

Colorado Helps Advanced Manufacturing Program

Pikes Peak Community College Case Study

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RUTGERS

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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 PPCC and to provide a summary of the PPCC 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 PPCC, its student population, and its service region. These sections are followed by a summary of the goals of PPCC’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 PPCC; 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 PPCC, 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

PPCC, established in 1968, is the largest institution of higher learning in the Pikes Peak region of Colorado. PPCC has three main campuses in Colorado Springs, with two additional satellite campuses and two military education centers in El Paso County. Serving approximately 21,000 students annually, PPCC offers 158 associate's degrees along with various certifications in career and technical fields.

PPCC'S CHAMP GOALS

The first of the four primary CHAMP goals is to establish and advance college–industry partnerships. To this end, representatives of PPCC attend monthly meetings of the Pikes Peak Manufacturing Partnership, at which industry partners serve as advisors on all matters of the advanced manufacturing program's development. Smaller, more specialized advisory board meetings have also been set up on a biannual basis; in these meetings, faculty from particular manufacturing subdisciplines directly interface with local business representatives in their field of specialization.

The second CHAMP goal—to ensure a technologically advanced education—has been met with the purchase of modern equipment and the updating of PPCC's laboratory/shop facilities. Thanks to equipment purchases made under CHAMP, for example, PPCC students can learn the latest design software, such as AutoCAD, SolidWorks, CREO, and MasterCAM, utilizing state-of-the-art 3-D printers. These purchases and renovations, made in direct response to the concerns and expectations voiced by local industry leaders, were designed to provide training for as many overlapping manufacturing trades as possible.

The third primary CHAMP goal is to create new or redesign existing Prior Learning Assessment (PLA)/Credit-for-Prior-Learning (CPL) policies to extend academic credit to students for skills and knowledge they obtain outside the classroom. To fulfill this objective, PPCC brought on a

CPL specialist to determine the appropriate methodologies and metrics for the best system of skill-to-credit assessment. One of the key priorities of PPCC's efforts in this area is to reach the extensive active-military and veteran population in the Colorado Springs region—especially to work with veteran's organizations to help military personnel transition to higher education and, eventually, the workforce. Awarding credit for accumulated skills helps these and other students save time and money as they complete their education at PPCC.

The fourth primary goal of the CHAMP grant is to introduce structures and mechanisms for stackable/latticed certificates and articulation. With this goal in mind, PPCC redeveloped three of its advanced manufacturing department's programs using grant funds: the computer aided drafting and design program (CAD), the electronics technology program, and the machining technology program. Under the redesigns, the number of certificates offered in the CAD program increased and a new degree program—an Associate of Applied Science (AAS) degree in machining technology—was added to the existing AAS degree programs in CAD and electronics.

In the following quote, PPCC's project lead illustrates how, at times, the college's efforts to address these individual goals became an intertwined process:

We saw that [employers] don't have time to wait for the two-year degree student to come out. . . . We looked at what the industry needs—in terms of certifications, qualifications, job skills—and one thing that stood out for electronics was J-Standard soldering training because they use that in all the high-tech companies. It's interwoven in all of their processes. So we wanted to make sure that we included that certification for electronics students. We did the same thing with machining. We have the National Institute for Metalworking Skills Level One certification that's built into our certificates. And then quality control is another thing that comes up in all of these disciplines in making sure we're meeting industry needs. Companies like JPM have a whole department that's focused on quality control, so we've woven that into our courses as well. . . . On the CAD side, we have the National SolidWorks Associate certification that our students take as they complete our CAD programs. . . . So these stackable certificates made sense. And then they build naturally into a degree program. [Students] can come back at any point in time and finish it.

According to the project lead, then, college–industry partnerships like the ones fostered through participation in the Pikes Peak Community Partnership and through advisory board involvement played a key role in reimagining and reshaping the advanced manufacturing programs' curricular and certificate offerings, creating more opportunities for students to earn industry-recognized credentials on their way to earning a degree.

PROGRAM OFFERINGS AND CAREER PATHWAYS

As noted above, CHAMP is in place to increase the attainment of degrees and certifications in manufacturing in order to best serve employers' needs, so programs developed using CHAMP funds are designed to produce 21st-century workers whose skills align to local market trends. PPCC worked with local employers to develop the following three programs such that they would align with industry-recognized skills and competencies.

Computer aided drafting and design (CAD). Professionals working in CAD find careers as mechanical engineers, installation drafters, printed circuit board designers, and layout designers. Thus, students in the CAD program learn blueprint reading, problem-solving techniques, methods for customizing AutoCAD, the use of research tools, general organizational skills, and applications in geometry and trigonometry.¹

The CAD program at PPCC has three areas of emphasis: electronics, HVAC, and mechanical. Each program pathway offers certificates that can be stacked toward obtaining an AAS in CAD. The program offers the following certificates: Advanced CAD Technical Skills, Animation, Basic CAD Skills, CAD Quality Assurance, CAD Skills for Interiors, Modeling Design, Professional CAD–Architectural Design, Professional CAD–Mechanical, and Revit Skills.

In 2014, the median wage for CAD professionals was \$25.10/hour—\$52,000 annually—with 12,400 job openings projected over the next six years.²

Electronics technology. Professional training in electronics technology qualifies students for technical entry-level positions in electronic automation and control systems, measurement, instrumentation, control systems automation, and industrial robotic environments. At PPCC, students can earn any of the following stackable certificates while pursuing an AAS in electronics technology: Advanced Manufacturing Electronics, Automated Systems, Basic Automation, Basic Electricity and Electronics, Basic Electronics, Basic IPC Soldering, and Intermediate Electronics.

In 2011, the median average salary for electronics technicians was \$58,670 (\$28.21/hour). 16,800 new jobs in this sector were projected to open up between 2010 and 2020.³

¹ Associate of Applied Science Degree. (n.d.). Retrieved from Pikes Peak Community College, Computer Aided Drafting and Design–Mechanical Program website:

<https://apps.ppcc.edu/catalog/current/computer-aided-drafting-and-design---mechanical.htm>

² What can I do with a degree in CAD? (n.d.). Retrieved from Pikes Peak Community College, Computer Aided Drafting and Design website: <https://www.ppcc.edu/degrees-certificates/computer-aided-drafting/career-options>

³ Is the electronics technology profession right for you? (n.d.). Retrieved from Pikes Peak Community College, Electronics Technology Program website: <https://www.ppcc.edu/degrees-certificates/electronics-technology/career-options>

Machining technology. An AAS degree in machining technology at PPCC offers two emphases: one in machining technology and another in advanced manufacturing. The machining technology emphasis is designed to advance students' hands-on fundamental skills in machining using MasterCAM 2D and 3D and CamWorks software while developing applied math skills and problem-solving strategies. Students pursuing the advanced manufacturing emphasis receive training in technology using software such as SolidWorks, MasterCAM 2D and 3D, and CamWorks and take courses that focus on skills such as geometric dimensioning and tolerance (GD&T) and 3D printing and prototyping.⁴

Students can also opt to earn individual, stackable certificates in Advanced Machining Technology, Advanced Manufacturing Machining, Basic Machining Technology, Basic Manufacturing Machining, CNC Machining, and Intermediate Manufacturing Machining. There are opportunities to earn further accreditation for students who elect to pass the National Institute of Metalworking Skills (NIMS) Level One Certification.

IMPLEMENTATION

Program and curriculum redesigns

In the second year of CHAMP, all the work with courses and curriculum has been completed. At PPCC this work primarily involved shifting existing course content into OER format, but the college also developed and enhanced some existing programming and added to its offerings. PPCC has put 36 courses into OER format; they had committed to a smaller number of courses and then extended help to other community colleges within the Colorado Community College System (CCCS) who were facing challenges meeting their own goals. All of the developed courses have been fully uploaded into the OER via the D2L learning management system where both students and instructors within the CCCS consortium can access syllabi and supplementary course materials. The project lead credits the rapid completion and success of course transition at PPCC to the high level of faculty engagement at the college as well as to one team member's strategy to conduct the bulk of curriculum development—and OER transitioning—during the summer months:

I think the biggest thing that probably sets us apart from other schools is that we chose to use our faculty to do curriculum development. We did not hire a course developer. So, we had very little ramp-up time. We put everybody to work right away and have done that during summer.

The project lead was not the only person to note the department's spirit of collaboration; the department chair stated that faculty members communicate with each other regularly and work as a team. A staff member at PPCC was also very active with helping its faculty get the courses

⁴ Associate of Applied Science Degree. (n.d.). Retrieved from Pikes Peak Community College, Machining Technology Program website: <https://apps.ppcc.edu/catalog/current/machining-technology.htm>

ready for online publication, which likely had a positive effect on the number of courses the college was able to upload in a relatively short timeframe. Additionally, the department chair spoke about working closely and extensively with faculty members to ensure smooth OER transitions and compliance with regulations.

The collaborative spirit of PPCC makes it an ideal setting for CHAMP implementation, so it is not surprising that the rollout thus far has been relatively smooth. CHAMP is understood to be a team effort, with each officer working in synergy with the rest of the group, wearing many "hats" along the way. At PPCC, the project lead, for instance, frequently joins the navigator in advising students about the different facets of employment-seeking beyond the fulfillment of academic requirements, believing in a more holistic approach to the professional preparation of students:

[Students] might have awesome skills, but they are not necessarily ready to go out and get the awesome job because they do not know how to do that. . . . A lot of these students were doing some job just to pay some bills as they go through school. So what we're finding is that we really need to nurture and mentor them as they get ready to put their best foot forward: put a resume together, put a cover letter together, apply, [go on] interviews.

In addition to revitalizing the academic curriculum, then, PPCC instituted the use of Goodwill Enterprise soft skills modules to teach students the interpersonal skills necessary to secure and retain employment. The project lead emphasized the importance of this addition to the curriculum:

We do the education portion, but we still need to work on the reliability. So we brought the Goodwill modules in, and it is more than just sitting in for 15 minutes . . . it's interwoven throughout all of the courses so the students realize, the instructors realize, that it's a skillset that can get you fired—but those are also the skills that can get you hired.

Through a process overseen by the CHAMP navigator, faculty members embed the soft skills modules into their digital coursework; this is done to make sure that each student spends sufficient time interacting with the educational tool. During our site visit, however, only a few students spoke about accessing the modules. It is not clear whether this is because students are finding ways around completing the modules as required or because they simply did not choose to speak to us about them.

Due to time and space constraints, PPCC searched for innovative ways to expand its schedule of classes. A Saturday electronics class was added to the typical Monday-to-Friday curriculum, for instance. The college also doubled the offsite capacity of its welding and diesel programs by forming training exchanges with local manufacturing sites. More classes are also being offered at night, a practice that alleviates space constraints while also increasing access to industry

workers who choose to increase their skillsets through the stacking of certifications now offered under CHAMP.

Equipment purchases

A primary goal of CHAMP is to ensure technologically advanced education, and at PPCC, meeting that goal required the purchase of modern equipment and the updating of laboratory/shop facilities. In the first year of the CHAMP grant, the PPCC team experienced delays receiving new equipment due to federal purchasing requirements as well as long waits for facilities' upgrade approvals. A year later, all equipment purchases and facilities improvements to make room for the new equipment have been completed. Among equipment purchased are several state-of-the-art, free-access, CNC-driven machines, automated circuit board production equipment, and 10 desktop MakerBot 3D printers. In direct response to the concerns and expectations voiced by local industry leaders, these purchases were designed to provide training for as many overlapping manufacturing trades as possible.

Student perceptions of CHAMP-redesigned programs

PPCC students reported largely positive experiences with the advanced manufacturing programs offered under CHAMP and enjoyed the high level of instruction and advising by the faculty.

The expansion of certificate offerings under CHAMP was a positive move for many students. While some of the students interviewed were pursuing an AAS degree, others were primarily interested in earning certificates, which they believed would give them an advantage over other job applicants. "As an employer, one of the things you search for when you're going through resumes is to find any kind of certificate in a software that someone wants to hire. And they will search for that certificate as a baseline to pull out resumes," one student explained.

Purchasing new equipment and hiring a CHAMP navigator to help guide students through their programs also added to students' positive perceptions of the advanced manufacturing programs offered under CHAMP. Overall, students were impressed with the new machinery and software purchased under the grant—3D printers are an especially popular hit. Several students also reported consulting with the CHAMP navigator prior to or since first enrolling in a CHAMP course and finding her informative and helpful.

Not everyone was fond of the Goodwill soft skills modules, but even that criticism was tempered to a degree: While some students considered the modules time-consuming and too basic, it was also stipulated that younger students with limited employment experience could benefit from having to pass through them.

Faculty and staff perceptions of CHAMP-redesigned programs

The current CAD instructor originally came to PPCC as a student, when she "found the CAD program and fell in love with it." After earning her associate's degree along with all relevant certificates, she stayed on as adjunct faculty, developing a total of seven courses under the CHAMP grant. She enjoys teaching and is particularly impressed with PPCC's industry relations:

I attend all of the advisory committee meetings, which are held twice a year, fall and spring. I am really pleased with the growth of our advisory committees. And they do help out. For instance: "Do I need to teach this?" and they say "No, you don't" or "Yes." They have driven a lot of the purchasing, too. "Do we need to have this?" "Yes, you have to have this."

PPCC's machining instructor joined the faculty from a mechanical engineering and military background. As part of the CHAMP team, he was in charge of developing all of his own academic curriculum and transitioning it onto the OER platform. He actively attends the biannual advisory committee meetings in his field, appreciating the feedback from the industry partners on the board. He is most impressed with the revamping of the program's equipment and the curriculum changes that happened under CHAMP: "[W]e have the capabilities to really punch out some pretty good machinists in here now that we have the equipment and all the stuff that they are going to be using out in industry. So that was a huge success."

EMPLOYER COLLABORATION

Having spent the first year of the CHAMP grant focusing on equipment purchasing and installation, facilities renovation, and curriculum development, the project lead, the dean, the department chair, the navigator, and the CPL specialist channeled their efforts towards building networks with local companies. They have gained considerable exposure by participating in various industry events such as the Southern Colorado Manufacturing Expo and have built numerous alliances by actively engaging local business representatives in the Pikes Peak Manufacturing Partnership, an industry committee that has facilitated PPCC-employer relations. The committee's monthly meetings have produced useful information for developing PPCC's advanced manufacturing programs under CHAMP. Board members from local industries have consulted with PPCC on facilities development, equipment purchases, and academic and soft skills curricula.

In addition to the success of the Pikes Peak Manufacturing Partnership, smaller subcommittees have been formed for individual programs within the advanced manufacturing department such as welding, machining, electronics, and CAD; those meetings, which take place twice a year, feature visits from experts and industry representatives who offer technology news and updates, curriculum advice, and information on employment opportunities for students.

Interpersonal connections have also been key to establishing PPCC–employer partnerships. For example, prior to the CHAMP period, the dean of PPCC had served on the Colorado Workforce Enforcement Board. While on the board, he was able to build a partnership with the CEO of Goodwill for Colorado Springs, a fellow board member. PPCC developed a diesel training program for Goodwill, and Goodwill supplied PPCC with its soft skills training programs and modules. It is hoped that through this effort, PPCC students can obtain full professionalization, not only in terms of academic readiness but also in terms of having the pragmatic social skills and work ethic required to succeed in the workplace. The project lead elaborated:

Within the grant itself, there are those paragraphs about engaging with community partners, so it seemed like a logical connection. . . . [Goodwill's curriculum] was an easy mechanism to purchase, and it fit very nicely with our student demographic because it resembled in many ways the population that [the Goodwill partners] served. So it was a great synergy there, and an absolute perfect fit in terms of meeting that need of soft skill training and making it relevant.

In addition to Goodwill for Colorado Springs, PPCC collaborated with a number of industry partners on program redesigns and enhancements. For instance, the college is using a local business, Spectrum Advanced Manufacturing Technologies, as a model for its technology training curriculum by adopting the company's core competencies of electronics manufacturing as the standards to be met by students in the classroom. To this end, a number of faculty have been trained on the newly purchased automated circuit board production equipment with the expectation that they will update their course curriculum to meet the latest industry standards set by PPCC's industry partners.

The new department chair also maintains an active relationship with Spectrum's top management, fostering a pipeline of training, laboratory tours, equipment, and, hopefully, employment opportunities for PPCC's graduates. Another engaged employer, Quantum Electronics, assisted with designing curriculum and donated a lot of equipment to the electronics program, while JPM consulted on the same topics for the machining program. The dean expressed pleasure with the straightforward, honest, and pragmatic advice the CHAMP team has received from employer consultants: "[Employers were] wise enough to say, 'You need to purchase equipment that will work for all the employers here in town.'" As the result, PPCC focused on purchasing standard equipment that was applicable to numerous manufacturing fields and utilized by multiple employers in the Colorado Springs region.

The PPCC CHAMP team also spoke about listening closely to industry partners about temporal constraints when structuring their curricular and degree offerings. A recurring concern for business partners was having to wait too long for students to complete their training before joining the workforce. For this reason, PPCC focused on short-term, stackable, professionally targeted certifications that can be completed within two semesters. As the dean pointed out:

[I]f we only had those certificates and nothing else, our students will be very employable. And so, the premise was [to] create a variety of certificates across the degree programs, and this will allow students to come in and have a degree without losing anything because it's part of the credit program. And then employers can draw from a larger pool now of qualified students because they are trained now in a particular skillset that is needed within that industry rather than having to wait for the whole two-year cycle for an associate's degree. So it was a win-win for all. And we saw our students getting internships and employment very, very quickly.

Indeed, industry leaders have repeatedly stressed that there is a shortage of skilled labor; in response, PPCC has been active in establishing targeted pipelines of student trainees to appropriate manufacturing sectors. At advisory board meetings, PPCC representatives update board members about the numbers of students in the relevant advanced manufacturing fields who are soon to complete their training programs. Additionally, PPCC created a manufacturing forum that brings together current students, alumni, and industry representatives for panel discussions about the field. The partners have been impressed with interns from PPCC and continue to stay engaged in shaping its programs.

Future plans for these and other college–industry partnerships

A new position of military and workforce outreach coordinator is being formed, partly inspired by consulting with the FRCC business outreach coordinator, who has been very successful and innovative in her position. At PPCC, the military and workforce outreach coordinator will focus exclusively on building and maintaining relationships between the college and local businesses and will implement strategies borrowed from FRCC that are aimed at drawing more and more community and industry attention and involvement to PPCC and its programs. In particular, the military and workforce outreach coordinator will serve as a liaison with the PPCC Workforce Development Center to ensure a streamlined, clear flow of communication and alignment of goals. Furthermore, as the dean put it, the military and workforce outreach coordinator will become the "visible face for the [college-to-workforce] pipeline" for military personnel and veterans who are searching for employment and would help match them up with appropriate opportunities in the local industry.

PPCC is also considering creating non-credit training opportunities for local businesses through the PPCC Workforce Development Division and the Pikes Peak Workforce Center. PPCC can easily accommodate laborer training, as all the necessary infrastructure is already intact. As the dean put it: "We just repackage [the content that already exists in our curriculum], modularize it, narrow it down to whatever scope [the employers] need, and we already have it put into place." The project lead spoke about other plans to engage employers—such as hosting a community open house in the Spring 2016 semester—that are designed to bring more attention to the newly redeveloped advanced manufacturing programs and facilities.

THE CHAMP NAVIGATOR

The current CHAMP navigator at PPCC worked at the college prior to taking this grant-funded position. She first worked as the director of retention services and later as a grant research writer. She holds a Ph.D. in educational leadership with an emphasis in higher education and has 15 years of experience working in various student services, including teaching and assessment.

Initially, the navigator believed she would work with a steady influx of students, but this was not the case—partly because students were used to consulting faculty advisors and partly because many students attended classes only at night, after the navigator's office hours. This prompted the navigator to take steps to make sure that all students were aware of her role and her value to them as a resource. She now visits every course related to a CHAMP certificate multiple times throughout the semester.

The navigator uses each class visit to talk about different aspects of her services. On the first visit, she introduces herself and describes her role as the CHAMP navigator, while on the second visit, she talks about the Goodwill soft skills modules the students are using. The third visit is an information session about various CHAMP certificates that may be of interest to members of the class she is addressing, and on a fourth visit, she continues that discussion by showing students individual-level data about their course completion, pointing out certificates they are near completing. She times that final visit so that it occurs prior to or early in the registration period for the next semester in an attempt to make it easier for students to map out their remaining credits and to motivate them to register early.

The navigator works closely with PPCC's data coordinator and CPL specialist to identify students nearing certificate completion so that she can keep students informed of any options available to them to receive CPL or to test out of certain requirements that may speed up the earning of their certificates. She also provides students with information on the nuances of different tracks they can pursue with their certificates:

One [option for them] is the manufacturing track—which is what the CHAMP certificates are. [On this track] they will have CAD classes. But then there are also the straight electronics or straight machining classes that don't have CAD courses in them. So they could earn the electronics certificate but not necessarily the CHAMP electronics certificate because they won't have done the CAD courses. But [the work I'm doing] will let them see—if they want to get into machining or manufacturing—what they will have to do.

The navigator and project lead work together to reach PPCC's large population of active-duty and veteran students, connecting with veteran organizations on and off campus to learn how to best meet their needs, which can be different from those of nonmilitary students. For veterans to take advantage of allotted benefits, for example, they need to enroll in an AAS degree program

rather pursue one certificate at a time. Moreover, they cannot earn any certificate prior to earning their degree. This is a hindrance both to the students, who miss out on shorter-term professional certifications, and the advanced manufacturing program, which is short-changed in terms of completion rates. As the navigator explained:

[The veterans] can't necessarily apply for a certificate before completing a degree, and so that is going to mess with our numbers. Because if they are waiting until the end to get their certificate, we may have 40 people eligible for five different certificates, and that would give us really good numbers. But if they're waiting till the very end . . . then they may only apply for their associate's degree—they may not apply for their certificates.

In light of these idiosyncratic issues, best serving the PPCC military students remains a challenge—one PPCC hopes to fix by hiring a separate military and workforce outreach coordinator as mentioned above to work with the unique problems and needs of that population.

At PPCC, student advising happens in several different ways: A student can consult the PPCC-wide Student Services, speak directly with faculty advisors, or seek out the CHAMP navigator. Because of the informal nature of this process, and because the navigator is relatively new and unknown to students compared with faculty and Student Services advisors, it has been hard for the navigator to establish a foothold within the advising system. Though she meets with students during classroom-based information sessions her main advisory function has been to connect students with appropriate faculty advisors. In the future, she hopes to be more frequently engaged with students, taking some of the burden off faculty and having a stronger presence as a PPCC program and career mentor. For the time being, however, her advisory case load is low compared to other navigators in the grant, so her duties include administrative tasks such as projecting budgets and tracking program demographics. She is therefore playing a more administrative role in the grant than navigators on other campuses, working on general grant functions and activities and truly serving as a team partner with the project lead.

Collaborations: Pikes Peak Workforce Center & PPCC Workforce Development Center

The navigator has been an important link between the Pikes Peak Workforce Center and the PPCC advanced manufacturing programs. She has a dedicated space at the workforce center, where she spends one full day a week checking in with youth and adult services leaders, connecting with employers, and responding to students seeking help. She counts the relationship she built with the workforce center among her best accomplishments as the CHAMP navigator in the past year and is proud of the collaborative work that is happening between the two institutions. However, there is still much work to be accomplished in developing this collaboration. While the space and time at the workforce center is there, the navigator's integration into the workforce center and the number of student-client referrals being made could be improved. The CHAMP team at PPCC hopes this relationship will become more fruitful over time.

CHAMP administrators have also been working with the Workforce Development Center Division at PPCC, strengthening that relationship over time. Initially, the Workforce Development Center was focused more on paid internships that doubled as jobs, while the PPCC team was interested in more academically-oriented (unpaid) internships. Eventually, though, those priorities overlapped. When the Workforce Development Center received more requests for employment than it could fill, they began directing employers to PPCC CHAMP officers.

In addition to the navigator, PPCC is currently looking to appoint an employment engagement specialist to, in part, work with the Workforce Development Center to boost productivity and reduce redundancies between the Center and the college's efforts. As the dean put it:

They [at the Workforce Development Center] have all the data in the world. Should we spend our time gathering data when we can give them a call, and they can give us data in a matter of hours? So that type of synergy is [the employment engagement specialist's responsibility]. Otherwise, the colleges have a tendency then to create this infrastructure to replicate what's already happening in the community.

Future plans

The navigator has immediate plans to start enrolling all students attending CHAMP courses in an online job networking site called Connecting Colorado, which connects job seekers with employers; she hopes that receiving systematic e-mails about local job opportunities in their field will motivate students to study harder and become tuned in to industry demands. She intends to link this effort with her work at the workforce center.

The navigator also looks forward to working with the soon-to-be-hired military and workforce outreach coordinator: "I'm hoping that that person will be able to help us find more internships for the students, will be able to identify businesses that are ready to hire or almost ready to hire, and that those businesses will start thinking of Pikes Peak first." Her biggest challenge as the navigator has been gaining access to students, and she is working on becoming more visible to the student body, taking cues from the FRCC navigator's successful "embedding" strategy. At FRCC the navigator is often present in the classroom.

PRIOR LEARNING ASSESSMENT/CREDIT FOR PRIOR LEARNING

Many students, especially those who are returning adults, possess valuable skills and knowledge obtained through life and work experiences, and one of the CHAMP goals is to help these students secure academic credit for those difficult-to-quantify achievements so that they do not have to spend time and money taking courses that cover material they already know well. As the dean noted, "when you look at it from a cost standpoint, if we could eliminate three or four courses—let's say even one course for a student—that's several hundred or several

thousand dollars." For these purposes, PPCC hired a CPL specialist to develop metrics and implement a consistent system of skill-to-credit evaluation.

The CPL specialist came from an extensive professional background in academic evaluation and instructional design, has published work on the subject of PLA, and has been very active in tackling the challenge of bringing CPL to the electronics, CAD, machining, and welding programs at PPCC.

Since joining the PPCC CHAMP team and serving on the consortium's PLA committee one year into the grant, the CPL specialist has been busy surveying existing accreditation models, writing and revising policies, running occupational statistics, updating the college website, and creating supplementary materials such as check-off lists for students interested in receiving credit for nonacademic knowledge. Currently, her agenda involves three separate but overlapping assessment tools: portfolio publishing guides, military student agreements, and the Alternative Credit Project. She works especially closely with the registrar and the military service representatives on campus. Active service members as well as veterans are the PPCC students that can best benefit from CPL since most had extensive military training that can translate into academic credit.

PPCC students typically learn about PLA/CPL from the CHAMP navigator or from student enrollment services. The CPL specialist conducted a series of training workshops for faculty and administrators across all PPCC campuses to ensure that information on PLA/CPL options would be made available to the students they advise. Once the students become interested in CPL, they can begin learning about their options by consulting the college website or by obtaining the handout "Prior Learning Assessment for Credit at a Glance," which was created by the CPL specialist. The PLA page on the PPCC website currently offers a link to the most recent PLA standards and policies as well as a number of assessment materials and paperwork—most notably, the Portfolio Information Sessions created by the CPL specialist. A student can fill out the Portfolio, provide all the necessary documentation, and the submission will be evaluated by a faculty member expert in the subject matter.

There are also resources for military personnel and exams for testing out of certain introductory coursework. The CPL specialist recalled one student coming into the machining program who had an extensive background in machining but could not fit the required introductory class into her work schedule. She was able to pass the machining Challenge Exam, collect academic credit for it, and immediately enroll in a more advanced course. Likewise, many military students have already completed training such as OSHA and can utilize military agreements to collect back credit for it without having to study anew.

Military students are a priority at PPCC, and the CHAMP team is committed to serving this population to their best ability. The dean explained:

We have 25 percent of our students here at the college who are veterans or military. And so getting them into programs that [the CPL specialist] thinks can leverage their prior experience and, perhaps, push them further down the line towards a certificate or degree in the manufacturing programs—that's how we see us reaching those milestones of drawing them in.

Plans for future

A new PLA/CPL manual was being written but had not yet been released at the time of interviews, and the CPL specialist stated that she looked forward to adjusting the PPCC policies to be consistent with the new manual directives. New guidelines for CPL are being considered, such as credit given for prior teaching. As the CPL specialist noted:

[I]t sounds odd, but you know in the AAS, we might get a brilliant instructor with 20 years' electronics experience. However, they don't have any electronics on their degree. So this would be a portfolio—a streamlined portfolio method to earn college credit for faculty for courses taught—not only within our system, but at a regionally accredited college, an ACE-evaluated program or on a military site.

The CPL specialist plans to engage PPCC faculty in devising the most optimal credit-for-courses-taught system. She is also considering developing short courses that may correspond with local manufacturing and electronics businesses' competencies as a mutually beneficial exchange of services.

CONCLUSION

Challenges to date

Most of the hurdles vocalized by the CHAMP team had to do with frustrations over institutional process delays such as those involving hiring, purchasing, facility approvals, or the fulfilment of contractual obligations. As the dean put it, the problems were "all process-oriented, but they've added delays to what should have been a very easy process."

The CHAMP navigator role at PPCC is still a work in progress. Earlier, we noted her struggle for direct access to students, and there have been challenges integrating and carving out a place for the navigator position on campus. In addition, while her relationship with the Pikes Peak Workforce Center has begun to develop, work in strengthening this relationship and making meaningful and lasting connections will be important.

Perhaps the greatest challenge facing the CHAMP team at PPCC, however, is maintaining the revamped advanced manufacturing programs' sustainability past the funding period. This is an ongoing concern that faculty and staff realize will require creative solutions. The project lead indicated that they have already begun to work on coming up with such solutions:

[The dean] and I have talked about how we make this sustainable after [CHAMP]. The school does not have a lot of money to throw at sustaining this because it would be hard for the school to continue to pay the salary that we are paying with the CHAMP money, but there are opportunities there.

Among the ideas being considered is a plan to partner with manufacturing companies to create recruitment and sponsorship opportunities that are mutually beneficial.

Successes/achievements to date

The faculty and staff members engaged with the CHAMP project unanimously praised each other and the excellent teamwork they were able to produce together. By all accounts, each member of the team worked very hard, and the team was able to communicate and be optimally productive.

The project lead also expressed respect and gratitude for the outreach from the employer partners on the Pikes Peak Manufacturing Partnership, industry advisory boards and beyond: "I am pretty impressed with the business community because they seem genuinely motivated. It's not just about their bottom line, not just necessarily looking to fill their positions . . . I think they are invested in the good of the community."

NEXT STEPS

The PPCC CHAMP team is looking to expand access to the program to an even more diverse student body. "We are focused on low income [students], first generation [students], students with disabilities, and we are going to be presenting at their conference going into Spring semester," stated the project lead. "We'll expand that out to include diversity to the workplace." As mentioned above, PPCC is also actively working to make its programming more accessible to active-duty military personnel and veterans—for example, by drawing attention to career options that members of the local veteran population may not have considered for themselves. As the CAD instructor explained:

At first you think, "maybe the disabled veteran population might not be [a] perfect manufacturing kind of fit" because some of these jobs have physical skills that are involved. On the other hand, there is CAD where someone in a wheelchair doesn't necessarily have to be able to go out and operate a machine. Maybe they can approach a pathway that fits them. So there is no shortage of things someone can do in manufacturing.

Because active or former military servicepersons account for about one quarter of PPCC's student body, the college has been actively networking with veteran and military service groups. The project lead and the dean, both veterans themselves, have fostered an easy and natural relationship with veteran industry leaders in the community. The project lead and the

navigator regularly attend meetings of the Military Veterans and Spouses Organization. A budget modification was submitted and has been approved to hire a full-time military and workforce outreach coordinator who can dedicate his or her efforts to recruiting, enrolling, and supporting military students at PPCC. "[T]he person that we are envisioning," explained the dean, "would be a military retiree who speaks the language, can get on base—which is always an issue—gets the trust of the soldiers coming out—and then brings them to the door."