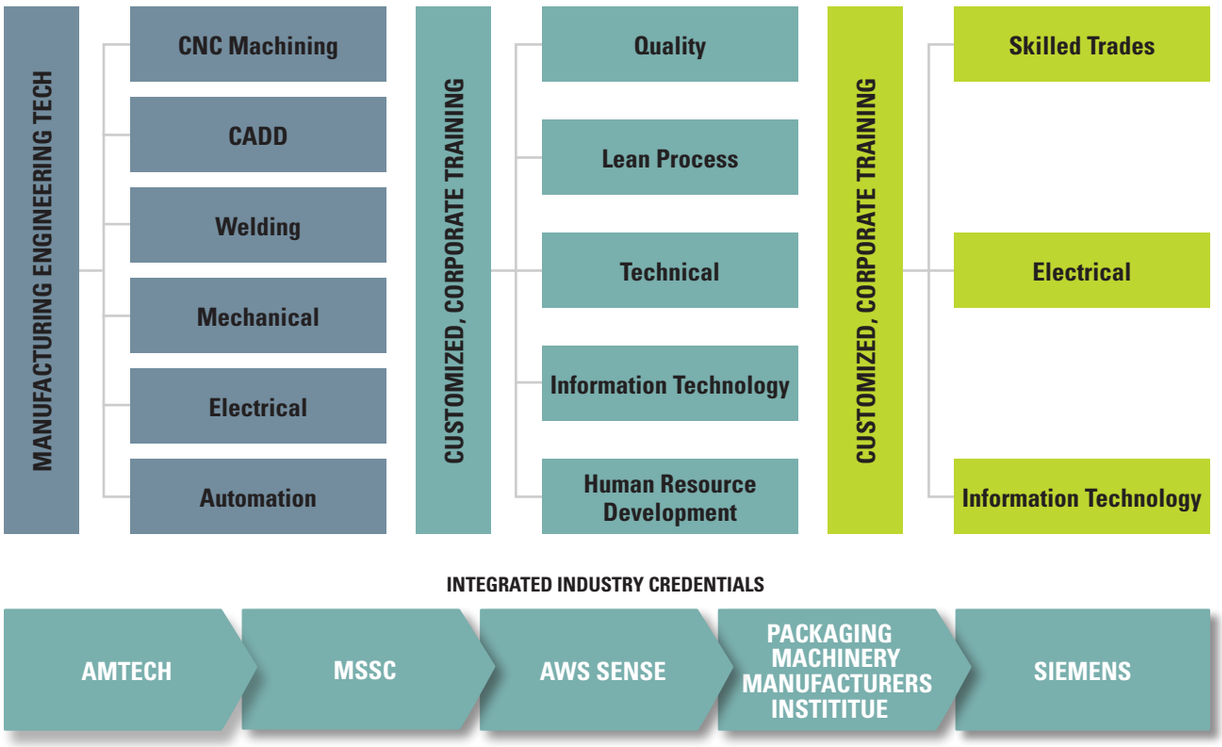
For Lansing Community College, timing was everything. After years of attempting to build more flexible and seamless pathways for students and employers between credit and non-credit, Lansing is launching its Open Entry/Open Exit Mechatronics program in Fall 2017. Design for the new program is similar to Lake Michigan's flipped model and was heavily influenced by Kellogg Community College's Advanced Manufacturing Assembly (KAMA) program where in four weeks of intense training, students gain essential entry-level production skills and industry recognized credentials.

Students in Lansing's new programs will receive instruction via three blocks containing 12 courses and 52 modules. Online content from the Automotive Manufacturing Technology Education Collaborative's (AMTEC) performance-based outcomes model is being combined with labs that were developed and configured through M-CAM. Stackable credentials have been integrated. Instructors have access to online learning software like Tooling U, Manufacturing Skills Standards Council (MSSC), AMTEC and Edmentum, helping to integrate multiple learning platforms into the instructional model — all part of M-CAM's system of deliverables.

Lansing's new flexible programs will be delivered at the college's new Center for Manufacturing Excellence (CME) facility. Faculty are currently in the throes of creating instructional building blocks. They are defining and aligning performance-based outcomes to industry partners' job profiles asking, "What does it take for a person to do specific tasks including technical, foundational, employability and computer literacy skills?" They are working with M-CAM Career Coaches and Job Developers to make sure the right wrap-around services are present in the program — all in an effort to sustain the approach after M-CAM funds are no longer available (see Figure 4).

EQUIPMENT, FACILITIES, AND TECHNOLOGY—TOOLS FOR TRANSFORMATION

Center for Manufacturing Excellence Seamless Pathway for Students and Employers Figure 4



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Stronger internal cooperation among disparate organizational units has been a goal for many community colleges. Although M-CAM afforded all eight colleges a rich opportunity to learn and share across institutions, for some M-CAM members the most important and transformative collaboration occurred within their own college.

Macomb's Michigan Technical Education Center (M-TEC) is an enterprise-driven facility designed to deliver non-credit workforce and continuing education instruction that is aligned to the needs of industry. The ultimate goal is to enroll students and quickly move them to completion, employment and/or job advancement. Although M-TEC and Macomb's credit instruction were aligned under the same department and dean, M-TEC students did not receive the full range of support services that credit students receive. M-CAM provided an opportunity to integrate these student services functions rather than having M-TEC staff provide these wrap-around services to its non-credit students. With M-CAM's emphasis on wrap-around services, all students now receive customized career coaching, employment development, and information about articulated pathways to help them make informed decisions about their education and training. Macomb has intentionally integrated existing student services into all M-CAM programs run through M-TEC.

In order to implement seamless offerings to students, the M-CAM staff held weekly meetings. The team took on the arduous task of overcoming perceptions, some inherent distrust, and resistance to change to produce a blueprint of comprehensive services to recruit, support, and place M-CAM students.

The team began work by exploring what each member did, what tools and processes they used, and how they worked with students. Mapping functions helped expose gaps and overlap and allowed team members to develop an understanding of motives, actions, challenges and struggles. Deep conversations about what is required to "do this right" led members to create a shared vision of success and shared strategies to achieve it. Values, aspirations and behaviors began to change. Instead of focusing on obstacles, the M-CAM team focused on expertise — what people knew and how that knowledge could be used to transform the system. The team forged relationships through awareness. M-TEC staff began to see how their limited access to resources credit students were receiving impacted M-TEC students. M-TEC staff members were not aware of the impact bypassing a procedure had on the system or of the myriad services that would be made available to M-TEC students (particularly veterans and those from vulnerable populations) that were not being offered. Student service staff also learned from the staff at M-TEC and began to understand the speed and agility required by M-TEC to meet grant goals, while remaining flexible to employer and student needs. The team realized all processes and procedures were in place within the college; they simply needed to be enhanced or redirected. Student services staff understood that their intake and analysis processes might prove to be barriers to M-TEC students. As work progressed, the two systems began to integrate.

Today, the team describes a borderless system where silos have almost disappeared. The work of each expert is left to that person. Information and inquiry flow freely. Questions are asked. Support is provided. All students have a single point of contact based on function, not on the organizational chart.

The model has produced a blueprint for credit and non-credit services to line up. As an example, the foundational and workplace readiness skills support delivered through Career and Student Services on the credit side of the college is now part of M-TEC's technical training. Resumes are developed and placed into Macomb's portal. The Employer Development Coordinator then

arranges on-campus interviews with employers who have job openings, resulting in an 83% placement rate.

The process of "student hand-off" is effortless and transparent. As one Macomb team member said, "Students don't need to know the structure. They don't care. They want to trust the college to get it done for them."

Career Pathways and Guided Pathways are also being examined as one interrelated system. Career Pathways produced through M-CAM are maps showing students multiple opportunities to onboard and complete M-CAM programs. The Guided Pathways project endeavors produce clear, educationally coherent program maps — which include specific progress, milestones, and learning outcomes aligned to education completion and employment in the workforce.

The college is rethinking how to onboard students modeled after M-CAM's intake process, and how to help them overcome barriers to meet educational goals in a new way. In fact, 10% of Macomb's M-CAM completers are pursuing advanced education as opposed to 4% prior to integrating this improved student services model.

Macomb used M-CAM as a catalyst to not only do things in a new way but to change the underlying thinking about how things get done. This new model allowed Macomb to ensure services that are provided under the grant are embedded into existing operations, so that new processes and initiatives are sustained beyond the life of the grant — increasing Macomb's ability to serve its community well into the future.

Change and Momentum: Industry Credentials and Stacked and Latticed Pathways; A Springboard to Articulation

Although community colleges have made great strides in providing seamless paths for students to transfer (articulate) credit from one institution to another, challenges still remain. With M-CAM's focus on industry credentials came an opportunity to consider both the value of industry credentials as a means to align instruction to manufacturing in a more robust way and as a potential tool to make articulating credit within and across institutions easier for students.

At the launch of M-CAM, Grand Rapids knew the adoption of national credentials would be an uphill slog. The college had never focused on them and in some instances areas of the college were actively opposed to using industry credentials. Using M-CAM as a springboard for exploration, M-CAM programmatic teams began to talk – about their courses, about employers needs/wants, about outcomes and assessment and about competencies and credit. The work required to align program outcomes included engaging faculty in deconstructing curriculum, comparing and contrasting approaches and design. The meetings provided a safe haven to express concerns and to have those concerns addressed by colleagues from other institutions.

As programmatic teams worked, the task of alignment and articulation became more and more difficult. Length of programs, delivery methodologies, and credits assigned ran the gamut in all four areas across all eight colleges. Under Macomb's leadership, the Multi-Skilled/Mechatronics team introduced the idea of using industry credentials as the foundation for alignment. Discussion about the content and assessment behind industry credentials eventually anchored alignment strategy. Working with the college's registrar, Grand Rapids' M-CAM team began to explore what assigning credit to a credential would look like — what value it would have for existing students, for faculty, and for employers. Concurrently, M-CAM faculty were agreeing to accept and make available to students industry credentials even though employers, for the most part, were not yet requiring them.

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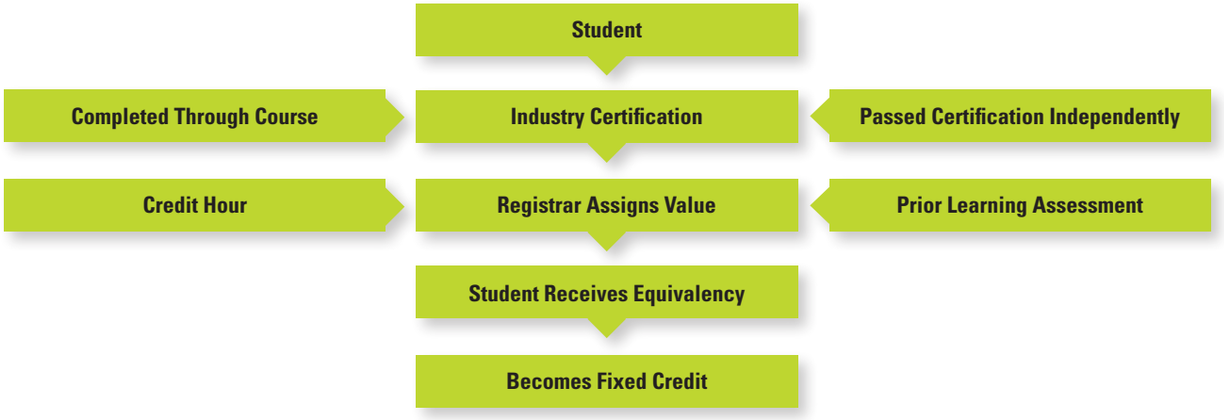
During two M-CAM meetings with college registrars, Grand Rapids' registrar introduced to her peers the model of assigning credit to each M-CAM industry certification — four in all — as the means for articulation and transfer from college to college. This approach became the strategy for the M-CAM articulation agreement, signed by all eight colleges in September, 2016. It was an historic and important outcome for M-CAM, but for Grand Rapids Community College it became the means to produce a lasting systemic change. The college's Academic Governance Council adopted a policy assigning credit for credentials — an embedded system transformation that will sustain long after grant funds disappear. The door for accepting credentials as a proxy for credit is wide open at Grand Rapids and represents a profound organizational change.

Another credentialing partnership of note is Macomb's work with FANUC. Macomb's M-TEC is scheduled to become the only community college training center in Michigan to hold the Authorized Satellite Training Program (F.A.S.T.) designation. The designation endorses the center as a FANUC America satellite training facility. In addition, Macomb has provided subject matter experts to help FANUC develop the first national robotics education standards and certification in robotics and automation level 1 & 2 with NOCTI Business Solutions. Macomb provides the industry recognized FANUC Certified Education Training (CERT) in both credit and non-credit programs. As a result, students learn to utilize the latest automation technology in robots, CNC, ROBODRILL, and integrated solutions while applying science, technology, engineering, and math (STEM) skills.

Expanded Articulation Opportunities

Providing pathways for students to move seamlessly from one institution to another included the ability for M-CAM students to transfer credit earned in the four programmatic areas to other Michigan colleges. In partnership with Eastern Michigan University and Ferris State University, transfer articulation agreements were developed and implemented. Not only do M-CAM students have the ability to articulate credit between M-CAM colleges (see Figure 5) but they can now transfer to four year programs at Eastern and Ferris after earning an associate's degree at the community college. The agreements

Transfer Within M-CAM Institutions Proposed Articulation Process Figure 5



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simplify the transfer process for students, open doors for continued educational attainment, and reduce the expenditure of repeating courses for knowledge and skills already acquired and validated through M-CAM programs.

Unexpected Data Alignment

The backbone for information management at all community colleges is the institution's Enterprise Resource Planning (ERP) system — a suite of integrated software applications used to collect, store, manage, and interpret data and to automate many college functions including those serving students and employers. For M-CAM, the eight member colleges committed to use Efforts to Outcomes (ETO) software for shared tracking and reporting.

M-CAM's specific data definitions and ETO collection processes were used to leverage and supplement each college's ERP data, providing a shared platform to not only track M-CAM-specific performance but to help realign some colleges' ERP system content.

ERP systems aren't typically set up to integrate information about non-credit students, leaving them out of these mainstream information systems. Grand Rapids used the grant to change that fundamental by automating its equivalencies processes.

Because M-CAM deliverables align learning outcomes, program credit, and credentials, it was incumbent upon institutions to be able to access student records and assign credit for credit (called equivalencies) as part of data collection and information management processes.

The function of aligning equivalences is owned at Grand Rapids by the registrar's office and has often been implemented by one person, primarily through review of paper documents. In other words, the process can be one that is standalone, extremely time-consuming and difficult to update and change. This was the case at Grand Rapids before M-CAM.

Grand Rapids' equivalency files had not been updated in 30 years. Although not identified early on as an M-CAM outcome, Grand Rapids deployed a strategy to use the grant to provide the means (funding and tools) to completely automate its equivalency process. That meant full integration into the college's ERP system — a huge win!

Because of this unintended outcome, Grand Rapids was able to begin developing a more robust, just-in-time way to record and extract student credit equivalencies. This is a first step toward integrating national credentials in the transcript process and in integrating credit and non-credit transcripts into a single document. It is also a major step in offering non-credit students on-line registration for the first time — all with the ultimate goal of delivering one easy to read, easy to access transcript to every Grand Rapids Community College student.

Unexpected Economic Impact Data

M-CAM's simply formatted ETO data collection system proved to be a powerful asset in enhancing Lake Michigan College's relationship with their local chamber of commerce. Described by Lake Michigan's project lead as a "cornerstone for a refreshed relationship", Lake Michigan has begun to use M-CAM employment, outcomes, and credentials data to demonstrate what employability looks like at the local level "in real-time". The data provided to the chamber by Lake Michigan is being used to understand how Lake Michigan's programs are having a positive impact on the area's economic development and to help create the story of Benton Harbor's total economic growth. For the chamber, access to this data means an enhanced way to evaluate the impact of incremental and long-term development strategies, to better align and marshal resources and to customize and target economic development work for the community it serves.

WHO WE SERVE AND HOW WE SERVE THEM

Helping Those Left Behind

M-CAM's model was based on ensuring manufacturing students could receive strong support throughout their journey. Specifically, the colleges agreed to develop and implement Career Coaching and Job Placement roles. For M-CAM colleges, this meant defining two new institutional functions, developing two new job positions, and recruiting and hiring people to fill those positions.

Once on board, M-CAM Career Coaches and Job Developers played an important role in the creation of enhanced support services to students and employers alike. Career Coaches guide students in the exploration of training and career opportunities, advise and support them while enrolled, help them navigate college processes, help mediate non-academic issues like acquiring life and employee readiness skills and facilitate the transition from program completion to the job market.

Working in tandem with Career Coaches, Job Developers reach out to employers, helping match students to available jobs. They often assist in scheduling interviews and in making sure students are prepared to present themselves as viable candidates through resume review, mock interviews, and other essential support. The comprehensive system produced by M-CAM is a holistic approach to the student journey from intake to employment – integrating employers as partners all along the way.

Lake Michigan College partners with forty-five area employers in an apprenticeship training program combining classroom study with work-based learning (WBL). Approved by the Bureau of Apprenticeship and Training of the U.S. Department of Labor, apprenticeship opportunities have been delivered by Lake Michigan College to 140 individuals in 35 occupational areas. These include career areas targeted by M-CAM, including drafting/design, machine building, maintenance, metalworking, mold making, quality control, and other skilled trades.

Building on a strong apprenticeship foundation, in 2014 Lake Michigan College and employer partners began to offer a pre-apprenticeship summer training academy. Upon completing the academy curriculum, students have acquired basic advanced manufacturing knowledge and skills putting them on a "fast track" to further apprenticeship training. Before the academy, completion of the basic foundational training would take two full semesters, impeding some participants' ability to complete and slowing down the training process. Employers are delighted to have a more productive new employee in a shorter period of time while students have multiple opportunities to advance as both learners and employees.

A significant resource that enabled the career coaching and job placement functions for all colleges came from the leadership and expertise of Mott Community College. Mott's workforce development team had long been champions and lead practitioners in processes that supported a comprehensive

An M-CAM Journey

After working for 35 years at a St. Joseph manufacturing facility, Ron's job was eliminated. Even though he had a degree from Purdue University, Ron wanted to update his skills and, after searching for a year, began courses at Lake Michigan College.

Ron's Lake Michigan College journey was supported by wrap-around services that included faculty and an M-CAM "Talent Coach" who helped Ron graduate with certificates in CNC, Machine Tooling, and Technology.

Today, Ron is working as a continuous improvement engineer, earning $31.00 per hour and credits Lake Michigan's M-CAM program with helping him remain a viable and contributing member of the workforce.

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student experience well beyond the classroom. Their approach was rooted in the belief that community colleges can and should meet students at whatever entry point at which they arrive and support any exit or milestone that meets their needs.

With this foundation, Mott helped lead the creation of the M-CAM Intake and Orientation process that all schools incorporated. This process focused on multiple entry points within the college, upfront program eligibility assessment (in order to maximize the resources that may be directed toward a student), and sequenced steps that define student aspirations and barriers alike. This process includes foundational and work-ready assessments, career planning, evaluations for job fit, and educational development plans (see Figure 6).

At Macomb, the improved intake and orientation model, career coaching and job placement functions led to one of the college's greatest achievements — its ability to contribute greatly to the numeric outcomes of the grant in addition to providing better services to its non-credit students. Macomb M-CAM team members never took their eye off of the prize — the grant outcomes. The team remained flexible and adapted to the changing economic environment and the needs of their students. A dedicated recruiter trained to talk to students about technical training, creating a pipeline of unemployed individuals, incumbent workers and participant referrals that led Macomb to enrolling 1,248 of the 3,826 (33%) participants served by the consortium as of March 31, 2017.

The relationship between the Intake Coordinator and the student is also a critical component of Macomb's success and begins at the WorkKeys workshop where an overview of student services and expectations are given. An upfront conversation about goals, obstacles and barriers takes place. The Intake Coordinator works throughout training to ensure student success through daily tracking of attendance and classroom presence, and one on one meetings to address obstacles and barriers. Sometimes students just need someone to talk to, sometimes they need to develop an action plan to get them through training, sometimes there is behavior that requires corrective action, and sometimes they just need support and encouragement in attaining their goals. This position supporting student success helped Macomb generate 727 of the 2,137 (34%) individuals completing M-CAM training to date and of the 385 (35%) participants pursue further education.

Additionally, two new roles created at Macomb under the grant were the Career Coordinator (Macomb's name for the Career Coach function) and the Employer Development Coordinator (Macomb's name for the Job Developer function). The Career Coordinator provides students with

Macomb's Michigan Technology Education Center (M-TEC) Food Cupboard

The M-TEC program is tough. Students spend eight hours a day in classes five days a week for twenty weeks. Many M-TEC students are struggling financially; some coming to class having chosen between feeding a child or eating themselves.

When M-TEC staff discovered some students were going through rigorous training without food they got to work.

By combining and marshalling resources, M-TEC and student service staff launched the Food Cupboard, modeled after the South Campus Food Pantry.

Fully stocked by donations from the community and former M-TEC students, the cupboard provides free food to all M-TEC students in need.

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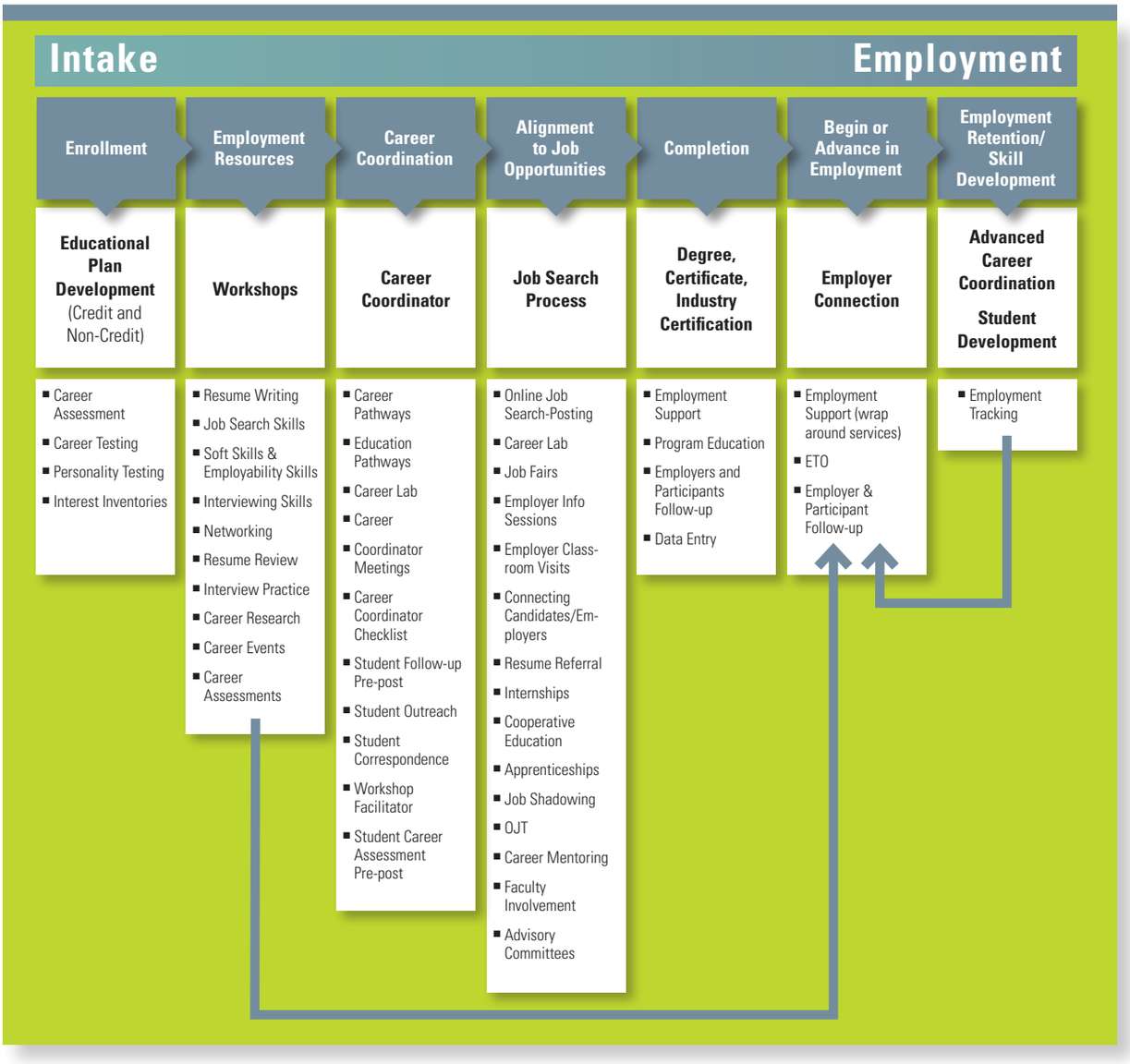
M-CAM Student End-To-End Journey Comprehensive Mat

Figure 6



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career coaching, job preparation, job readiness skills, job leads, student advocacy and resource referrals. The Employer Development Coordinator works to build and strengthen relationships between employers and the college and helps students acquire job attainment skills through interview coaching, arranging interviews (including 33 Interview Days which bring employers on site), employer tours, and tracking employment and retention. To date, approximately 400 M-CAM students have been served through Career Services and these new functions. As a result, 298 of the 769 (39%) participants employed and 271 of the 1,220 (22%) participants receiving a wage increase participated in training at Macomb. This model has been so successful that Macomb has developed a sustainability proposal based on its success and is receiving a positive response from private funders interested in helping the college to sustain this model. An internal sustainability strategy is also being developed.

Helping Those at the Margins

Combining new wrap-around services with new programs and new delivery systems gave M-CAM colleges the opportunity to reach out to people who experience seemingly insurmountable barriers to social and economic success.

Successful Re-Entry

After 20 years in prison, Jeffery came to the KAMA program seeking training, basic skills, and employment placement. Following the KAMA program Jeffery was interviewed and directly hired by Denso. Jeffrey maintains a resilient, positive attitude about life and work, has hope for the future, and has become a productive member of society.

Kellogg Community College's Kellogg Advanced Manufacturing Assembly (KAMA) program was conceived and designed as a short-term, entry-level manufacturing production training program serving all students but placing a special emphasis on vulnerable populations like parolees and the homeless who have traditionally been at the margins of recruitment strategies.

Kellogg's partnership with other M-CAM colleges informed the purchase of equipment, the configuration of the assembly line and instructional delivery used in the KAMA program. Functioning as a gateway to multiple manufacturing and educational career pathways, KAMA offers students course work — short-term, contextualized and experiential — through simulated production line environments that replicate those used in manufacturing.

For learners challenged with major life issues, offering a short-term path to employment combined with intensive wrap-around services has been instrumental in Kellogg's ability to reach students who never imagined they would be going to college or would be able to secure a life-sustaining wage. These students often struggle with commitment, time management, classroom behavior, interpersonal issues and other challenges that impact their ability to become responsible employees. Kellogg's team works on a daily basis with each student, often coaching in real-time, securing additional support resources and intervening before a student is overwhelmed and implodes.

Through the job development process, Kellogg's outreach has engaged employers in rethinking their hiring practices to include interviewing people they would not normally consider because of myriad challenges employers face when hiring someone recently paroled or living in a half-way house. Kellogg's team not only introduces employers to students but facilitates multiple conversations that help change perceptions and build relationships. As one Kellogg employee said, "Employers have a genuine interest and want to be involved in solving the

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skilled worker shortage. They are willing to give their time or open doors to talk about the industry and career opportunities that exist within." Kellogg's Career Coach noted, "M-CAM training and successful student employment placement has precipitated partner companies to revisit their recruitment and hiring policies to include people who would normally not be under consideration." Partner employers have commented that KAMA and all M-CAM programs have produced well prepared students who are "work ready" — a measurable return on investment for employers.

For Kellogg, the instigation and implementation of Career Coach and Job Developer models has meant systemic change. Traditionally, recruitment and support services were more generic. The new emphasis on customized and intensive engagement of students through career coaches and the success that approach brought, helped Kellogg reconsider its traditional approach. This, in turn, produced a shift in traditional college practices in recruiting, intake, outreach, support services and student success to now include coaching and defining achievable academic and employability goals. This shift has resulted in the college broadening support services to include those instigated and implemented through M-CAM. For Kellogg students, M-CAM has meant life-changing opportunities. For employers, it has meant much-needed talent is being produced, resulting in deeper and more systemically engrained relationships with the college. And for Kellogg's community, M-CAM programs and processes have moved some 300 underserved people to become independent, productive, and vital citizens.

Reinvention

When a major manufacturing facility in Grand Rapids' district announced it was closing its doors and that many long-term employees would be displaced, college staff and their Michigan Works partners went into action. Grand Rapids' job developers became a liaison between the company's human resources department and the college's M-TEC facility where M-CAM programs are housed. With permission from the company, job developers began to visit the facility, introducing services to people who were, as the M-CAM lead described, "shell shocked and angry."

Easing in slowly, Grand Rapids staff began to counsel those employees who were struggling to decide upon a course of action. Older employees were invited to visit M-TEC labs including those developed through M-CAM funds. They were exposed to career pathways and alternative opportunities. They were helped with resume writing and coached in the interview process. They were linked to Michigan Works as well as temporary agencies to help them understand the process of getting hired — something that many affected workers had not experienced in many years. For anyone, the process of reinvention is daunting. For employees close to retirement, the thought of reinvention is terrifying. Through M-CAM's job developers, many vulnerable workers were transitioned from a potential life shattering experience to one that was life sustaining.

PARTNERSHIPS

Engaging the Michigan Works Agencies

When the U.S. Department of Labor first awarded TAACCCT funds, many grantees were focused on serving people who had lost their jobs during the Great Recession. For M-CAM colleges, this meant people who had lost jobs as Michigan's manufacturing base was dramatically altered. However, when the M-CAM award arrived, Michigan's economy had bounced back, reducing the number of unemployed participants in each of the college's pipeline. It became evident early on that in order to meet targeted numbers of people served by M-CAM, the colleges needed to engage in a concerted effort to reach out to their network of partners and most essentially to the Michigan Works agencies, the state's public workforce system.

As in all states, the Michigan Works agencies work with local employers and communities to provide employment information and job search assistance for job seekers, support for employers looking for talent, and funding in a limited number of instances for training. Michigan Works agencies are structured to be regional, and strive to be locally responsive and demand driven. Michigan Works agencies engage in a range of partnerships in doing their work, including with community colleges.

As with any long-term relationship, there can be ebb and flow in how well the partnership functions. For some M-CAM colleges, such as Macomb and Mott, their Michigan Works partnership was extremely effective and for others, there was room for development and growth.

MiWorks!/M-CAM Partnership Action Plan

AREAS OF JOINT ACTION:

- Communication and Information Sharing
- Advancing Co-Enrollment
- Developing/Aligning Credentials
- Sharing Data
- Immediate and Miscellaneous Place-based Action

For Macomb, M-CAM funds helped create new opportunities within an already well established partnership. Together the Macomb St. Clair Michigan Works! Agency and the college strive to provide employment opportunities for the people they serve. Using a shared approach, students receive complementary services from both organizations. Macomb's recruitment coordinator presented the M-CAM program to more than 50 Michigan Works case managers during monthly meetings. This increased their understanding of M-CAM's potential impact for Michigan Works' clients, resulting in a significant number of referrals. The case managers learned about Macomb's wraparound services as well as training options and now share that information with clients. Frequent updates about information sessions, training schedules, and other important decision-making content are given to case managers, youth advocates, and career development facilitators. Michigan Works in turn provides supportive services for Macomb students, including helping with completion of On the Job Training (OJT) paperwork and hosting Interview Day events at Macomb's M-TEC and employer sites.

Historically, each of the M-CAM colleges has aligned recruitment and training efforts with their regional Michigan Works agency in some form, such as providing specific employers with training programs, providing programs

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to upskill incumbent workers, or helping displaced workers find new avenues to skill development and employment. Much of this work was predicated on policy and funding streams. And as is often the case, when funding streams change, actions can be redirected.

M-CAM's explicit focus on targeted career pathways, wrap-around service, advanced manufacturing skill attainment and industry recognized credentials provided an opportunity to serve students and employers in a more cohesive way.

In the first two years of the grant, colleges worked individually with partners in their communities, including the Michigan Works agencies, to help them understand M-CAM. The approach, while well intended, was often haphazard. As the need for solid partnerships with the Michigan Works agencies grew, the M-CAM consortium initiated a collective approach to helping partners understand what differentiated M-CAM from other college programs and services and how leveraging M-CAM could be mutually beneficial in reaching respective goals.

In December 2015, M-CAM leads began to articulate opportunities and challenges experienced in their partnerships with the Michigan Works agencies. Among those challenges were lack of clarity about roles, the mechanics of reporting student participation, the need to better align with employers, and the need to show how recruitment and referral processes could work seamlessly to better benefit students and employers.

In January 2016, a joint exploratory meeting was held. Each M-CAM college invited partners from their local Michigan Works agency (MWA) to attend. Ten representatives from MWAs attended. The meeting proved to be extremely productive and resulted in a roadmap the colleges and agencies agreed to follow.

For Grand Rapids and Lake Michigan, the meeting and resulting roadmap led to relationship reboots with their workforce agency partners. During the meeting, Lake Michigan's Michigan Works representative began, in real time, to map out how to begin alignment. The two now meet every month and include not only M-CAM staff but other Lake Michigan staff as well. The partnership is secure enough to ask bold questions and challenge some long held assumptions. Information is being shared and training opportunities have been identified. The Lake Michigan project lead was clear, "It's coming together!"

Today, Grand Rapids points to M-CAM as the reason Michigan Works now sees the college as a preferred partner in their region. Grand Rapids staff is included in Michigan Works staff meetings, provides information sessions on career pathways, and has been instrumental in co-creating a "whole person" approach to services by introducing the M-CAM Intake/Orientation model to Michigan Works partners. Grand Rapids' Vice President and Dean for Workforce Development now sits on the area's Workforce Development Board. The partnership model developed by Grand Rapids Community College and West Michigan Works is now being explored as a model for the region with funding from the regional prosperity board and the intent to migrate M-CAM work to West Shore, Muskegon, and Montcalm Community Colleges.

Passing the Baton

Grand Rapids is a leading center of office furniture production, housing such giants as Herman Miller and Steelcase. A natural sub-sector of advanced manufacturing programming for Grand Rapids Community College to pursue through M-CAM was industrial sewing. Approached by the Women's Co-op of Calhoun County to help build an entrepreneurial program to train low income women to become Industrial Seamstresses, Grand Rapids believed Kellogg was better equipped

to partner in the endeavor within Kellogg's service area. Introductions were made. Conversations began between Kellogg and the Women's Co-op. Now in its conceptual stage, the initiative envisions Kellogg would develop short-term programs for women to learn industrial sewing skills by producing a product for companies. The partnership would provide a double safety net for participants, equipping them to be skilled for entry level positions and then to eventually help the Women's Co-op launch a social enterprise to manufacture clothing for plus-sized women.

Inclusion

Two other impact stories of note involve Kellogg's Burmese student population and Grand Rapids' Hispanic community. In Calhoun County, Kellogg's location, there is a considerable Burmese population. Kellogg offers its Advanced Manufacturing Assembly program to non-traditional organizations and schools including the Burma Center which pursued and received grant funding to deliver KAMA classes in Burmese — a first for both organizations and an important part of the Burmese population's sense of success in their adopted home. An early initiative, only one student was able to complete the program.

The Hispanic community's relationship with Grand Rapids Community College was described by the college's M-CAM lead as "running hot and cold" until M-CAM. Working with a group of area employers needing skilled CNC operators, Grand Rapids approached the community anew through a service lens — how could the college serve underemployed Hispanic workers?

The effort resulted in a CNC program for students whose second language is English in which the college provided an English as a Second Language instructor in combination with a technical instructor in the same classroom. The outcome was substantial increases in pay for participants and a pathway to more lucrative employment. Grand Rapids is now working as a trusted partner in helping the city's Hispanic residents find pathways to equitable jobs with competencies and quality at the core. Of the 16 students who began the program, 15 finished and 14 received raises or better jobs as a result of the training. Based on the initial success, two new training programs beyond M-CAM have been initiated with the Hispanic Center.

Employer Partnerships: Job Developers as Connectors

Before M-CAM, moving students from the classroom to employment could often be a hit or miss proposition for employers, in part because employers worked directly with faculty to find qualified talent. Although faculty were eager to work with employers, their primary function is to support student learning, so responding to employers in a timely fashion was challenging. Through M-CAM job developers, the road to job placement became more centralized and systematic, working like a hub to match qualified students with good jobs. Job developers monitor human resources websites to locate opportunities for students in the college's area or to find ways to work directly with employers to find ways to engage them.

Best Metals facility in Grand Rapids posted such an opportunity and the Grand Rapids job developer immediately contacted the facility. The effort led to a tour of the facility for students and an open discussion with the Human Resources department about competitive wages in the area for similar positions. The partnership resulted in an increase in starting wages at Best Metal and an employer partner willing to share their facility as a learning platform for Grand Rapids students.

As part of M-CAM, Grand Rapids' two job developers are now the entry contacts for employers seeking students who are enrolled or have completed skilled trades programs. Once screened, employers are given the name of a college representative to contact directly. Additionally, job developers follow up with the employers and college

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representatives, and pass important information on to both. After only two years, Grand Rapids' job developers have added the contact information of nearly 400 employers to the M-CAM (ETO) database. With the introduction of Handshake software, the process is even more effective. Employers can post positions online, allowing students to access the information and directly apply for positions. For Grand Rapids, M-CAM provided the means to make sure employers offering good jobs and students seeking them have direct access to one another.

Leveraging Partners

Macomb realized the role that M-CAM could play in the workforce and economic development efforts in the county by leveraging its $4 million partnership. Macomb Community College, the Macomb County Planning and Economic Development Department, the Macomb St. Clair Michigan Works! Agency and the Michigan Economic Development Corporation work together to address the talent development needs of the county.

4M integrates the services provided by each of the partners into a seamless approach customized for each client. Together they provide updates on services in response to identified employer needs, educate each other about their individual services to increase referrals for all partners and design and implement cost-effective training and consulting services for local business and industry. When M-CAM was introduced to this group, employers engaged in validating training program components and in providing insights into M-CAM's recruiting, training, and equipment purchases. Employers also engaged with students in the classroom and have hired program graduates.

Noted as a best practice in economic development by the Small Business Association of Michigan, the 4M Group also leverages funding sources available to each partner to collectively address the short and long-term development of a talent pipeline.

Macomb Community College engaged more than 340 employers in M-CAM, of which 218 have hired program graduates. Macomb brought in employers for assistance in many elements of M-CAM. Employers provided input into the knowledge, skills and abilities that industry expects from people who complete programs. They validated program objectives and outcomes, confirmed the relevancy of equipment, offered work-based learning opportunities, attended orientation sessions, made classroom presentations and posted job opportunities. They also actively participated in Interview Days — an event where employers and students come together and engage in an interview process which includes observing students demonstrating skills using M-TEC equipment.

In addition, and in partnership with the Michigan Works agency, Macomb's M-CAM graduates are eligible for on-the-job training funding, further incentivizing hiring by employers. More importantly, each employer relationship and employment placement represents a person on the job, an income and perhaps the ability to support a family — changing lives one at a time.

Partners and Policy

When Macomb hosted an event to share the impact of the grant on the community, the college had no idea of the spiraling effect that would occur. This event brought together employers, students, college leadership and elected officials to see the new equipment and increased capacity to train at Macomb's Michigan Education Training Center (M-TEC) and to hear from students now gainfully employed as a result of M-CAM training and support services. As the audience heard the stories from students, a local school district community relations aide asked if he could return with U.S. Senator Gary Peters so that the senator could experience first-hand the impact that grant programs like M-CAM have on students. Senator Peters toured the facility within weeks of the

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event and met with students. This interaction with students and the students' ability to demonstrate their skills on advanced manufacturing equipment left a lasting impression on the senator and was a chance for Macomb to demonstrate its role in workforce and economic development at the local, state and national level.

In addition, Macomb's M-TEC became a stop on the National Association of Manufacturers' (NAM) State of Manufacturing Tour. This tour featured the M-TEC and focused on manufacturing as a high-tech industry that leads to sustainable wage jobs. NAM CEO Jay Timmons spoke at the M-TEC graduation ceremony and afterwards facilitated a discussion with students, elected officials, college and county leadership about the talent development opportunities in advanced manufacturing and the need to develop a skilled talent pipeline.

PRESIDENTIAL LEADERSHIP

An essential element of M-CAM's success was strong leadership from the college presidents in support of the work. The presidents held several meetings and conference calls to review M-CAM strategy, progress, and at several crucial points, the presidents collaborated to resolve an important issue or to advance the visibility of advanced manufacturing training in Michigan. Here are three examples.

Making a Mid-Course Correction

As with many federal grants, M-CAM started slowly. After the award, it took the colleges several months to identify their lead staff, hire career coaches and job developers, and to put the multiple strands of a complex strategy into motion. Macomb was managing its role as the lead college through a newly hired staff, which also struggled to accelerate progress.

The pattern that emerged was that by the second year of the grant, work on deliverables, student enrollments, and spending were reaching a stable level that fell far short of what would be needed to achieve success by the end of the grant. As the end of the second year approached, Macomb President Jim Jacobs recognized that a mid-course correction was needed and put one into motion.

First, Jacobs moved the lead office responsibilities directly into his office, and put a trusted senior manager in charge of M-CAM, tasked with ensuring the needed acceleration happened and making operational changes required to achieve M-CAM success.

Second, he met with the M-CAM presidents to review the data about the inadequate pace of progress, the managerial changes he had made, and to discuss how the colleges could accelerate their activities. Following that meeting, Jacobs and the other presidents were in regular communication about M-CAM progress and issues to be resolved.

Jacobs directed M-CAM technical assistance consultant Corporation for a Skilled Workforce to provide customized technical assistance to each college to help it meet its needed results.

The mid-course correction succeeded and was pivotal to M-CAM's ultimate success.

Meeting with the Governor

The U.S. Department of Labor requires each TAACCCT evaluator to track the employment and earnings results of those trained through the grant. M-CAM's evaluator, Social Policy Research Associates, was struggling with how to meet this requirement because of limits Michigan state policy has placed historically on access to the wage record reporting data. Social Policy Research brought this problem to the attention of the M-CAM presidents, who agreed to take action. Three presidents met with Michigan Governor Rick Snyder to discuss the data issue and potential solutions, as well as to make him aware of the strong advanced manufacturing curriculum being implemented by M-CAM schools. As a result of that meeting, the presidents and Social Policy Research were able to negotiate an agreement with the state providing the evaluator with the needed access to wage record reporting data. This has allowed far richer analysis of M-CAM results than would have otherwise been the case.

Partnering with the Michigan Manufacturing Technology Center

The Michigan Manufacturing Technology Center (MMTC) provides technical assistance to small and medium-sized businesses to help them compete and grow. MMTC is part of the 50-state Manufacturing Extension Partnership network led by the U.S. Department of Commerce.

Two M-CAM presidents met with MMTC's leadership and negotiated an agreement in which M-CAM colleges serve as a strategic training provider/partner, including coordinating services between the staffs at MMTC and the colleges.

WHAT'S NEXT?

Each of the preceding M-CAM stories illustrates how, by infusing new resources and helping to redirect existing resources, TAACCCT funding produced and accelerated organizational change needed to produce a pipeline of skilled people to fill advanced manufacturing jobs in Michigan.

Grant funding for M-CAM comes to a close in September 2017. With that deadline looming, M-CAM colleges face the challenge of sustainability, continued development, and innovation without a direct source of funding. Strategies to leverage achievements and build momentum going forward are unique to each college and include Bay's new partnership with Oshkosh Corporation, Macomb's execution of a five year plan, Schoolcraft's expansion of boot camps, Lake Michigan's replication of M-CAM strategies to develop a new culinary arts facility, Grand Rapids' model of a system of streamlined, targeted and customized wrap-around services, Lansing's pursuit of integrated credit and non-credit programs, Mott's deepened alignment with new manufacturing employer partners, and Kellogg's newfound role in a major, regional economic development enterprise. One shared goal cross-cuts all eight colleges — the need to retain and integrate the Career/Success Coach/Job Developer function to become a standard part of institutional operations. This common thread can be found in every college's approach to sustainability.

BAY COLLEGE: *Unexpected Partnerships and Impact*

Bay College was operating without a career counselor. A critical student support and success function, the college attempted to fill the gap by engaging the registrar, faculty and others whose plates were already full. M-CAM funding provided the means to fill that gap in M-CAM project areas. Through M-CAM, Bay was able to hire a grant manager who also filled the role of a dedicated career coach/job developer. In these roles, the grant manager successfully built a holistic system of aligned student recruitment, retention, completion, and job placement services specific to the needs of rural upper Michigan communities and employers.

The model included customized workshops to develop career readiness skills, an open-door policy to attend to life issues faced by economically disadvantaged students, exposure to the world of work through tours, applied and supplemental instruction and ultimately defined pathways to employment based on both academic achievement and attainment of industry credentials.

Initially offering these services to M-CAM students in a revamped and expanded welding program and a newly developed mechatronics program, Bay was able to demonstrate how effective the wrap-around services model could be particularly when viewed through an academic improvement and job placement lens. Bay cites a pass rate improvement in technical math and blueprint reading from as low as 30-40% baseline to over 80% in M-CAM programs. Students also successfully obtained AWS welding certifications and PMMI mechatronics industry certifications ensuring they had the knowledge and skills to meet employer standards for unfilled jobs.

As student support efforts ramped up, Bay's career coach developed relationships with the region's Michigan Works agency and more importantly, with employers. Barriers to placing students in advanced manufacturing jobs included lack of skills, both technical and employability, and a deep seated cultural barrier found in many rural communities — an attachment to home and community — leading to an unwillingness to travel to or relocate to jobs — even those a few hours away. In spite of this barrier, Bay was able to work with McNeilus Truck and Manufacturing, Inc., a division of Oshkosh Corporation in Dodge Center, MN. An international

WHAT'S NEXT?

company, Oshkosh's Dodge Center facility has a huge demand for welders and as such has offered to hire Bay students who have completed Bay's program and have passed AWS certification without an interview. The company will also provide relocation funds, a signing bonus and an entry level salary of over $60,000. The partnership sharpened the need for Bay to develop life transition strategies as part of its holistic support system.

Oshkosh Corporation also produces the Joint Light Tactical Vehicle under a $30 billion, multi-decade contract with the Department of Defense (DoD). Contract fulfillment requires a pipeline of skilled welders and mechatronics employees — another avenue for Bay students. As part of Bay's ability to continue momentum, the college is exploring its ability to fund career coach/job developer services going forward and expand these services to students from other departments. This window gives Bay the opportunity to develop life transition services to help ease the cultural transition from student to employee and bolster the student's sense of home and community.

Finally, M-CAM has propelled Bay to explore more deeply how it approaches non-credit to credit alignment, customized training and prior learning experience based on industry certification, supplemental instruction through simulation and remote learning. By leveraging funding from the National Science Foundation, partnerships with Michigan Technological University, and state grants, Bay will expand to offer a two-year associate's degree in Multi-Skilled/Mechatronics and Robotics Systems, with articulated credit available towards a bachelor's degree at Michigan Technological University across six counties in Michigan's Upper Peninsula. These changes are part of the M-CAM legacy and help place Bay squarely in the center of economic development and prosperity for the region.

GRAND RAPIDS COMMUNITY COLLEGE:

From Poverty to Employment

For Grand Rapids Community College, M-CAM sharpened and aligned a collection of tools and people to help those in the college's community with the most acute need and the least experience navigating a complex system. Grand Rapids' service model is simple in concept: add the most value with the least amount of pain. Create a customized support system for individuals based on acquiring competencies and students' ability to describe those competencies. Use technology to promote direct connections between students and potential employers. Make sure students have the skills required to make those connections by successfully translating classroom skills to job skills and in doing so deploy a service system that functions as a customized learning system. M-CAM Welding/Fabrication and CNC Machining programs served as venues to prototype this approach.

From the beginning, students entering the system are guided through a decision tree that helps the individual explore career outlooks of various programs and what role a specific program plays in the student's preferred career pathway, understand options like time to completion of programs, financial aid and how it can be applied to a number of pathways (short-and long-term), and how specific pathways might help students avoid acquiring unnecessary debt.

As students move through the system, foundational skills are assessed. A learning coach is assigned to students unable to pass the assessment. This step is designed to ensure all students acquire the foundational skills necessary to succeed in programs. Access to Handshake (an employment portal) and training in its use is part of the M-CAM service package. Lastly, through employer partnerships, strategies to reduce bias-based hiring and training aid in employee retention, productivity and performance are executed.

WHAT'S NEXT?

All M-CAM colleges defined strategies to accelerate the acquisition of foundational skills like reading, math, communication, and team work. Grand Rapids is using two tools in tandem, WorkKeys and Edmentum as the means to make sure students have those skills and can fast-track into job training programs. M-CAM Welding/ Fabrication and CNC Machining programs became the pilot venues to apply these tools with special focus on adult and ESL (English as a Second Language) students (see Figure 7). This foundational skills model has now expanded to include all of Grand Rapids' job training programs.

WorkKeys, a product of ACT, measures skills that employers feel are essential to success in the workplace. Completed assessments give students a valid way to learn about their strengths and weaknesses within varying levels of difficulty — one level building on the other. For Grand Rapids students, successful completion when first assessed means direct entry into programs. For students who are unsuccessful, Grand Rapids' learning coach, using Edmentum modules in concert with contextualized learning, creates personalized learning lessons and instruction to augment skill development. For ESL students, this means the Learning Coach may rework the questions so ESL students understand what's being asked. Grand Rapids' intensive intervention ensures students are equipped with skills to succeed in the classroom and on the job and accelerates their ability to demonstrate those skills leading to the attainment of the National Career Readiness Certificate (NCRC).

Handshake, another Grand Rapids tool, was created by a Michigan Technological University student who wanted a way to access high tech jobs from remote upper Michigan. Handshake's motto is "Talent is distributed evenly. Opportunity is not." Handshake is currently used by over 175 universities. Grand Rapids is one of a few community colleges

Conceptualize Applied Math using Edmentum with CNC and Welding **Figure 7**

Students can access Flex Assignment in four modules each with a pre-and post-test based on content from faculty. Students passing the pre-test are exempt. Sample Edmentum modules of Applied Math:

Module 1

Lesson 1
Adding and Subtracting Fractions Like Denominators

Lesson 2
Adding and Subtracting Decimals

Lesson 3
Renaming a Fraction as a Decimal

Module 2

Lesson 1
Finding Equivalent Fractions

Lesson 2
Simplifying Fractions

Lesson 3
Working with Common Denominators and the Least Common Denominator

Module 3

Lesson 1
Comparing Fractions

Lesson 2
Ordering Fractions

Lesson 3
Relating Decimals, Fractions, and Mixed Numbers

Module 4

Lesson 1
Understanding Decimal Place Value: Tenths and Hundredths

Lesson 2
Understanding Decimal Place Value: Thousandths and Ten-Thousandths

Lesson 3
Comparing and Ordering Decimals

WHAT'S NEXT?

working with Handshake to customize the product for community college students.

Before Handshake at Grand Rapids, employers had no single point of contact or simple way to post jobs. Additionally, the college had no standardized way of screening the quality of jobs being posted for students across multiple college venues. Faculty functioned as one-to-one job developers. Career services staff were often out of the loop as faculty engaged with employers.

Now employers seeking to post jobs are directed to Handshake which enables them to quickly post job offerings (with customization and standards). Faculty, career coaches, and students are able to easily track and monitor postings. Students can proactively post resumes for employers to review through individualized student dashboards. The college now has data to identify where opportunities exist, how to relate potential upticks in employment sectors to program development and improvement, just-in-time placement data, and where to target job developer relationships. To date, the system has 2,600 employer users with an average of 50-60 job postings/day. The success of the system has driven a Grand Rapids action project with the goal of offering the system college-wide.

KELLOGG COMMUNITY COLLEGE: *The Heart of Economic Development*

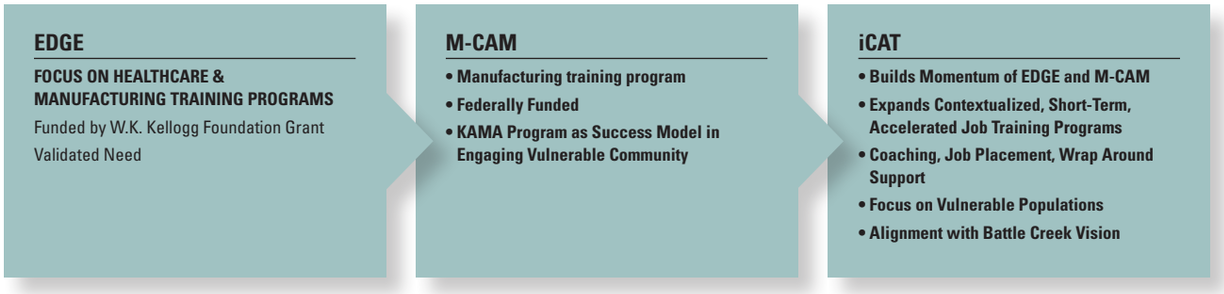
The Essential Skills Demand by Great Employers (EDGE) program is a workforce development collaborative designed to improve employment readiness and economic security for individuals with family incomes below federal poverty guidelines by creating and maintaining jobs for targeted Battle Creek Michigan residents. Along with Kellogg Community College, EDGE partners include local workforce providers and economic development agencies like Goodwill Industries of Central Michigan Heartland, Southwest Michigan Works and Battle Creek Unlimited.

Through the EDGE partnership and by leveraging M-CAM funding, the college built its Kellogg Advanced Manufacturing Assembly (KAMA) program which successfully recruited, prepared and placed vulnerable populations in entry-level manufacturing production jobs. A challenge for the college was how to sustain and scale the KAMA program after M-CAM funding disappeared.

Coupling EDGE success with M-CAM's capacity building and system change model, the college created the Innovative Accelerated Credentialed Training (iCAT) program that has the potential to become a local and regional economic driver (see Figures 8 & 9).

Because of KAMA's success, Kellogg's M-CAM team knew they had

Kellogg's Sustainability Model Figure 8



WHAT'S NEXT?

a story to tell, first to their colleagues in the college community. The team produced a series of articles in the college's monthly staff newsletter, shoring up interest in M-CAM as a means to recruit and help underserved students not only find employment but also to improve instruction, increase completion rates, increase the number of credential holders and, through pathways, increase enrollment in and completion of degree programs.

The college's M-CAM team then engaged senior leadership, the college President, and Chairman of the Board of Trustees to further share the M-CAM story and garner support for the emerging iCAT initiative. Through these conversations, the model and its value were embraced and resulted in a strategy to expand it to other academic programs and student support services.

The iCAT program is a labor-market driven job training system that includes technical, foundational and financial literacy skill development. Targets for expansion of the model include Transportation, Healthcare, Retail/Food Service and Information Technology. Student focus would include those in high school, adult dislocated workers (unemployed and under employed), parolees and probationers, veterans, and disconnected youth.

iCAT Phased Delivery Figure 9

Concurrent with M-CAM, many college employees were participating in Battle Creek Vision (BC Vision), a community-based economic development initiative intended to:

- Increase the number of permanent jobs and the number of residents with skills to fill those jobs;
- Build the talent pipeline by increasing kindergarten readiness and college and career readiness; and
- Strengthen civic pride, unity, collaboration, trust and healthy lifestyles among Battle Creek residents.

BC Vision is comprised of local business and industry, K-12 systems, workforce agencies, community-based organizations, and post-secondary systems. Conversations about iCAT as a winning proposition began to take place in BC Vision's three task force and leadership meetings (Workforce Development, College and Career Readiness, Large Business), as an actionable mechanism for BC Vision to reach its ambitious workforce development goals. The iCAT model was well received and garnered external support to move forward.

The college is clear that iCAT will retain KAMA's student success model which is predicated on working with the individual student, using career navigators to help students make informed decisions as they move through the college, and integrating faculty and student success teams to maximize resources and expertise. With champions like the college's President and Board Chair, industry and community partners like Goodwill Industries and Michigan Works and with the support of Battle Creek Vision, the college is seeking local funding support to build and scale iCAT as a sustainable, talent pipeline — an important key to Battle Creek's economic future.

WHAT'S NEXT?

LAKE MICHIGAN COLLEGE:
Building and Leveraging Trust

At Lake Michigan College, the career coach wears three M-CAM hats — career coach, job developer and academic partner. Taking a student-centered approach to the work starts with building trust, learning who the student is, understanding fully what's needed in their learning/employment journey and then removing obstacles through proactive and targeted help. Lake Michigan College's coach is a welcomed presence in the classroom where she outlines M-CAM services for students and demonstrates a seamless partnership with faculty. She and faculty work together to monitor a student's academic progress, ensuring timely and proactive interventions that are intrusive yet non-invasive. She tracks and identifies job opportunities with employers like Hanson Mold, Edgewater and Eagle and, through her deep relationship with Michigan Works, makes arrangements for interviews, helps with resume development and coaches interview skills, specifically through Lake Michigan's Work Opportunities Workshop. She understands how to make sure students persist. Goals are kept in the forefront. She is often creative. As an example, working with faculty, she helped identify a class to substitute one needed for a student to complete coursework and fast-track to a job. It's the trust created through this relationship that facilitates the capture of wage and employment information — essential data that is often lost after training ends. As a result of the system, which is predicated on predictive data analysis provided by ETO, completion of M-CAM programs has boomed. M-CAM is seen as a game changer for the college and those touched by a new service model. Lake Michigan is now attempting to identify funding to ensure the work being done continues beyond the end of the grant. Developing and sustaining an ETO-like system is seen as an essential part of that work.

Lake Michigan faculty and staff have been and will continue to be essential in maintaining the information regarding participant outcomes. In the absence of ETO software it will become necessary to develop a strategy for capturing and compiling this information thereby continuing to make the "just-in-time" data available to all stakeholders. The college has yet to discover a solution for this. However, its value can easily be demonstrated for future grant endeavors and finding a solution remains a priority. On a local level this has been accomplished by engaging non-grant Lake Michigan staff in the processes. For instance, the relationship between Lake Michigan and its local Michigan Works agency. These monthly meeting are already scheduled for the next year, alternating between organization sites and involving staff in a variety of capacities.

Industry credentials created common ground from which the college could begin an articulation dialogue and will spare a considerable time investment as a model for articulation agreements in other disciplines.

And lastly, the success of the Hanson Technology Center development strategy combined with M-CAM instructional models, has created a prototype for the college to use in developing its next big idea with partner Whirlpool — a new Lake Michigan Culinary Arts Center.

Veteran Success

Jason, an unemployed Veteran, entered the M-CAM program 7/8/2014 where he received resume, cover letter and interview assistance. He was dual enrolled in the Workforce Investment Act program and received a Gold NCRC (National Career Readiness Credential). He applied and was offered a Machine Operator position with LoveJoy on 7/14/14 and completed his Associates Degree in General Technology in May 2015 while continuing his full-time employment.

WHAT'S NEXT?

LANSING COMMUNITY COLLEGE:

It's All in the Planning

From the beginning, Lansing Community College had a plan (see Figure 10). For each M-CAM priority and activity, Lansing established college goals and performance indicators. Throughout the grant, Lansing monitored system change in tandem with monitoring quantitative performance, providing the college with a picture of what success looked like, how M-CAM impacted student performance, and how M-CAM models could be useful college-wide. The function and role of the success coach is a case in point. Lansing goals and performance indicators for the M-CAM career coach services are:

Lansing achieved and exceeded its strategic goals. The college believes the impact of the success coach has been extraordinary. Even with a late hiring start (almost two years into the grant cycle), Lansing's success coach began to articulate and mold the system.

Following the Student End-to-End Journey as a blueprint, Lansing put a myriad of tools and processes in place that blended and leveraged college and Michigan Works processes. Using pathways to connect the corporate training side of the college with the credit side, options for students expanded, giving non-credit students a service system that was nonexistent before.

Using diagnostic tools and just plain conversation, the success coach helps define a pathway, develops an educational plan, uses college and community resources to mitigate life issues and problems like criminal backgrounds, living in shelters, and transportation. Since students spend 90% of their time with faculty, an intentional effort to align students with instructors provides seamless service support. And lastly, the coach plays cheerleader — doggedly engaging in proactive outreach.

As a result, Lansing is expanding the system with a goal of hiring 20 success coaches and using Sales Force based software to develop a comprehensive case management system where advisors, coaches and faculty can track an individual's progress, identify pitfalls and engage in proactive strategies to avoid them.

Goals and Performance Career Coach Services Figure 10

GOAL	PERFORMANCE INDICATOR
Implement Career coaches, Success Coaches, and Job Developer roles within the college	Success Coach hired in conjunction with Capital Area Michigan Works
Connect Michigan Works Services to M-CAM grant participants	MOU written with CAMW; LCC services for assessment/advising, etc., located at CAMW
Develop infrastructure to support a career services model	Pathway defined from intake to employment
Strengthen Lansing Student Services connections to M-CAM grant participants	Success coach position in place and expanded within the institution
Streamline services for M-CAM participants from entry to employment	Additional connections to the Experiential Learning Coordinator who also coordinates apprenticeship opportunities for students. CAMW support services (resume writing, interviewing tips, hot job listings) available for M-CAM students

WHAT'S NEXT?

In the end, the success coach function will be part of a larger, more ambitious goal for the college to produce transparent, modularized, instruction across credit and non-credit programs, ensure work-based learning is part of every student's experience, increasing engagement by employers, producing alternative credentials like digital badges, increasing employer perception that Lansing Community College is a first source training provider in mechatronics and production. In addition to sustaining the M-CAM coaching model, Lansing plans include:

- Success Coach (grant) was converted into an Academic Success Coach (ASC) within the Student Affairs Division. 4 new ASC positions created; Technology Careers has also submitted a proposal to create a Success Coach to support information technology students using Perkins funds from the 2016-2017 academic year.
- Non-credit Welding programs have been submitted into the state eligible training provider system for future Workforce Innovation and Opportunity Act (WIOA) funding and will also be used for Corporate Training opportunities. Programs will also be offered as a part of the college's Get a Skill/Get a Job Programs as needed.
- Non-credit Mechatronic programs will continue to be offered in Corporate and Continuing Education. The non-credit modules will also be cross-walked with future credit modules, linked to industry recognized credentials and offered to corporate clients and Continuing Education students. Continued work with the local Michigan Works agency is focused on linking programs to WIOA dollars for Trade Adjustment Assistance, veterans, and unemployed/underemployed workers. Credit and non-credit students will have the opportunity to gain credentials through exams/test in the Student Services area at West Campus for a fee.
    - The Certified Production Technician program will continue to be offered to both corporate training clients and Continuing Education students. The college will also work with the local Michigan Works agency to secure WIOA funding as needed for this program.
    - Equipment purchased with M-CAM funding will be housed in the new Center for Manufacturing Excellence located at the college's West Campus.
    - The college will continue to work with the Michigan Works agency to support TAA, unemployed or underemployed workers and expand its partnerships with other community agencies.
    - Foundational Skill classes that are contextualized for Manufacturing in reading and writing skills will continue to be offered to Lansing students.
    - Manufacturing classes offered at Lansing will have Employability Skills rubrics built into them.
    - Apprenticeship programs will continue to grow and thrive at the college.
    - Lansing plans to implement performance based objectives into credit and non-credit courses and use them with local employers to help determine needs and validate course curriculum.
    - Lansing plans continued connections to M-CAM partner schools with articulation agreements kept in place beyond the grant.
    - The college is expanding its work on flexible format in Mechatronics. Kellogg Community College's approach was reviewed and is being used as a model.
    - New Pre-Apprentice Program piloted summer 2016 and offered summer sessions in the future. Lake Michigan College model was reviewed and modeled.

WHAT'S NEXT?

MACOMB COMMUNITY COLLEGE:
Blueprint of the Future

Knowing M-CAM funding was finite and that the grant's end might render the M-CAM programmatic brand obsolete, Macomb Community College asked a fundamental question: "How will M-CAM be used as a strategic tool and not a funding source?"

The college already had a blueprint for the future, a five-year plan that included expanded training capacity at the M-TEC Center through equipment upgrades of $2.6 million, offering an "open enrollment" model alongside existing cohort and contract training, instigating closer alignment of credit and non-credit offerings where the distinctions would be transparent to students, and creating a seamless support service system based on function not the physical facility.

Macomb's M-CAM goal was to deliver quality training leading to pathways of employment for students and to continue to deliver contract training to employer partners at a competitive price. In other words, use M-CAM as a tool to build a legacy that would live well beyond the life of the grant.

Because the M-TEC is a self-sustaining entity, it operates on a revenue and results business model. In the end, the measure of success for Macomb was the number of students enrolled, retained, completing programs and placed in viable jobs.

Capacity building started with relationships – finding the right people, putting them in the right places to do the right thing. Macomb worked to combine and deliver student support services to M-CAM students (M-TEC students as well) that equaled those offered in the credit arena. In instruction, the college created bridges for faculty to identify alignment between credit and non-credit instruction in all four M-CAM programmatic areas. Instructional analysis based on the need to create articulation agreements combined with training in industry credentials like Siemens and PMMI, provided the environment to develop common instructional experiences and common language. Embedded industry certifications was a long-time goal at Macomb. M-CAM's focus on pathways and industry credentials gave Macomb a rallying point to make industry certifications an intentional part of credit instruction.

In both service and instructional areas, cultural gaps were bridged to the advantage of students and employer partners.

Watching numbers focused corrective action over 3.5 years and helped operationalize iterative and concurrent activities during development and implementation periods of M-CAM. Equipment purchases were defined in partnership with firms like General Motors and their suppliers. This work helped inform how the college could produce short-term and long-term talent pipelines in a high-end advanced manufacturing environment. The strategy ensured equipment purchases were relevant, installation was staged to go live in alignment with curriculum redesign, and cohorts of students benefited from planned efficiency.

As M-CAM sunsets, Macomb has ensured it has the capacity to sustain and advance the work. At Macomb's M-CAM graduation each student, with family members and employers in the audience, have the opportunity to talk about their journey. Almost all will leave the college with one or many job offers for which they express amazement. Most striking though, is the sense of gratitude expressed for committed staff, for the opportunity to unearth and use their talent, and for knowing that all the while, Macomb was working tirelessly to make sure they succeeded. They all say M-CAM changed their lives!

WHAT'S NEXT?

MOTT COMMUNITY COLLEGE:
Jobs of the Future

TRIBAR is a supplier of manufactured parts to Michigan's big three automotive producers – Chrysler, Ford and General Motors. Located in Livingston County, the plant is approximately forty minutes from Mott Community College located in Flint, Michigan. TRIBAR is growing — creating jobs for the future.

The company's mission statement describes its commitment to professional development. The company routinely offers a variety of development opportunities and since 80% of TRIBAR staff live in the Flint area, Mott Community College is the perfect location to deliver that training.

TRIBAR's relationship with Mott Community College is sound, and as such, the company has been working with the college to expand its workforce. Livingston County has a very low unemployment rate and many available jobs. This condition has led to a good fit for a partnership with Mott to fill jobs in both production and robotics. Originally, the college and company worked together to ensure training in employability skills, safety, and quality operations, leading to securing over 80 jobs as molding operators and in assembly. Since many students living in Flint did not have transportation to the Livingston County facility, Mott leveraged funds from the Michigan Community Ventures program and a partnership with the Mass Transit Authority of Genesee County to run bus services from Flint to Livingston County. The result of these braided services is a transportation initiative that will live beyond M-CAM.

A second opportunity with TRIBAR focuses on Robotics/Multi-Skilled Mechatronics. Through a unique program at the plant, students who complete Mott's Robotics program will secure employment at TRIBAR, which is offering qualified Mott students the opportunity to enter employment through two twelve-hour weekend shifts starting at a pay rate of $17.50/hour. TRIBAR has a reputation of promoting from within, so these entry level positions hold the promise of a lucrative career pathway at the company for Mott students.

Concurrently, TRIBAR is working with the Flint & Genesee Chamber of Commerce to develop a Flint location. As Mott moves forward with plans to further align non-credit and credit Welding and Robotics programs, collaboration with companies like TRIBAR are essential.

Working with community-based organizations like local churches to recruit students, Mott is a focal point in the area's economic development strategy. If a pipeline of talent is available, the likelihood of company's like TRIBAR leveraging that talent is greatly increased.

The M-CAM collaborative environment is equally important to Mott's strategy moving forward. Plans to visit Lake Michigan College's Hanson Technology Center, to learn about Kellogg Community College's iCAT program and Bay College's relationship with Oshkosh are all in the works. The college's goal is to remain a staple in Mott's community by staying agile and relevant to meet the demands innovation brings to advanced manufacturing.

SCHOOLCRAFT COLLEGE:
Momentum

Maintaining M-CAM momentum is Schoolcraft College's goal. For Schoolcraft, the M-CAM start was slow. The college needed to build its Mechatronics program from the bottom up. It needed to establish a positive image of advanced manufacturing for college leadership and Schoolcraft students. It needed to produce short-term, viable learning opportunities aligned to good manufacturing jobs. It needed to demonstrate how the college's career services could leverage M-CAM support systems to help deepen relationships with employers and provide broader access to employment for Schoolcraft students.

WHAT'S NEXT?

Schoolcraft's Boot Camps are at the center of the college's M-CAM success and have proven to be a vehicle for demonstrating the value of advanced manufacturing programs at the college. Employers are now vocal about the value and return on investment Boot Camps provide and have committed to hiring students. The local Michigan Works agency is supporting the Boot Camp effort through direct "matchmaking" as an extension of Schoolcraft's wrap-around services.

The college is expanding its internal marketing and awareness strategy. Posters are placed in classrooms. M-CAM videos are being used to help the college and employers understand the work. And leadership has embraced the value of advanced manufacturing programs as a viable college investment.

Schoolcraft's formal plan focuses on staffing and using the job developer function as a means to building out employer engagement. M-CAM staff are now working in partnership with Career Services and have rethought how the college's central network can be used to help improve the quality and nature of advanced manufacturing job postings which are now an extension of Career Services' database. Additionally, Career Services is providing a single point of contact for employers and meeting with them directly. This shift marks a more effective way to deliver the student/employer matchmaking function lifting that role from faculty to the larger support system. Instead of opportunities potentially slipping through the cracks, Career Services is now keeping them alive. Career Services is also working with M-CAM staff to improve the degree audit system, accelerating the time to conduct the audit and to identify M-CAM completers. And lastly, the M-CAM/Career Services partnership has resulted in active promotion of Boot Camps to employers and to students – a major win for M-CAM and for Schoolcraft to sustain M-CAM achievements.


BAY COLLEGE


GRCC
GRAND RAPIDS COMMUNITY COLLEGE


KELLOGG
COMMUNITY COLLEGE


LANSING
COMMUNITY
COLLEGE
Where Success Begins


LAKE MICHIGAN
COLLEGE


Macomb
Community College
Education • Enrichment • Economic Development
Discover. Connect. Advance.


MOTT
COMMUNITY
COLLEGE


Schoolcraft
College