Colorado Helps Advanced Manufacturing Program

Metropolitan State University of Denver Case Study

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INTRODUCTION

The Colorado Helps Advanced Manufacturing Program (CHAMP) is a United States Department of Labor (USDOL) Trade Adjustment Assistance Community College and Career Training (TAACCCT)-funded grant project intended to develop new or redesigned online and hybrid courses leading to credentials in advanced manufacturing in high demand fields across the state of Colorado. The Colorado schools involved in CHAMP are a consortium of eight of the state's community colleges and one four-year institution: Front Range Community College (FRCC), Pueblo Community College (PCC), Red Rocks Community College (RRCC), Lamar Community College (LCC), Pikes Peak Community College (PPCC), Aims Community College (Aims), Community College of Denver (CCD), Emily Griffith Technical College (EGTC), and the Metropolitan State University of Denver (MSU Denver).

Prior to the development of CHAMP, the Colorado Advanced Manufacturing Alliance identified two gaps in the state's existing academic training programs that had been previously designed to meet the needs of the industry: 1) the lack of a consistent voice representing the needs of industry to the academic community and 2) the absence of a strong network to facilitate business-to-business activity partnerships with educational institutions. The CHAMP project was conceived to address these issues with the larger goal of making Denver and the state of Colorado a leading advanced manufacturing hub.

CHAMP is in place to increase the attainment of degrees and certifications in manufacturing in order to best serve employers' needs. In service of the market-oriented end of this goal, its programs are designed to produce 21st-century workers whose skills align to local market trends—community colleges work with local employers to align their programs with industry-recognized skills and competencies. With regard to increasing the number of graduates entering the market, CHAMP is focused on creating innovative and flexible learning opportunities for students. The grant calls for schools' existing courses to be adapted for hybrid delivery, for example, such that a portion of the traditional face-to-face instruction is replaced by web-based, online learning.

In addition to designing or redesigning advanced manufacturing programs to fit a hybrid model, each college is required to integrate open education resources (OER) into its CHAMP curriculum. OER are teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and repurposing by others. OER may take the form of full courses, course materials, modules, textbooks, streaming videos, tests, software, or any other tools, materials, or techniques used to support access to knowledge. Under the CHAMP grant, consortium colleges are encouraged to use OER in the creation or redesign of online or hybrid courses and are also required to create or redesign their courses and programs such that they can be packaged and licensed as OER for use by other educators and institutions. Thus, staff at CHAMP colleges will package, license, and post their course materials during the course of the grant.

Each college in the consortium is also required to employ at least one CHAMP navigator to collaborate with employer–partners, local workforce centers, community and nonprofit organizations, and students to ensure students' access to CHAMP resources and facilitate their success. Within each of these areas of collaboration, navigators work according to their institution's needs to build CHAMP programs, recruit and retain students for CHAMP programs, and assist those students as necessary. Navigators track their interactions with CHAMP students to report outcomes based on a model of *intensive advising*, which involves multiple interactions and points of intervention with each student throughout his or her education to ensure each student's success and, ultimately, employment.

Aside from these institution-specific innovations, consortium-level outputs are also to be integrated within each college. These include massive open education courses (MOOCs) and a new credit-for-prior-learning process. Three MOOCs were created at the consortium level: a math MOOC, a student success/employability MOOC, and a credit-for-prior-learning MOOC. Each college is encouraged to include one or more of the MOOCs in its program or institutional curriculum. The process at each college for awarding students credit for prior learning will also be redesigned at each college according to policies developed by the consortium.

This report is one of nine created to highlight each individual college's contributions to the CHAMP project at year two of the grant. The purpose of this case study is to identify the implementation processes utilized by MSU Denver and to provide a summary of the MSU Denver CHAMP team's activities, successes, and challenges to date. This case study begins with an overview of its methodology and data sources and then moves on to the contextual frame—demographic and socioeconomic background information about MSU Denver, its student population, and its service region. These sections are followed by a summary of the goals of MSU Denver's CHAMP program; a discussion of the implementation of the program, including the design process and its incorporation of OER; a look at student and faculty perceptions of the program; an examination of employer and workforce center collaborations; a discussion of the CHAMP navigator position as it has developed at MSU Denver; an examination of the college's approach to redesigning its credit-for-prior-learning options and processes; and a summary of successes, challenges to date, and recommendations for next steps.

METHODOLOGY/DATA SOURCES

This report examines the development and implementation of the first two years of the CHAMP grant at MSU Denver, including experiences of the project team members and participating staff, faculty, and students. As such, this report uses qualitative data and analysis. Subsequent EERC evaluation reports will include outcome measures and report on quantitative data collection and analysis.

The qualitative methodology for this report includes content analysis of consortium goals and activities to date, relevant proposals, and project- and college-specific statements of work, quarterly reports, and websites developed by individual colleges. EERC team members also

conducted phone and in-person interviews with college project leads, staff, faculty, navigators, and students.

Most interviews were taped and transcribed; non-taped interviews involved extensive note taking. These transcriptions and notes as well as the documents cited above have been coded through the use of NVivo qualitative data management software and analyzed by EERC team members to represent each college's individual story relative to the CHAMP project.

As noted above, while quantitative analysis will be presented in subsequent reports, this summary is meant for contextual purposes only and will only utilize data from qualitative analysis. For this reason, grant targets relative to each college, student counts, course counts, industry- and workforce-related targets, and other quantitative objectives will not be discussed as part of this report.

COLLEGE DESCRIPTION AND OVERVIEW OF STUDENT POPULATION

Founded in 1965, MSU Denver educates more undergraduate Colorado natives than any other institution in the state, offering 244 academic degree options, ranging from master's degrees and bachelor's degrees to certifications and licensures. Ranked 23rd among regional colleges in the West by the U.S. News & World Report, and 32nd on Military Times' list of the nation's Best Colleges for Veterans, MSU Denver serves approximately 23,000 students annually, with 75 percent of the alumni staying to live and work in the state of Colorado. As of Fall 2014, MSU Denver's student population was 46 percent male and 54 percent female, with the average age of 26, with 40 percent of students attending part-time.[1] With its main campus located in downtown Denver and one extended campus in Denver South, MSU Denver offers the least expensive tuition of all four-year institutions of higher learning in the state.

MSU DENVER'S CHAMP GOALS

Goals at the start of the grant

At MSU Denver, the CHAMP grant was applied in the department of engineering and engineering technology (EAET) to the mechanical engineering technology (MET) program. Under the terms of the grant, four goals have been elaborated for the duration of the project: to establish/advance college-industry partnerships; to ensure technologically advanced education; to redesign the Prior Learning Assessment (PLA)/Credit for Prior Learning (CPL) policies; and, lastly, to introduce structures and mechanisms for stackable/latticed certificates and articulation.

MSU Denver's CHAMP team consists of program director/EAET department chairperson, associate professor/instructional designer, program manager, program associate, the navigator

[1] MSU Denver: Fact Sheet. Retrieved on Apr. 20, 2016. https://www.msudenver.edu/factsheet/

and an assistant lab coordinator. The team is jointly working to redesign and create curriculum by implementing new certificate programs, initiating online or hybrid courses in CHAMP-identified programs for increased flexibility and adding and updating content, based on the needs of industry. MSU Denver redeveloped all of its CHAMP-related courses into the OER online platform, to share with the Colorado Community College System (CCCS) consortium.

Much of the curriculum redesign specified by the first CHAMP goal hinged upon the fulfillment of the second CHAMP goal – the purchase of new equipment – which allowed MSU Denver to make additions and improvements to their existing curriculum, producing graduates who can compete in today's engineering and manufacturing job market landscape and providing training that corresponds with the modern needs of its industry partners.

The industry outreach effort under the grant is directed at strengthening relationships with employers and creating work experience opportunities for students. As a brand new initiative under CHAMP, MSU Denver assembled the Industrial Advisory Board (IAB) – a committee comprised of local industry leaders, who extended their considerable professional experience towards decisions about new curriculum development and equipment purchase choices.

Career pathways

The MET program at MSU Denver is accredited by the Engineering Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (ETAC-ABET).[2] Mechanical engineering technologists can be found across a variety of industries, ranging from aerospace to medical to manufacturing and custom-design businesses, large and small. The MSU Denver MET program is designed to provide students with both theoretical and applied skillsets, essential in succeeding in these careers.

As of Fall 2015 semester, the MET program at MSU Denver offers two new certificates, developed specifically under CHAMP. The certificates are: the advanced composite materials & manufacturing certificate, which requires 15 credits hours to complete and the Additive manufacturing engineering certificate, which is earned in 18 credit hours. Both certificates can be obtained while seeking a bachelor of science degree in mechanical engineering technology. The certificates will be noted in the official MSU Denver credit transcripts.

Of the nine members of the CCCS consortium, MSU Denver is the only four-year academic degree-granting institution. Therefore, while the community colleges are focused on helping students transition to four-year institutions, MSU Denver is positioned on the receiving end of the same equation: to enroll and integrate students with community college manufacturing credentials into MSU Denver's larger-scale engineering pathway that ends with a bachelor of science degree.

[2] MSU Denver: MET program overview. Retrieved on Apr. 17, 2016. http://msudenver.edu/met/programcurriculum/

It follows that developing articulation agreements with consortium members is a top priority for MSU Denver. Prior to CHAMP's involvement, MSU Denver had already been allowing students to complete up to 40 percent of their coursework at a different institution. CHAMP is being used to expand the existing options and agreements, with exclusive focus on manufacturing-to-engineering transitions. For instance, MSU Denver has been reworking its five-year agreement with Aims (not part of CCCS), to allow Aims students with associate's degrees in manufacturing to transfer to MSU – and be classified as juniors, upon the completion of two courses, Manufacturing Processes (MET 1010) and Principles of Quality Assurance (MEET 1310). A transfer and articulation coordinator, appointed by CCCS, has been working with MSU Denver and other 4-year institutions offering degrees that benefit a manufacturing pathway, to develop inter-institutional agreements for a guaranteed transfer of credits, certificates and degrees.

IMPLEMENTATION

Process of design/redesign

As mentioned above, two new certificates, stackable into a MET bachelor's degree, have been developed and introduced at MSU Denver since the inception of CHAMP: advanced composite materials & manufacturing certificate and Additive Manufacturing Engineering certificate. Since those new offerings launched in Fall 2015, the certificates have been primarily pursued by students in their third and fourth year of the MET program. According to the associate professor/instructional designer, MSU Denver was originally invited onto CHAMP for the opportunity to help more community college students transfer, but ended up developing two certificates of its own. MSU Denver chose to offer certificates in specializations not available from other local institutions of higher learning – to stay competitive and contribute an engineering focus to the CCCS manufacturing offerings.

A total of nine courses must be passed in order to earn the new certificates. Six of those courses had already existed, and three more have been developed by the associate professor/instructional designer (who also serves as a mechanical design faculty at MSU Denver and is a principal investigator on the grant) since the inception of CHAMP. Those three courses are: Composites Manufacturing, Advanced Composite Structures and Direct Digital Manufacturing.

All courses related to the CHAMP certificates have been redeveloped and uploaded into the OER platform, shared by CCCS. The process was not without delays and compatibility issues. For instance, being the only four-year institution in CCCS, MSU Denver was initially using a different syllabus format from the rest of the consortium and had to restructure some things to fit in. In the end, the instructional designer, with faculty's cooperation, redeveloped and uploaded the maximum amount and variety of resources pertaining to the CHAMP coursework:

> It is not just the syllabus, not just the competencies, not just the outline... We made all the lecture notes [available]... We have homework published. We have quizzes published. And we have lab manuals published as OER for all these nine courses.

In addition to the newly developed in-class courses, three self-paced MOOCs have been created as pilots under CHAMP grant. These MOOCs were primarily developed by the system but staff at MSU and other colleges have been helping. The MOOCs are Math for Industry (electro-mechanical, engineering graphics and machining trades); Credit for Prior Learning (for the purposes of assessing work experience such as military or industry training this has not been launched yet); and Soft Skills Curriculum (covering communication, time management, teamwork, leadership, personal confidence and critical thinking to boost student employability).[3]

CHAMP navigators from around the CCCS consortium worked together on developing different modules of the soft skills curriculum and, at the time of interviews, the new MOOCs had only just been launched at MSU Denver. The MSU Denver navigator had already made the faculty aware of the MOOC and was now making rounds to MET classrooms, presenting it to students. The program manager noted that the soft skills curriculum is a necessary component of the educational process at MET because professionalism is one of the key traits employers demand from their workers. He brought up the example of a recent conversation with one of the industry partners:

> It's a family run, medium, middle-size machine shop. And the owner basically just literally told us: look, we don't need someone who has brilliant ideas or with, maybe, a four year degree. Of course, it's nice. But we need someone, number one, [who] knows how to do the math. Number two, know how to communicate with people. Plus, know how to follow the rules, which is something really basic. Show up on time – don't be late. Know how to communicate with your co-workers and supervisor. The rest of those things – we can train that person.

The math and soft skills MOOCs fit well with the employability parameters outlined by IAB.

Equipment purchases

With the mentorship of the industry partners of the IAB, new equipment has been purchased for the MET program, including a compression molding machine, an electric discharge machine and a 3D metal printer.[4] Now, engineering students have learning/ training opportunities with additive manufacturing machinery they did not have access to before.

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[3] MSU Denver Newsroom: "CHAMP Grant Yields New Courses, Equipment for MSU Denver. Retrieved on: Apr. 19, 2016. http://msudenver.edu/newsroom/news/2015/march/18-champ-grant.shtml

[4] MSU Denver Newsroom: "CHAMP Grant Yields New Courses, Equipment for MSU Denver. Retrieved on: Apr. 19, 2016. http://msudenver.edu/newsroom/news/2015/march/18-champ-grant.shtml

Before the equipment could be purchased and installed, however, MET had to expand their available space to make room for more machinery and students. The expansion of shop space was challenging: MSU shares an urban campus with two other institutions of higher learning and the project lead had to take a proactive stance with the Auraria Higher Education Center (AHEC) to find and/or create the necessary space for MET. Additionally, budgetary approval delays in the purchasing of the equipment postponed the launch of the certificates into the Fall semester. Once equipment was in place, classes were launched, serving 38 students in Fall 2016, with a growing waiting list to sign up for the following semesters.

Students served/student perception of program

When asked about their experiences and impressions of the improved MET program, students spoke with excitement about the new equipment CHAMP had provided, the newly developed certificate programs and the industry connections that had come to fruition under the grant. Each student believed that CHAMP had provided them with additional possibilities for enhancing their skills to more favorably compete in the job market.

All interviewed students were working on their CHAMP certificates: some were working on one, while others decided to earn both certificates. The ease of obtaining certificates along one's way to a bachelor's degree was brought up as a key selling point. One student was particularly impressed with the cross-listing opportunities for credits:

> This is one of the few programs when they ask you to "double dip" – which means you can check multiple boxes with single class credits. I can get a minor and I can also apply the same credits to the advanced composite certificate. It is only a few [credits] more on top of your minor to get industry certification. That is huge! I know from my previous experience in the job market: as much as the piece of paper is important, certifications will give you more weight than certain degrees can. That link to industry is important.

Students also expressed confidence in the training and experience they were receiving at MSU Denver, especially from having the benefit of the IAB to prepare them for the job market. One student stated that MSU Denver offered a more personalized, hands-on education than larger institutions:

> [T]hose certificates – they are built by industry companies. They are represented in advisory boards... Students that come from big schools often never had their hands dirty. Because these companies work with us, we come out of the school ready.

The newly purchased equipment had also made a big impression on the students, especially the Mark One Carbon Fiber 3D printer that allows for the printing of continuous carbon fiber, creating, among other things, mechanical parts to sustain machinery. Overall, students seemed thrilled with learning/training opportunities afforded by the new technology:

> The equipment that CHAMP funded gave us is a dream come true. Our compression molding machine, EDM, VARTM – those things are super advanced. A lot of workshops even don't have them.

Overall, students seemed aware and appreciative of the privilege of attending the MET program at MSU Denver. Some of them had very practical plans for the future and very clear expectations of the program, and they seemed happy with their progress at MSU Denver:

> I came to Metro specifically for industrial design program and MET program. I wanted to do a dual major. The industrial design program here is, actually, pretty widely recognized. The program is really good, it has great professors... There is no other MET program that has as much hands-on training [as] here. It was really small at that point – about 50 students – and everybody knew everybody. We had really good community and worked well together and it just felt good. I wanted to put my hands on tools, and this is what I got here, and that is what really kept me in the program.

Faculty/staff perception of programs

Like students, faculty and staff spoke highly of the MET program's revitalization under CHAMP, due to new, modern equipment as well as the networking opportunities with ever-expanding circles of industry partners. The assistant lab coordinator, for example, noted the difference the grant has made:

> It has been two years [with CHAMP], and I have been here four-five years. Things dramatically improved in MET department... I definitely see positive changes. The guys working here truly care and it seems all this comes from CHAMP.

While happy with new equipment purchases made possible by CHAMP, a professor of mechanical engineering technology believed that this was just the beginning stage of the long-term task of developing MET as a program. He felt that there was lots of room for growth, particularly in terms of making more space for more technology: "We can always use some new equipment and tooling. Right now, one of the neediest things right there is composites tooling, which is so much cheaper than metal tooling."

A common theme that resonated through faculty interviews was satisfaction in being able to prepare their students to compete in a rapidly transforming job market; they seemed assured by the continuous feedback from the industries, that they served their students well: "I do think we are starting up some educational programs that really meet the needs of the industry, and the students."

Another change faculty and staff attributed to the CHAMP grant was the enhanced collaboration between MSU Denver and other members of the CCCS consortium. One faculty

member spoke positively about a collaborative recruiting/awareness event for all the CHAMP programs in the Denver area. Every year Manufacturing Week kicks off across the country. This is a week where manufacturing initiatives are celebrated on a particular day (Manufacturing Day) during that week to inspire the next generation of manufacturing employees across the country. Manufacturing Day this previous year was planned by three CHAMP colleges: MSU Denver, EGTC, and CCD. It was held on the day of the site visit and attended by workforce system clients and students from local high schools. All three programs provided speakers and offered tours to show perspective students the new, CHAMP-sponsored facilities and equipment. Faculty and staff have noted that they have enjoyed the opportunity to work with their counterparts at the other CCCS institutions.

EMPLOYER COLLABORATION

Previous employer relationships/how they changed

Under the coordination of the champ program manager and program associate, the MSU Denver CHAMP IAB was formed, establishing by-laws and identifying several companies of interest to reach out to. IAB's first meeting took place in December 2014 and included industry representatives from companies such as Protogenics, Arrow Sheet Metal, Davis Manufacturing, Cart Works Company, Image West Apparel, Inc., and B & B Machining.

Today, MSU Denver's IAB meets on a quarterly basis and keeps growing in participants. According to the program director, more and more companies reach out to MSU Denver, drawn in by CHAMP's reputation or having already partnered with other members of the CCCS. Most recently, the program director had been contacted by Lockheed Martin, a giant in advanced technologies, aerospace, defense and security, looking to create a lasting partnership.

One innovative way MSU Denver has made use of the advisory board is as an educational resource for students. According to one faculty member, several student groups had already presented their senior projects and research to the IAB and received feedback from board members. The faculty member pointed out that seeing student projects allows employers a better look at their abilities and talents, giving them a glimpse at what they can expect from MSU Denver alumni and providing the students with a golden networking opportunity while still in college.

Another faculty member, a professor of mechanical engineering technology with 30 years of combined industrial and educational experience, is a member of the MSU Denver IAB, which allows him to contribute to the program as a teacher as well as an employer partners' liaison. He, too, takes his students for visits to industrial facilities and manufacturing leaders' presentations, as an effort to increase the learning opportunities and networking exposure for all involved.

Feedback on course changes, equipment purposes, etc.

The IAB serves the whole MET program at MSU Denver as well as the CHAMP grant and its goals in particular. Quarterly meetings are typically dedicated to advising the faculty and staff on the program's general direction, evaluating the program's strategic plans, providing perspective on curriculum development and equipment purchases and reviewing the overall health and status of the MSU Denver CHAMP grant.

By cultivating ties with a growing number of local companies, MSU Denver has also worked to create new opportunities for students, in terms of internships they can take advantage of while still in school, as well as future, post-graduation employment options. MSU Denver students are being noticed and hired by companies that had never paid attention to MSU Denver's engineering and manufacturing alumni in the past. According to MSU Denver's website, the MET program is currently engaged with 27 local industry partners, such as: Alfred Manufacturing, GeoTech Environmental Equipment, Ingram Machining, Techniques Swiss, Coors, St. Vrain and Interex Aerospace.[5]

Future plans for these/other employer partnerships

The list of industry partners continues to grow as the MSU Denver CHAMP initiative gains more publicity. The program associate, a member of the American Society of Mechanical Engineers (ASME), for example, has been contacted by the organization to set up the next ASME event at MSU Denver. This presents the opportunity for 50-60 members of the ASME Colorado chapter to visit MSU Denver and learn about CHAMP.

In addition to its usual activities, the MSU Denver IAB is currently being consulted for assistance in sustaining the newly developed aspects of the program beyond the duration of the CHAMP grant. Concern had been expressed about keeping the equipment and the trained faculty with the MET program – past the grant expiration – and the board is expected to play a big role in helping find solutions.

The IAB has proven to be a valuable asset in MET's development. The challenge now is to create the infrastructure for maintaining the dynamic interaction that has been established between the university and the manufacturing sector. The CHAMP team at MSU Denver has been contemplating what kind of institutional and financial mechanisms need to be developed to ensure the sustainability of this fruitful interchange but no specific plans have been outlined.

MSU Denver is ready to meet this challenge with a new curriculum for a baccalaureate degree in advanced manufacturing housed in a new Advanced Manufacturing Sciences Institute. The programs associated with this interdisciplinary degree will be co-located in a new building on

[5] MSU Denver. Retrieved on Apr. 20, 2016. http://msudenver.edu/newsroom/news/2015/march/18-champ-grant.shtml

campus, the Aerospace Engineering Sciences Building (AES), slated for completion in June 2017. By providing MSU Denver students with a solid foundation in core skills, knowledge and dispositions to facilitate employability in advanced manufacturing professional positions, the Advanced Manufacturing Sciences (AMS) degree and the associated AES building have been created and designed to facilitate collaboration between the involved disciplines and relevant industry entities. The building includes entrepreneurial activity space, and many courses in the major are designed to facilitate collaboration with industry. There is also a growing emphasis on potential fee-for-service opportunities associated with the degree and the departments participating in the AMS program. These would help offset some of the costs for the facility and equipment. For example, the current and planned equipment acquisitions for both the engineering technology, especially mechanical engineering technology, and industrial design departments lend themselves to helping solve an identified advanced manufacturing industry issue of a lack of rapid prototyping machines available for smaller manufacturing firms. These firms will be able to collaborate with MSU Denver departments to use equipment in fee for service arrangements. This should provide ongoing mutual benefits by providing the manufacturing community with access to normally unaffordable equipment and benefit the departments both financially and with real world learning opportunities for students.

NAVIGATOR

Background/role at college

Prior to assuming her current position at MSU, the navigator, a retired elementary school teacher, worked as a consultant, conducting workshops for math and science teachers around the country. In her time away from her navigator duties, she serves as a volunteer at her church, helping community members with job search and placement.

Work to date

In the first year of her appointment, the navigator focused primarily on raising the visibility of the CHAMP grant, the MET program and its new certificates – on campus as well as with the local community at large. This effort had the dual purpose of catching the attention of local manufacturing industries and drawing in new students. From the start, the navigator has assumed a proactive role in community outreach, presenting at local events and high schools, engaging the workforce system and the Denver Chamber of Commerce and developing brochures, banners and informational pamphlets to make available to interested parties.

The navigator has been also focusing on promoting the CHAMP to MSU Denver students, internally. Even before the launch of the new certificates, she had made rounds to ~~different~~ each MET class, raising awareness of the coming changes and gauging student interest for the certificates. Now that the new CHAMP initiatives have been implemented, she has added a wealth of new information to her classroom presentations, including referrals to the new MOOCs:

> In the presentation, I show them how to get to the MOOCs. I break down one of the MOOCs by listing the modules and the skills covered. I tell them about our Blackboard learning and the fact that the Employability Student Success MOOC is on Blackboard. I haven't worked one-on-one with any student. However, students have information on how to choose the module that will help them improve their self-identified skills.

In her second year with CHAMP, the navigator took over additional student advising duties, previously performed by the program associate. At the time of the interview, the navigator was still adjusting to the new advising task, but described her work as helping students understand the program, providing thorough explanations of what it takes to earn each of the two CHAMP certificates and how they fit into the larger academic pathways involved.

Since the instatement of new certificates, the navigator has shifted her focus from simply bringing awareness to the program's anticipated offerings to proactive student recruitment. She has been particularly focused on establishing connections with the local workforce center, to work with TAA and TAA-like students to familiarize them with information about the MET program, their eligibility and funding options. The navigator, likewise, engages the help of the workforce center as well as IAB to help existing MSU Denver students with job search and placement. Finally, the navigator is very actively involved in tapping local veteran organizations for potential students, by routinely visiting local chapters and giving presentations about their career and funding options at MSU Denver. As of December 2015, the navigator had a caseload of nearly 200 students.

Future plans

The navigator is currently focused on strengthening her student advising skills as well as cultivating targeted collaboration with the regional workforce center to establish a steady student pipeline and information exchange between them and the MET program. As well, part of the role of the navigator also is to help develop courses related to soft skills for engineers. In reaching her goals so far and setting new accomplishments for the future, the navigator credits the CCCS navigator advisory board for being a reliable support system:

> I believe a lot of it has to do with the CHAMP advisory board. For example, the navigators, from day one – even when there were just two of us, and then three, and then there were four, talking on the phone – we have always talked together... And we've tried to support each other. [W]e started out having monthly navigator meetings and we went to each campus. On one occasion, we all drove three hours to Lamar!

The navigator enjoyed the camaraderie of the group and expressed confidence in using the advisory board as a resource for networking and finding solutions to future challenges that may arise under CHAMP.

PRIOR LEARNING ASSESSMENT/CREDIT FOR PRIOR LEARNING

A PLA specialist from MSU Denver's Center for Individualized Learning (CIL) has been engaged to assist with bringing PLA assessment to the MET program in a standardized format that can be used by all members of CCCS. The PLA expert specializes in serving student veterans and adult learners and has been the main resource and driving force behind the effort. As the program manager put it:

> Before CHAMP, [the PLA specialist] was telling me, veterans were coming in and it was kind of a hit-or-miss on whether they're going to get some prior credit. Now, it's set in stone that they're going to get some sort of credits for the stuff that they've learned.

Although most of the CHAMP staff were not directly involved in CPL/PLA development, the navigator has incorporated talking about it in her general CHAMP presentation to the students:

> During my presentation, I inform the students about the PLA/CPL MOOCs. I tell them that they've always had that as a bill of rights, to ask for credit or an assessment of their previous knowledge.

MSU Denver's CIL website offers a wealth of information on various CPL/PLA assessment tools for students with different background, as well as providing a downloadable questionnaire that helps students determine what sort of PLA they may qualify for, hyperlinked to more online resources.[6]

CONCLUSION

Challenges to date

At MSU Denver, most challenges reported had to do with time delays due to complex internal/external bureaucratic and logistical processes. The program director, for example, expressed the wish that CHAMP budget modification procedures would be less cumbersome, as it, evidently, took him a long time to obtain all the necessary financial approvals to proceed swiftly with purchasing in the past. Likewise, obtaining approval for creating the two new certificates for the MET program was more time-consuming and labor-intensive than anticipated. A lack of communication about the timing of new courses had also been brought up as an obstacle.

Other struggles seemed to be part of the normal process of enacting new initiatives. Redeveloping courses into the OER format was, initially, a very heavy undertaking, with unforeseen requirements – such as having to make the OER course materials compliant with the

[6] MSU Denver: Center for Individualized Learning. Retrieved on Apr. 19, 2016. http://www.msudenver.edu/cil/priorlearningassessment/

Americans with Disabilities Act (ADA) code – demanding extra time and attention. Having accomplished the necessary preliminary set-up, however, the instructional designer expects things to be much easier and run much smoother from now on.

Successes/achievements to date

The most common praise elicited by the CHAMP staff was towards the fruitful, growing relationships between MSU Denver and local manufacturing businesses. The program director expressed pride in the partnerships developed with local companies under CHAMP – and the caliber and dedication of the professionals serving on IAB:

> I will say the advisory board members, themselves, will be something we are really proud of. I mean, these people have a full-time job. Their time is valuable. And they are willing to contribute their time for us – just because, I think, we have the same passion like they do.

The program coordinator agreed that the IAB's involvement with both, the MET department as well as MET students, is helping create unprecedented cohesion and communication between the college, the Industry and the students:

> ...The institution, the faculty members, the students, and the industry – they all work together. Versus the [way it was] before – just the industry and the school, [just] the school and the students. Then, the students really don't have any connection with the industry, until they graduate and they get a job. But, then, they're losing the school part. But now, with this pattern, all the three dots are connected.

MSU Denver's other achievements include the successful and thorough redevelopment and posting of CHAMP-relevant course materials into the OER sharing system, as well as the launching of the CHAMP website.

NEXT STEPS

In year three of the CHAMP grant, MSU Denver's priorities will be divided between ensuring that the articulation agreements with other schools are completed and usable by students and continuing to develop and expand internship and employment opportunities for MSU Denver students with local industry partners. The CHAMP staff expects IAB to become even more proactively involved in shaping the MET program.

The CHAMP team at MSU Denver also seemed worried about the sustainability of the achievements under the grant, past the grant's expiration. The project lead also believed that too much has been invested into training the faculty on new machines to simply let them disband after the grant:

> [T]he human resource, positions, I would say that's valuable. They're spending that much time already training these people, get these people on board, learn their job, know exactly what they're talking about. And why just let these people go away after the program is over?

In light of these concerns, MSU Denver will focus on developing a strategic plan for holding on to the achievements made under CHAMP, even past the grant's effect at the college.

Finally, MSU Denver is committed to continue its efforts to encourage community college students from CCCS and other Colorado institutions to transfer to its MET program, to pursue a bachelor's degree. The CHAMP instructional Designer insisted that one of the main reasons why MSU Denver welcomed the CHAMP grant was the intention to bring in more community college students, which is why, the articulation agreements remain a top priority:

> One thing I agree with is serving more populations... So, we're looking at having the educational pathway for advanced manufacturing from high school to community college, [from] community college to the four-year degree... Since my area of expertise is in advanced manufacturing, I wanted to share my knowledge with more people so that it would help bring manufacturing back to the United States.