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Strengthening Community Colleges (SCC) Grant

Round 1 SCC Award (2021)

Northwest State Community College Evaluation

Final Evaluation Report

PREPARED AND PRESENTED BY

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Executive Summary

Northwest State Community College (NSCC) was awarded a Strengthening Community Colleges (SCC) training grant to create two short-term certificate programs in computer-aided manufacturing and industrial automation/robotics to address the workforce deficit and skills gap in Northwest Ohio's advanced manufacturing industry. Grant activities included the development of single-credit stackable courses, the formation of a steering committee of key industry partners to inform curriculum development, and recruitment efforts through partnership with employers and community partners.

Pacific Research and Evaluation (PRE) partnered with NSCC to conduct a participatory evaluation to assess NSCC's efforts in developing and implementing the program and to understand the effects of the program on students and industry partners, including the extent to which students are prepared to attain employment or advancement in advanced manufacturing. This evaluation endeavored to assess NSCC's progress toward their intended grant activities and outcomes from a formative and summative lens using both qualitative and quantitative methodologies.

PRE conducted annual phone interviews with faculty and staff, industry partners, and community partners involved in the SCC program initiative. Findings from the qualitative data emerged through a thematic analysis and have been reviewed by the NSCC project team to contextualize the interpretation of findings. A student survey was conducted to ask students questions about their experience in the hybrid/accelerated courses, the strengths and weaknesses of the hybrid/accelerated courses, and to what extent the courses will aid in their employment in the advanced manufacturing industry.

Summary of Findings

- Investments to infrastructure included hiring new faculty, building out technological systems to house hybrid course content, developing an open-lab model schedule, purchasing training equipment, and updating financial aid and registrar policies and procedures to accommodate the new program schedule.

- NSCC purchased training equipment that aligns as closely as possible to what is currently used in the workplace among industry partners and increased their capacity to provide students with hands-on experience using robot controllers.

- The new hybrid/flexible model will provide greater accessibility and flexibility for adult learners to accelerate and complete the certificate programs to support economic mobility and bring more skilled workers into these high-need industries.

- A total of 19 one-credit courses were developed for the computer-aided manufacturing (CAM) accelerated certificate program and a total of 20 one-credit courses were developed for the industrial automation/robotics (IA/R) accelerated certificate program. More specifically, faculty identified specific competencies for each one-credit of course content and designed competency-based assessments to assess student progress to create a streamlined stackable course progression from start to finish for each program. In year 4, NSCC strategically bundled the one-credit courses into 12 three-credit courses still in the hybrid and accelerated format.

- NSCC identified eight key industry partners to include on the steering committee to provide continuous employer feedback through program development and align with industry standards and needs. NSCC worked closely with industry partners to incorporate industry credential competencies throughout course content to meet the direct needs of industry partners and increase student employability. Industry partners participated in steering committee meetings and provided NSCC faculty/staff with in-person site visit tours of their workplace facilities.

- Industry partners felt their input was well-received by NSCC and believe the hybrid programs will prepare students for the advanced manufacturing environment. All Industry partners agreed that communication from NSCC has been clear, timely, and informative, and their experience partnering with NSCC has been positive.

- Industry partners encouraged NSCC to regularly update their point of contact for effective student recruitment and suggested NSCC personnel come to their facilities to provide an in-person overview of the programs to management-level staff.

- NSCC engaged in outreach efforts with community partners, including five Jobs and Family Services offices, two Veterans Affairs offices, and the Region Seven and Eight Local Workforce Development Boards.

- Industry partners are excited about the hybrid model, alignment with industry standards, and overall quality of training these certificate programs provide and have sent or intend to send current employees through the programs. They also noted lack of internet access and self-discipline as potential challenges for students.

- NSCC fostered relationships with eight industry partners and five community partners to create a pipeline for recruiting potential students from both within the industry and beyond. Some community partners see potential for the programs to interest their clientele and plan to engage in recruitment activities.

- In grant years 3 and 4, NSCC increased student recruitment efforts including conducting outreach to over 50 industry employers and high schools. NSCC has also increased internal recruitment efforts of NSCC students through advising.

- Aligning one-credit courses with the registration system and learning management system (LMS) proved to be more labor intensive than expected and ultimately unsustainable, leading the college to pivot to bundled three-credit courses instead.

- Recruitment of students was slow to start, and it was more challenging than anticipated to create a recruitment funnel through employer partners and community partners.

- Gaining support from leadership and intentionally aligning across offices to ensure the success of the programs led to greater success with student enrollment halfway through the grant timeline.

- A total of 52 students enrolled in hybrid/accelerated courses over the course of the grant and the student survey was completed a total of eighteen (n = 18) times across both programs. Student survey respondents agreed or strongly agreed that they were satisfied with the courses they completed. All survey responses (100%, n = 18) indicated that they would recommend the course they completed to other students, highlighting the flexible scheduling, easy to follow course content, valuable knowledge gained, and helpful instructors. As a result of course completion, students felt more prepared to work in the CAM or IA/R industry and felt the courses will help them reach their career goals at a faster pace.

Evaluation Insights

1. While great effort was put into building out technological systems to house the one-credit course content and updating financial aid and registrar policies and procedures to accommodate the one-credit, 6-week course schedule, the complex nature of trying to fit a new process into existing systems was ultimately unsustainable and negatively impacted student enrollment. NSCC learned from this experience and was able to adjust their strategy from the one-credit course model to a three-credit course model while keeping the hybrid/accessible aspects of the courses to provide students with increased flexibility. This change led to greater eligibility among NSCC students to enroll in these courses and made the process of enrollment more seamless.

2. The new hybrid/flexible model will provide greater accessibility and flexibility for all learners to accelerate their education and job potential, however, it takes time to see results of these programs in supporting economic mobility and bringing more skilled workers into these high-need industries. While NSCC had high hopes for recruiting around 128 students over the life of this grant initiative by funneling students into the programs through forging partnerships with employer partners and community partners, NSCC did not see student enrollment as quickly or to the extent they had expected. It took NSCC time to learn how to clearly and effectively communicate how these new hybrid/accelerated programs were different from traditional and hybrid-only programs and how they can benefit potential students.

3. Faculty identified specific competencies for each one-credit of course content, and designed competency-based assessments to assess student progress to create a streamlined stackable course progression from start to finish for each program. Feedback from the student survey indicated that students' experience with the courses aligned with the intention of creating streamlined course content. Students indicated that assignments were aligned with course learning materials and course content was clear, informative, and easy to follow. Students also indicated that the course structure and lab requirement, in their experience, were as flexible in practice as NSCC intended. As more students complete these hybrid/accelerated courses and word spreads of the flexible nature of these courses and programs, NSCC anticipates greater enrollment in the hybrid/accelerated certificate programs. As demand for these programs grows, NSCC will need to ensure that they have the capacity to sustain the increased level of flexibility it has been able to provide through these courses thus far.

Final Takeaway

Findings from this evaluation show that NSCC's efforts to create two certificate programs that were hybrid and accelerated are meeting the needs of students by providing a more accessible and flexible educational option to advance in their careers within the advanced manufacturing industry. As awareness grows among industry partners, community partners, high schools, and within the NSCC student community, interest in the hybrid/accelerated courses is likely to grow. Through trial and error, NSCC faculty and staff feel they have a better understanding of how to implement the hybrid/accelerated model in a sustainable way that aligns with institutional systems, and they see potential for the hybrid/accelerated model to be applied across other programs at NSCC. As they progress into the future, NSCC intends to continue to gather information regarding employment outcomes of students who complete these hybrid/accelerated courses and hopes to see an impact on the local workforce deficit.

Introduction

Northwest State Community College (NSCC) was awarded a Strengthening Community Colleges (SCC) training grant to create two short-term certificates in computer-aided manufacturing and industrial automation/robotics. Pacific Research and Evaluation (PRE), headquartered in Portland, Oregon, provides evaluation services across the country and has extensive experience working with community colleges and state and federal grants. PRE partnered with NSCC to conduct a participatory evaluation to assess NSCC's efforts in developing and implementing the program and to understand the effects of the program on students and industry partners, including the extent to which students are prepared to attain employment or advancement in advanced manufacturing. This evaluation endeavored to assess the NSCC programs from a formative and summative lens using both qualitative and quantitative methodologies, including surveys and interviews, to explore the following evaluation research questions based on NSCC's intended grant activities and outcomes. A full list of research questions and sub-questions is provided in the Methods and Analysis section on page 10.

Primary Research Questions	
RQ1.	What infrastructure did the college invest in to facilitate delivery of online courses?
RQ2.	What stackable courses have been created and how do students perceive the courses?
RQ3.	How has NSCC increased the breadth and depth of employer engagement?
RQ4.	How has NSCC increased program and policy alignment across systems?
RQ5.	To what extent was the program implemented as intended?
RQ6.	What role did the programs play on student outcomes?

PRE sought to answer the research questions through annual interviews with NSCC faculty and staff, industry partners, and community partners, and an ongoing student survey. Through its partnership with NSCC, PRE built meaningful relationships with project stakeholders, used a participatory approach when engaging in evaluation activities, identified facilitators and barriers to implementing the proposed project while considering the Northwest Ohio context, assessed what efforts were made to develop and implement the programs, examined the role of faculty, staff, and partners in these efforts, and evaluated the extent to which participating students are prepared to attain employment or advancement in the advanced manufacturing industry.

Background

The Northwest State Community College (NSCC) Strengthening Community Colleges (SCC) Training Grant project sought to address the workforce deficit and skills gap in Northwest Ohio's advanced manufacturing industry. With the grant funds, NSCC developed two new advanced manufacturing short-term accelerated programs in computer-aided manufacturing and industrial automation/robotics. These two new programs include stackable courses and industry recognized credential offerings with expanded remote and hybrid learning options that seek to accommodate both traditional and non-traditional students such as adult learners, parents, and full-time employed individuals. NSCC engaged in collaboration efforts with the workforce development system to attract, place, and retain new entrants into advanced manufacturing programs and occupations, as well as create a steering committee made up of key industry partner employers to guide the development and alignment of curriculum with industry competencies.

The subsequent sections of this report include Methods and Analysis, Program Overview, Summary of Activities and Outputs, Findings, Evaluation Insights, and Conclusion. The Methods and Analysis section describes in detail the methods used to evaluate the grant project. The Program Overview describes in more detail the program's purpose, personnel, and plan. The Summary of Activities and Outputs section lays out the grant project activities, intended outcomes, targets, and progress toward reaching the targets, in addition to laying out a summary of the programs' output data. The Findings section lays out the findings across all data collection activities and is organized by the research questions guiding the evaluation. The Evaluation Insights section highlights key takeaways from the evaluation and provides some recommendations for improvement. The Conclusion section summarizes the report and discusses limitations and implications moving forward.

Methods and Analysis

This final report is structured around six main evaluation research questions, each with a set of sub-questions:

Evaluation Research Questions
RQ1. What infrastructure did the college invest in to facilitate delivery of online courses? a. How are faculty being trained on the hybrid delivery model and is the training useful? b. How are new roles hired through the grant facilitating delivery of online courses? c. How is the machinery purchased for labs supporting student learning? d. What are the strengths and weaknesses of the hybrid delivery model?
RQ2. What stackable courses have been created and how do students perceive the courses? a. What was the process for developing the stackable courses? b. What are the strengths and weaknesses of the courses? c. How were the credentials identified?
RQ3. How has NSCC increased the breadth and depth of employer engagement? a. What role have industry partners played in selecting industry competencies? b. How do the new credentials align with industry competencies? c. What is the value to employers of having the new credentials? d. Do industry partners believe students are well qualified to serve in advanced manufacturing roles? e. What are the strengths and weaknesses of employer engagement? f. What are the strengths and weaknesses of the outreach to community partners?
RQ4. How has NSCC increased program and policy alignment across systems? a. How has NSCC conducted outreach to new students? b. How has NSCC collaborated with the workforce development system?
RQ5. To what extent was the program implemented as intended? a. What barriers and facilitators have come to pass as the program has taken shape? b. How did program activities change over time?
RQ6. What role did the programs play on student outcomes? a. What implementation efforts were most effective at playing a role in student outcomes? b. In what ways did the credentials help students attain employment? c. In what ways are students prepared to attain employment in computer automated manufacturing or industrial automation/robotics?

To answer the evaluation research questions, PRE conducted interviews with faculty and staff, industry partners, and community partners involved in the NSCC SCC program initiative. All three interview protocols for each group were developed by PRE to address the research questions and were updated annually based on input from NSCC. Additionally, a student survey was developed with input from the NSCC project team and embedded as a link within each course for students to complete at the end of each course.

Faculty and Staff Interviews

PRE conducted annual phone interviews in grant years 2, 3, and 4 with faculty and staff involved in the development of the computer-aided manufacturing (CAM) and industrial automation/robotics (IA/R) accelerated certificate programs. NSCC sent an email alerting faculty and staff about upcoming interviews. PRE followed up by sending an email invitation to participate and schedule a phone interview. Up to three email reminders were sent to faculty and staff. In year 2, a total of twelve faculty/staff were invited to participate, and ten faculty/staff completed interviews (n = 10) in August 2022. In year 3, a total of twelve faculty/staff were invited to participate, and twelve faculty/staff completed interviews (n = 12) in August 2023. In year 4, a total of twelve faculty/staff were invited to participate, and nine faculty/staff completed interviews (n = 9) in August 2024. Interview participants were asked about their involvement with developing the hybrid delivery model, stackable course structure, and student recruitment, the strengths and challenges of the two certificate programs, and their experience collaborating with workforce development and industry partners. The interview questions are provided in **Appendix B.**

Industry Partner Interviews

PRE conducted annual phone interviews in grant years 2, 3, and 4 with industry partners, including potential employers, engaged in one or both of the accelerated certificate programs. NSCC sent an email alerting industry partners about upcoming interviews and PRE followed up by sending an email invitation to participate and schedule a phone interview. Up to three email reminders were sent. In year 2, a total of eight industry partners were invited to participate and five completed interviews (n = 5) in November 2022. In year 3, a total of eight industry partners were invited to participate and six completed interviews (n = 6) in August 2023. In year 4, a total of eight industry partners were invited to participate and three completed interviews (n = 3) in July 2024. Interview participants were asked about their involvement with the two SCC funded certificate programs, their perspective on the strengths and challenges of the program, and their recommendations for recruitment. The interview questions are provided in **Appendix B.**

Community Partner Interviews

PRE conducted phone interviews in grant years 2 and 3 with community partners engaged by NSCC. NSCC sent an email alerting community partners about upcoming interviews and PRE followed up by sending an email invitation to participate in and schedule a phone interview. Up to three email reminders were sent. In year 2, a total of five community partners were invited to participate, and four completed interviews (n = 4) in January 2023. In year 3, a total of six community partners were invited to participate, and three completed interviews (n = 3) in January 2024. Interview participants were asked about their involvement with the two SCC funded certificate programs, their perspective on the strengths and challenges of the program, and their recommendations for recruitment. The interview questions are provided in **Appendix B.**

Student Survey

PRE developed a student survey in collaboration with NSCC to administer to students in the two new accelerated hybrid courses. The survey link was embedded in each one-credit stackable course and later in each bundled three-credit course for students to complete at the end of each course. Students were not required to complete the survey; however, students were encouraged by faculty to complete the survey after each course completion. This survey was administered on an ongoing basis throughout grant years 2, 3, and 4 and closed on October 31, 2024. NSCC saw hybrid/accelerated courses completed 93 distinct times by a total of 52 students. The survey was completed eighteen times (n = 18) for a response rate of 19.4%. Students were asked questions about their experience in the hybrid/accelerated courses, the strengths and weaknesses of the hybrid/accelerated courses, and to what extent the courses will aid in their employment in the advanced manufacturing industry. The student survey questions can be found in **Appendix C.**

Quantitative and Qualitative Analysis Procedures

The qualitative data gathered from interviews with faculty and staff, industry partners, and community partners was analyzed using both inductive (predetermined) and deductive (emergent) thematic analysis. The quantitative data gathered was cleaned and analyzed using SPSS. Statistical analyses were conducted to derive descriptive outcome findings.

Program Overview

Program Purpose

The Northwest State Community College (NSCC) SCC grant project intends to address the workforce deficit and skills gap in Northwest Ohio's advanced manufacturing industry. NSCC has focused its efforts within six rural northwest Ohio counties including Defiance, Fulton, Henry, Paulding, Van Wert, and Williams. According to the Ohio Development Services Agency County Profiles, these six counties contain a total of 374 manufacturing establishments with an increasing demand for skilled employees. With the grant funds, NSCC developed two new advanced manufacturing short-term accelerated programs in computer-aided manufacturing and industrial automation/robotics. These programs are intended to fulfill the growing workforce demand in the advanced manufacturing sector and build NSCC's capacity to provide vocationally relevant education and training. NSCC engaged in collaboration efforts with the workforce development system to attract, place, and retain new entrants into advanced manufacturing programs and occupations.

Program Personnel

The NSCC SCC grant project personnel included a project director, project administrator, and two new full-time faculty members to each lead one certificate program. NSCC created a steering committee made up of eight key industry partner employers to guide the development and alignment of program curriculum. Industry partners involved in the steering committee are MEC, Inc., Sauder Woodworking Co., Wauseon Machine, Worthington Industries, Automatic Feed Company, Wieland Chase, Haas Door, and Pioneer Industrial Systems. NSCC also established partnerships with community partners such as Ohio Jobs and Family Services across multiple counties including Fulton, Henry, Van Wert, Williams, Defiance, and Paulding. NSCC conducted general outreach to over a dozen additional employers in the advanced manufacturing industry for marketing and recruitment purposes. Over the course of the grant, NSCC experienced turnover in the project director role and one full-time faculty. Additional NSCC faculty were brought on board to support aspects of ongoing program improvement and implementation.

Program Plan

NSCC set the goal of converting 12 three-credit courses into 37 one-credit courses across the two certificate programs that can be completed asynchronously with minimal time on-campus

required. Potential students have the opportunity to enroll in either program at six different entry points throughout the year, specifically during the fall and spring semesters. Each course includes Knowledge and Application Assessments (KAA) for students to demonstrate their knowledge before progressing on to the next stackable course in the program. The courses provide students with an open-lab schedule to allow students to schedule a time to come to campus to gain hands-on experience and demonstrate their competency via hands-on assessments. In grant year 3, NSCC made the strategic decision to bundle the one-credit stackable courses into three-credit courses that were still hybrid and accelerated. Shifting to provide bundled three-credit courses through the accelerated programs sought to better meet the needs of students by aligning with the registration system to allow students to self-enroll in courses and align with financial aid minimum-credit requirements to increase the amount of financial aid students were eligible to receive. The bundled three-credit courses also allowed NSCC to open up these courses to all NSCC students as a means to potentially funnel students into the hybrid accelerated certificate programs.

To support the development of the two new certificate programs, NSCC completed the following additional grant activities:

- Apply hybrid asynchronous course delivery model to the one-credit courses for both certificate programs
- Provide professional development to faculty on how to use the hybrid course model
- Hire a grant project administrator and two new full-time faculty
- Purchase training equipment for labs
- Create an advanced manufacturing steering committee with eight industry employer partners to guide the development and alignment of curriculum, identify necessary skills, validate credentials, and inform course schedules to meet employer needs
- Employ diverse outreach methods including but not limited to collaborating with workforce development to attract, place, and retain a broader range of students

The intended outcomes of the grant activities described above include 1) the alignment of new courses with industry competencies, 2) Students have 24/7 access to course materials and access to labs on weekends and evenings, 3) Students have access to well-developed technical curriculum with embedded accelerated learning tools, and 4) Program and policy alignment exists between college and industry/community partners. The NSCC SCC grant project's overarching goal was to provide the people of Northwest Ohio with access to jobs in the advanced manufacturing industry that pay a sustainable wage, and that Northwest Ohio has a fully staffed and well-qualified advanced manufacturing industry. A logic model identifying this program's complete list of inputs, activities, outputs, outcomes, and identification of problem is located in **Appendix A.**

Summary of Activities & Outputs

Grant Activities

The following table provides the grant activities as listed in the logic model (located in **Appendix A**); NSCC has completed all nine grant activities (as indicated in the table below with a green check). The 10th grant activity (indicated in yellow) emerged as a clear strategic change for NSCC to best meet its intended grant outcomes and overarching goal.

Grant Project Activities	Complete
1. Convert 12, two to four-credit courses into 37 one-credit courses	✓
2. Develop Knowledge and Application Assessments for each one-credit course	✓
3. Apply hybrid asynchronous course delivery model to the one-credit courses for both certificate programs	✓
4. Implement new registration schedule with six entry points across the year	✓
5. Provide professional development to faculty on how to use the hybrid course model	✓
6. Hire a grant project administrator and two new full-time faculty	✓
7. Purchase training equipment for labs	✓
8. Create an advanced manufacturing steering committee with eight industry employer partners to guide the development and alignment of curriculum, identify necessary skills, validate credentials, and inform course schedules to meet employer needs	✓
9. Employ diverse outreach methods including but not limited to collaborating with workforce development to attract, place, and retain a broader range of students	✓
10. Bundle the 1-credit accelerated/hybrid courses into 3-credit courses to align with registration/financial aid and open the courses to all NSCC students to potentially funnel them into the new certificate programs	✓

Progress Toward Outcomes

NSCC made progress toward its project outcomes to address the three core elements of the SCC grant, including 1) Employer Engagement, 2) Career Pathways Programs/Accelerated Learning Strategies, and 3) Alignment to Workforce Development System. The core element and its associated outcome, target, and status are described below.

Outcome: Employer Engagement

- **Outcome Description:** Create an Advanced Manufacturing Steering Committee (with membership drawn from the Advanced Manufacturing Consortium) to guide the development and alignment of curriculum, identifying necessary skills, validating credentials, and informing course schedules to meet employer needs.

- **Target:** Eight employers will be identified and sit on the new steering committee.

- **Status:** NSCC reached its target for Employer Engagement by creating a new advanced manufacturing steering committee with eight industry employer partners to collaborate with in the development of both certificate programs.

Outcome: Career Pathways Programs/Accelerated Learning Strategies

- **Outcome Description:** Increase Advanced Manufacturing short-term accelerated programs, single-credit stackable courses, and industry recognized credential offerings, using a hybrid model and implementing Prior Learning Assessments with employer validation.

- **Target:** Increase Advanced Manufacturing short-term certificate programs from four to six, by developing and implementing two new accelerated programs, consisting of 12 total technical courses that will be segmented into 37 one-credit hour courses, offered in a competency-based/hybrid model.

- **Status:** NSCC reached its target for Career Pathways Programs/Accelerated Learning Strategies by successfully completing the development of two new accelerated programs and a total of 37 one-credit courses. In grant year 3, NSCC made the strategic decision to bundle the one-credit stackable courses into three-credit courses that were still hybrid and accelerated in nature. Shifting to provide bundled three-credit courses through the accelerated programs sought to better meet the needs of students by aligning with the registration system to allow students to self-enroll in courses and aligning with financial aid minimum-credit requirements to increase aid opportunities for students. NSCC was also able to make the hybrid accelerated courses available to NSCC students not enrolled in the hybrid accelerated certificate programs as a means to potentially funnel students into the hybrid accelerated certificate programs.

Outcome: Alignment to Workforce Development System

- **Outcome Description:** Collaborate with the workforce development system to attract, place, and retain new entrants into Advanced Manufacturing occupations/newly created courses.

- **Target:** Increase the enrollment into Advanced Manufacturing courses, focusing on Workforce Innovation and Opportunity Act/Comprehensive Case Management WIOA/CCMEP eligible, by 32 students per year, from 129 to 257 enrolled over the life of the project.

- **Status:** NSCC engaged in recruitment efforts through the workforce development system, industry partners, and community partners and began direct outreach to potential students after course development was complete in December 2022. Across both certificate programs, NSCC had a total of 52 students enrolled in hybrid/accelerated courses across the life of the grant. NSCC experienced unforeseen delays in course development completion, and therefore a subsequent delay in recruitment launch. Student recruitment was more challenging than expected and took time to build awareness of the programs among employers and potential students. More detailed information on recruitment efforts is described in the Findings section of this report.

Program Outputs

The table shown below provides the outputs listed in the program logic model and NSCC's progress made toward these outputs over the course of the four-year grant period.

Program Outputs	
Number of one-credit hybrid courses created	**37**
Number of three-credit bundled courses created	**12**
Number of open labs per course	**5+**
Number of faculty trained in course delivery model	**2**
Number of training supplies & equipment pieces purchased	**10**
Number of employers on steering committee	**8**
Number of times steering committee convened	**3**
Number of site visits with steering committee members	**6**
Number of organizations conducting outreach to	**50+**
Number of students enrolled in hybrid courses	**52**

Findings

Findings emerged from the interviews conducted with faculty and staff, industry partners, and community partners, as well as the student survey data. The findings in this report are organized by research question and each of the six primary research questions have a sub-set of questions that are addressed and summarized in the key findings box presented at the top of each section. PRE values developmental and collaborative evaluation and the continuous sharing of evaluation data with program stakeholders for program improvement purposes. To this end, data have been presented to the project leadership team at monthly evaluation check-in meetings where they were invited to provide thoughts and feedback to help contextualize the interpretation of findings.

Career Pathways Programs/Accelerated Learning Strategies

RQ1.What infrastructure did the college invest in to facilitate delivery of online courses?

Key Findings

- Investments to infrastructure included hiring new faculty, building out technological systems to house hybrid course content, developing an open-lab model schedule, purchasing training equipment, and updating financial aid and registrar policies and procedures to accommodate the new program schedule.
- NSCC purchased training equipment that aligns as closely as possible to what is currently used in the workplace among industry partners and increased their capacity to provide students with hands-on experience using robot controllers.
- The new hybrid/flexible model will provide greater accessibility and flexibility for adult learners to accelerate and complete the certificate programs to support economic mobility and bring more skilled workers into these high-need industries.
- Industry partners are excited about the hybrid model, alignment with industry standards, and overall quality of training these certificate programs provide and have sent or intend to send current employees through the programs. They also noted lack of internet access and self-discipline as potential challenges for students.

Faculty and staff interview participants shared how NSCC invested in infrastructure to facilitate the delivery of the hybrid courses in both the computer-aided manufacturing and industrial automation/robotics accelerated certificate programs. Investments to infrastructure included:

1. Hired two new full-time faculty for each program to assist with course development, implementation, and instruction.
2. Added courses to learning management system (LMS) called Sakai to host all online learning and knowledge content and assessments.
3. Implemented a flexible open-lab model schedule with adaptable faculty availability to accommodate students with varying schedules.
4. Purchased new training equipment including PLC controllers.
5. Updated server to accommodate more virtual training machines.
6. Trained recruiters on understanding hybrid program model and delivery.
7. Updated registrar to accommodate the new six-week enrollment offerings.

RQ1 a. How are faculty being trained on the hybrid delivery model and is the training useful?

Faculty and staff attended three virtual sessions provided on the course hybridization process, and faculty received one-on-one coaching support on a weekly basis from the Vice President Emeritus of Special Projects who serves as a content expert and is very familiar with this grant initiative.

RQ1 b. How are new roles hired through the grant facilitating delivery of online courses?

Two full-time faculty were hired to spearhead the development and delivery of each certificate program. This includes ensuring that all online curriculum is appropriately configured, updated per industry standards and employer feedback, and hybridized from the traditional, in-person delivery model. Each faculty member is responsible for managing program and course-level content, as well as communication and announcements, within the learning management system site for each respective program. Faculty were also hired with the upfront expectations that they would be able to provide a flexible open-lab schedule to support adult learners' varying schedules to receive in-person, hands-on lab experience. Hired faculty bring recent industry experience and previous teaching experience at NSCC as well.

RQ1 c. How is the machinery purchased for labs supporting student learning?

Faculty and staff shared that machinery/equipment purchased for the labs is intentionally as similar as possible to what industry employers are using to provide students with learning experiences that align as closely as possible to what they will see in the workplace. NSCC has purchased robot controlling equipment that connects to a virtual machine, which allows students to gain the tactile experience of using machinery without having a need for the actual full machine. One faculty member shared that NSCC has "more than doubled our capacity to actually have a physical controller in their [students'] hands as opposed to triple people up on an actual machine." Robot controlling equipment reduces the need to purchase entire machines and the heavy cost associated with it, and simultaneously increases their capacity to provide hands-on experience to more students all at the same time. Additionally, faculty noted that some older units were broken down and SCC funding was used to purchase replacement parts for three machines and one additional training machine for a total of four training machines to meet the needs of students.

> *"The goal is to provide students with training equipment that is as similar as possible to what they would see at a workplace."*
>
> - *NSCC Faculty*

RQ1 d. What are the strengths and weaknesses of the hybrid delivery model?

Faculty and staff shared multiple strengths about the new hybrid delivery model. They highlighted the accessibility and flexibility of the hybrid delivery model to accommodate adult learners with jobs, families, or other commitments, and to give these adult learners the ability to complete their certificate without disrupting their work life. Another strength is the ability to self-pace the program to go at either a faster or slower pace than the traditional set timeframe for completing a course. Faculty and staff also highlighted the streamlined progression of course content to build a skillset in a logical order, clearly defined competencies to allow for primary learning assessments, and the opportunity provided for economic mobility and advancement in the workforce.

"If something should happen, they all can still restack, and transfer back should someone decide they want to pursue the long-term certificates or degrees." – NSCC Faculty/Staff Member

"It accommodates students who need to take it slow and students who are eager to complete and apply to their work much faster." – NSCC Faculty/Staff Member

Industry partner interview participants echoed many of the strengths highlighted by NSCC faculty and staff, including the flexible self-paced nature of the programs sharing, "If we wanted to send different employees through the program and get them trained, they can do it on their own time, and they can do it quickly," and "any class that's being taken at your own pace makes sense for our students." Industry partners all appreciated how the certificate programs are aligned with their work environments and machines, providing students with a solid foundation for entering the workforce and a familiarity with the equipment they will be using on the job. Industry partners also highlighted the instructor availability to accommodate a variety of lab times, the self-paced model, the accessibility of courses for working individuals, and the ability to only take one course at a time as key strengths of the program. In addition to these strengths, industry partners suggested some potential barriers of the hybrid model for potential students including the need for internet access and the self-discipline required to complete the programs. One partner noted, "The self-paced nature of it could possibly be a double-edged sword for those who are not self-motivated. But that's not a weakness of the hybrid model per se."

"Because of the struggles of everyone to find skilled labor, I think Northwest State has done a nice job of bringing in some personnel, some staff in their custom training solutions branch where they do customize training to your specific company, it's not just generic." – Industry Partner

"This gives [employees] the flexibility to take these certificate programs, which is phenomenal for use because we work 12-hour rotating schedules. The flexibility is huge. I'm very excited to try to get more of our employees to register." - Industry Partner

"The strengths are that the skills that they need to find work immediately are basically taught when they leave. When they have their certificate at the end, employers are happy to bring them on through their work experience or hire them directly." – Industry Partner

Finally, NSCC faculty and staff shared that the hybrid delivery model has proven to be scalable and sustainable moving forward, and NSCC hopes to apply the hybrid delivery model to other NSCC program areas.

"We figured out what works and what does not work, so we know what to avoid should we want to apply this to other programs at the college. I feel it is a super sustainable, scalable model that we can replicate, even after the grant is over." – NSCC Faculty/Staff Member

RQ2. What stackable courses have been created and how do students perceive the courses?

Key Findings

- A total of 19 one-credit courses were developed for the computer-aided manufacturing accelerated certificate program and a total of 20, one-credit courses were developed for the industrial automation/robotics accelerated certificate program.
- Faculty divided two to four-credit course content into one-credit segments, identified specific competencies for each one-credit, and designed competency-based assessments to assess student progress to create a streamlined stackable course progression from start to finish for each program.
- In year 4, NSCC strategically bundled the one-credit courses into 12, three-credit courses still in the hybrid and accelerated format.
- NSCC worked closely with industry partners to incorporate industry credential competencies throughout course content to meet the direct needs of industry partners and increase student employability.

NSCC created a total of 37, one-credit courses; 19, one-credit courses for the computer-aided manufacturing accelerated certificate program and 20, one-credit courses for the industrial automation/robotics accelerated certificate program (with both programs sharing the same two courses covering safety content) (see Table 1 below).

Table 1. One-credit hybrid/accelerated course list by certificate program

Computer Aided Manufacturing	Industrial Automation/Robotics
INT 110 Safety Equipment & Procedures	INT 110 Safety Equipment & Procedures
INT 111 Hazardous Materials &First Aid	INT 111 Hazardous Materials & First Aid
INT 107 Print Reading & Sketching A	PLC 120 Industrial Electricity IA
INT 108 Print Reading & Sketching B	PLC 121 Industrial Electricity IB
INT 109 Print Reading & Sketching C	PLC 122 Industrial Electricity IC
INT 112 Principles of Machining A	PLC 123 Industrial Electricity IIA
INT 113 Principles of Machining B	PLC 124 Industrial Electricity IIB
INT 114 Principles of Machining C	PLC 125 Industrial Electricity IIC
INT 115 Solidworks A	PLC 126 PLC IA
INT 116 Solidworks B	PLC 127 PLC IB
INT 117 Solidworks C	PLC 128 PLC IC
INT 118 Solidworks D	PLC 129 PLC IIA
INT 121 Programming CNC A	PLC 130 PLC IIB
INT 122 Programming CNC B	PLC 131 PLC IIC
INT 123 Programming CNC C	PLC 132 PLC IIIA
INT 124 CAM IA	PLC 133 PLC IIIB
INT 125 CAM IB	PLC 134 PLC IIIC
INT 126 CAM IC	PLC 135 Servo/Robotics A
INT 127 CAM ID	PLC 136 Servo/Robotics B
	PLC 137 Servo/Robotics C

In grant year 3, NSCC made the strategic decision to bundle the one-credit stackable courses into three-credit courses that were still hybrid and accelerated in nature. This shift led to the creation of 12 three-credit courses offered through the two new hybrid and accelerated certificate programs.

Table 2. Bundled three-credit hybrid/accelerated course list by certificate program

Computer Aided Manufacturing	Industrial Automation/Robotics
IND 105 Industrial Safety	IND 105 Industrial Safety
IND 107 Print Reading & Sketching	IND 120 Industrial Electricity I
IND 140 Principles of Machining	IND 121 Industrial Electricity II
CAD 213 CAD III Solidworks	PLC 200 Programmable Controller I
MET 222 Programming CNC	PLC 210 Programmable Controller II
MET 223 CAM I	PLC 220 Programmable Controller III
	PLC 230 Servo/Robotic Systems

RQ2 a. What was the process for developing the stackable courses?

Faculty and staff interview participants elaborated on their process for developing the stackable courses. They first began by dividing the original two to four-credit courses by separating content into one credit-hour courses and defining clear learning outcomes for each. They determined what competency level students should have at each stage in the stackable course progression as well as what was an acceptable amount of content for the amount of time and credit for each course. Faculty and staff working to develop the hybrid stackable courses worked closely with head machining instructors from campus. Additionally, course content was updated to include what is new and relevant in the industry and bring it up to the latest global standards. After course content was created, faculty and staff developed competency-based assessments for each one-credit stackable course. Industry partners also contributed to the development of the two hybrid certificate programs. Industry partner interview participants shared that they contributed through virtual and in-person meetings with NSCC to provide input to integrate into the development of the courses. Industry partners also gave in-person tours of their workplace environments to NSCC faculty and staff to help increase alignment between course content, machinery, and standards with local industry partners who also serve as potential employers for students completing these certificate programs.

RQ2 b. What are the strengths and weaknesses of the courses?

> *"We treat class like a job to reinforce workplace expectations in prep for the real workplace."*
>
> - *NSCC Faculty*

Faculty and staff highlighted how the hybrid certificate programs will prepare students for employment and seek to address a growing need in the industry for more workers. Incorporating industry-recognized credential competencies within courses and meeting closely with employers to ensure certificate programs meet the direct needs of the industry will address both student and industry employment needs. Industry partners echoed these benefits noting that course content is tailored to the needs of employers such that it is preparing students for real world application in the local industry. NSCC provides front-end advising to ensure that students are pursuing the right program for them and taking the right courses and credits to reach certificate completion. The hybrid courses also provide opportunities to workers in the industry to level-up and advance within their workplace or field.

"I think that these programs are applicable to the things that we see specifically in our business. Even with a lot of the local industry that I'm familiar with I know that they use a lot of the same controls we use and being able to have that common knowledge between industry to industry and have those same focuses on that specific platform for automation as well as robotics is just huge, especially in our area." – Industry Partner

Community partner interview participants also highlighted the industry relevant curriculum as a strength of the programs to provide students with the skills that they need to find employment following program completion. Community partners also mentioned the flexibility of the hybrid model as a great advantage for potential students.

"The strengths are that the skills that they need to find work immediately are taught by the time they are done. When they have their certificate at the end, employers are happy to bring them on through their work experience or hire them directly. It is something that is hard to find, and I think Northwest State has a great reputation for completing programs that are useful to employers, that really upskill students and potential employees. I think that Northwest State has a great training program and students that go through any of their courses honestly are ones that are looked at favorably by employers." – Community Partner

RQ2 c. How were the credentials identified?

Through interviews, faculty and staff shared that certificate credentials were identified by faculty with current or recent field experience and were vetted by industry employers. More specifically, NSCC had meetings in-person and virtually to help guide what should be included in the course content and certificate programs as a whole. Competencies for the National Institute for Metal Working credentials (NIMS) were incorporated through direct consultation with NIMS. The current market Computer Aided Software (CAD) software was also implemented into the programs to increase student familiarity with current industry software.

Employer Engagement

RQ3. How has NSCC increased the breadth and depth of employer engagement?

Key Findings

- NSCC identified eight key industry partners to include on the steering committee to provide continuous employer feedback through program development and align with industry standards and needs. Industry partners participated in steering committee meetings and provided NSCC faculty/staff with in-person site visit tours of their workplace facilities.
- Industry partners felt their input was well-received by NSCC and are optimistic that the hybrid programs will prepare students for the advanced manufacturing environment. All Industry partners agreed that communication from NSCC has been clear, timely, and informative, and their experience partnering with NSCC has been positive overall.
- Industry partners encourage NSCC to regularly update their point of contact for effective student recruitment and suggested NSCC personnel come to their facilities to provide an in-person overview of the programs to management-level staff.
- NSCC engaged in outreach efforts with community partners, including five Jobs and Family Services offices, two Veterans Affairs offices, and the Region Seven and Eight Local Workforce Development Boards.

RQ3 a. What role have industry partners played in selecting industry competencies?

NSCC created a steering committee with eight industry partners to help inform the development of the hybrid programs. The workforce development division at NSCC, also known as Custom Training Solutions (CTS), helped with identifying which specific industry employers should be included on the steering committee. NSCC has engaged the steering committee in continuous employer feedback through the development process. NSCC has also engaged with the Advanced Manufacturing Consortium (AMC) of over 20 employers to provide input and increase alignment with the industry.

Industry partner interview participants listed the ways in which they have contributed to the development of the hybrid programs during steering committee meetings and in-person site-visit tours of their workplace environments. Industry partners provided input on their greatest

needs, the desired skills and knowledge of workers, current industry standards and credentials, the exact equipment, machinery, and software they use, how to align NSCC programs with employer training programs, and the best schedules and structure to accommodate their employees.

RQ3 b. How do the new credentials align with industry competencies?

Industry partner interview participants agreed that the program will align with industry competencies. One partner shared, "They captured our ideas with the curriculum, some of the courses that we know would be helpful, and how they plan on slicing those up into smaller parts. That just all seems on track."

RQ3 c. What is the value to employers of having the new credentials?

According to faculty and staff interview participants, these hybrid programs will benefit both students and industry partners, by funneling more students into registered apprenticeship programs and more skilled workers into the advanced manufacturing industry workforce. There is currently a great need for skilled labor and a nationwide shortage of qualified workers in the field, and employers are struggling to fill open positions. NSCC is working to address this gap by providing more accessible programming through the hybrid/ accelerated model. NSCC also sought to directly address areas of need in the workforce by involving employers in identifying what should be included in the programs to increase the relevance and benefit to industry partner needs. Industry partners shared through interviews their gratitude to NSCC for creating opportunities to grow the skilled trades workforce and provide their employees with opportunities to gain the necessary education in a way that accommodates their schedules and allows them the ability to advance in their careers.

"As soon as there's any kind of training program that is created to quickly bring somebody to a point where they can contribute right away, that gets me involved because it's been a very difficult road for 10 plus years trying to find people to enter into the skilled trades market." – Industry Partner

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"Yes. I think our maintenance guys would benefit a lot from it. Especially on the automation side, we're getting more and more into automation. – Industry Partner

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"It gives them the ability to work fulltime, provide for themselves, and take on only as much as they can handle with one credit hour here and one credit hour there." – Industry Partner

RQ3 d. Do industry partners believe students are well qualified to serve in advanced manufacturing roles?

In general, industry partner interview participants were very optimistic about the two hybrid programs. Industry partners agreed that the programs will prepare students for the manufacturing environment, awareness of the dangers and hazards, and instill safety practices. The programs will enhance student readiness for certain jobs by designing the programs around relevant software, robots, and machinery. Industry partners noted that the programs provide an opportunity for internal hires to upskill and work their way up to more advanced positions. They also plan to recommend the program for apprenticeship program prospects. Industry partners shared that they are hopeful the hybrid and stackable model will allow for people to participate who otherwise would not be able to and make individuals who complete the program more marketable and hirable right out of school.

> *"I already do think it puts them [students] in a position where they have a leg up on other people competing for the same jobs."*
>
> - *Industry Partner*

RQ3 e. What are the strengths and weaknesses of employer engagement?

In terms of NSCC engagement, industry partners only reported positive experiences. NSCC maintained employer engagement through consecutive steering committee meetings, program progress updates via email, and in-person worksite tours. All industry partner employers agreed that worksite tours with NSCC faculty and staff went well and were beneficial to both NSCC and employers. Industry partners noted that NSCC communication has been clear, timely, and informative. Industry partners have shared that "NSCC has been very receptive to the input we provide," "The employers have been involved in all the right locations," and "I felt very well informed from the very get-go of the program." Input from industry partners conveys that they have felt included and heard through the development process. One industry partner stated, "They know what machinery we have and what we would like to see when students get out." A few employers had some recommendations for how NSCC might

> *"NSCC has been an excellent partner to us."*
>
> - *Industry Partner*

engage with them more effectively. One employer suggested that NSCC occasionally confirm with each employer who would be the best point of contact for relaying student recruitment related information to interested employees at their companies. Another employer suggested that NSCC come to their facilities to provide an overview of the programs to their management team to allow managers to recommend the programs to employees who they think may be a good fit.

"I thought the college did a fantastic job of making sure that they followed through trying to get the program kicked off, and they've stayed in touch." – Industry Partner

"I will say that has been one very positive thing with Northwest State is they've been very good at reaching out to us, getting insight, getting feedback from us on the management side." – Industry Partner

RQ3 f. What are the strengths and weaknesses of outreach to community partners?

NSCC conducted outreach to five Jobs & Family Services offices in the region, engaged two county Veterans Affairs organizations, and met with the Area Seven and Eight Local Workforce Development Boards to build awareness of the hybrid/accelerated program offerings.

"Maybe giving [workforce development entities] a little more skin in the game and asking, "How can this really work for you?" Not just some sort of vague, "Yes, we can promote this and put it on our job board." How can this be a real in-depth partnership?"

- NSCC Faculty/Staff

Communication efforts between community partners and NSCC involved webinars, emails highlighting program progress and updates, flyer information for community partners to distribute, and in-person visits. NSCC faculty and staff interviewees expressed that they were hoping for more integration and collaboration with the local workforce development system beyond posting flyers on their bulletin boards. Interest and relevance of programs to community partners varied with some seeing potential in these programs benefiting their clientele, while others expressed that their client-base was typically not ready for higher education and was more interested in basic needs supports and resources. One NSCC interviewee suggested that initial work to meet the needs of workforce development offices may be needed in the future to create greater buy-in and partnership.

Alignment to Workforce Development System

RQ4. How has NSCC increased program and policy alignment across systems?

Key Findings

- NSCC fostered relationships with eight industry partners and five community partners to create a pipeline for recruiting potential students from both within the industry and beyond.
- In grant years 3 and 4, NSCC increased student recruitment efforts including conducting outreach to over 50 industry employers and high schools. NSCC has also increased internal recruitment efforts of NSCC students through advising.
- NSCC hired an Adult Learning Coordinator to target adult learners in the 25-plus population and started marketing internally among current NSCC students.
- Industry partners are interested in sending current employees through the hybrid programs and are willing to participate in creative and strategic recruitment initiatives, such as in-person open-house events.
- Some community partners see potential for the programs to interest their clientele and plan to engage in recruitment activities.

RQ4 a. How has NSCC conducted outreach to new students?

In grant years 1 and 2, NSCC laid the groundwork for recruitment through the development of partnerships with both industry and community partners. Through ongoing collaboration with industry partners in the development of the programs, NSCC hoped to encourage employers to send their employees through the program as a means of growing within the ranks of the industry. NSCC also engaged five Jobs and Family Services offices across the six-county region to recruit potential students into the program who may or may not already be working in the industry. NSCC also hired a new position titled “Adult Learning Coordinator” to increase recruitment efforts specifically among adult learners. This coordinator has been instrumental in the development of alternatively delivered courses and programs in the Business and Public Services Division of NSCC. NSCC has developed a territory management approach with a recruiter for each area to go out into the community to engage employers, high schools, and the 25-plus population. Additionally, NSCC marketed the hybrid/accelerated programs internally to current NSCC students.

In grant years 3 and 4, NSCC notably increased their student recruitment efforts. NSCC faculty and staff conducted virtual and in-person outreach to over 50 industry employers and high schools to share information about the programs to a variety of potential student groups. In-person outreach included one-on-one meetings, organized worksite tours, presenting to management and potential students, dropping off marketing materials, and participating in job fairs. They also conducted outreach through social media, podcasts, radio, and targeted ads through online marketing. The NSCC team also worked to create flyers with more detailed information about the hybrid/accelerated model and how it works to clearly communicate and build understanding and awareness of these programs among current NSCC students and prospective students.

"Another thing that we have really ramped up is we have done a lot more localized, individual employer visits, really going to their sites, understanding their needs, and saying, 'We think we've got a program that could assist you with whatever skills deficit you are seeing.'" – NSCC Faculty/Staff member

Industry partner interview participants continually reported that they plan to send their employees to NSCC for those looking to transition from general labor to more advanced positions. Some industry partners indicated that they had NSCC personnel come and present about the programs to their management teams. One employer noted that it is important for NSCC to ensure they are providing information to the correct person at each employer to disperse program information to employees such as individuals from HR. Employees recommended NSCC share more information in marketing materials about the kinds of job opportunities and potential income students can expect to receive after completion of these programs. They also suggested that NSCC come to the facilities to speak directly with employees, answer their questions, and address their concerns in-person.

"This [program] is something that we hope to be able to send some of our folks to."

- *Industry Partner*

"They have actually done an overview of the certificate program for our management team. That way, if our managers know of somebody who might be interested, then they can actually go out there and try to share that information as well." – Industry Partner

"There is still an opportunity somehow to get that marketing out to the employees. It can't just be me trying to sell it to our employees." – Industry Partner

"I think they definitely need to have some unsolicited conversations and be on-site in the real world. Maybe sit at some of these large manufacturers, maybe you go into the top 10 in Defiance County and just have an open house basically on-site and answer questions for an hour." – Industry Partner

RQ4 b. How has NSCC collaborated with the workforce development system?

Outreach and recruitment activities among community partners varied, with three participants indicating that they either have assisted with student recruitment and outreach or will be doing so in the future. One community partner indicated that they had provided customers with program flyers to increase program enrollment, while another community partner reported that they had not done any specific recruitment or activities related to the two hybrid programs.

"We will be assisting with student recruitment. We will work with each of the local schools in our district to basically identify those students who lack credits to graduate or are interested in updating their skills. This program will allow them to graduate with skills that would allow them to find employment right away, so that's what our purpose is with the program." – Community Partner

"Currently, I have a handout posted in our resource room. It's available for customers to look at, and we can make copies of that information if that best suits them. The only promotion that we're doing is just through the flyers that we received." – Community Partner

RQ5. To what extent was the program implemented as intended?

Key Findings

- Aligning one-credit courses with the registration system and LMS proved to be more labor intensive than expected and ultimately unsustainable, leading the college to pivot to bundled three-credit courses instead.
- Recruitment of students was slow to start, and it was more challenging than anticipated to create a recruitment funnel through employer partners and community partners.
- Gaining support from leadership and intentionally aligning across offices to ensure the success of the programs led to greater success with student enrollment halfway through the grant timeline.
- Changes to grant activities included shifting from one-credit to three-credit course offerings and increasing access to the hybrid/flexible courses for all NSCC students.

RQ5 a. What barriers and facilitators have come to pass as the program has taken shape?

NSCC faculty and staff have experienced a few challenges to development and implementation, including staff turnover, student recruitment, and technical difficulties with internal systems (i.e., registration system, LMS). While NSCC put a great deal of effort into laying the groundwork for creating partnerships and feedback loops with industry partners and community partners, recruitment through these channels did not happen to the extent that was anticipated. While partners expressed interest in the programs and agreed the programs could benefit their employees/clientele, this did not lead to immediate results in student enrollment. One NSCC interviewee explained, “Now the employers are supporting via the promotions and the referrals of their employees to the program. We have had this successfully happen, just not at the scale we were hoping.” In response to the delay in student recruitment, NSCC notably increased recruitment efforts in years 3 and 4, conducting outreach to over 50 companies. NSCC also placed more focus on recruitment of high school students and current NSCC students who may benefit from the hybrid/flexible courses. Shifting from one-credit courses to three-credit courses while still using the hybrid/flexible model made these courses accessible to NSCC students not enrolled in the certificate program as well as College Credit Plus (CCP)-eligible high school students.

Another challenge that NSCC faced was the misalignment of the one-credit course with the LMS and registration system. While NSCC initially was able to implement workarounds within these systems, it was ultimately unsustainable and prevented students from registering for these courses. The one-credit courses were not able to be listed on the normal course schedule as options and therefore limited their exposure and prevent students from being able to register without the aid of NSCC staff. The one-credit courses also posed complex challenges within the LMS (Sakai), making the courses more difficult for faculty to manage. The strategic decision to bundle the one-credit hybrid courses into three-credit courses helped to solve both the registration and LMS challenges, and increased accessibility of these courses to more potential students and financial aid options (i.e., College Credit Plus).

According to NSCC faculty and staff, another key facilitator that helped the program increase enrollment was the high level of institutional leadership support received. Approximately half-way through the grant, NSCC faculty and staff came together to discuss how to best ensure the success of the new hybrid/accelerated certificate programs. Ensuring relevancy and buy-in from both internal and external partners through individualized discussion and collaboration was key to increasing program quality, community awareness, and student enrollment.

"To sum it up together, despite a lot of the turnover of key staff and then the pivots we had to make, I do think the project has made a lot of strides and has set a good foundation for us to be a learner-ready college instead of expecting learners to fit the mold that we preset for them." – NSCC Faculty/Staff Member

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RQ5 b. How did program activities change over time?

The primary way in which program activities changed over time involved the shift from one-credit courses to three-credit courses. In year 3, NSCC made the strategic decision to bundle the one-credit stackable courses into three-credit courses that were still hybrid and accelerated in nature. This strategic change allowed for the following:

- A more streamlined back-end experience for faculty in the LMS (i.e., Sakai)
- More full-time instructors to teach some of the courses
- Made courses visible on the registration schedule and allowed students to register themselves without the aid of NSCC staff
- Made courses accessible to CCP students

"We realized due to extreme challenges with the registration system, we needed to bundle them in a three credit-hour format to get people registered and for it to work within the system that we just have for financial aid purposes and just the general way that the college operates." – NSCC Faculty/Staff Member

As a result of the credit change, NSCC created a petition process for students to receive some credit and an incomplete grade should they not be able to complete the full three-credit course and want to pick it back up in the future. This shift also led NSCC to revert back from a 6-week format to an 8-week format to align with all other courses and the registration schedule.

"We were doing six-week options to complete, and we had difficulty having the learners understand how that worked. It's also very hard to keep track of six-week options, the start dates, the end dates for each course, just because the learners are used to an eight-week format in terms of our industrial programs." – NSCC Faculty/Staff Member

Additionally, NSCC decided to make the hybrid/accelerated courses in these certificate programs open to all NSCC students, thereby increasing the number of students eligible to enroll in these courses. This strategic decision also sought to potentially increase student awareness of the hybrid/accelerated certificate programs (also referred to as "flex-track") and funnel more students into them as a result.

"The advising center has more information for prospective students. There's a better explanation of how classes are run. We have just recently created an even more detailed description of how the flex model works for students, because there was some confusion before." – NSCC Faculty/Staff Member

"I think for this fall semester in particular, I've seen our flex classes have more enrollment than the spring, because I think we're just making students more aware, and we have the knowledge up front as to explaining what the classes are like." – NSCC Faculty/Staff Member

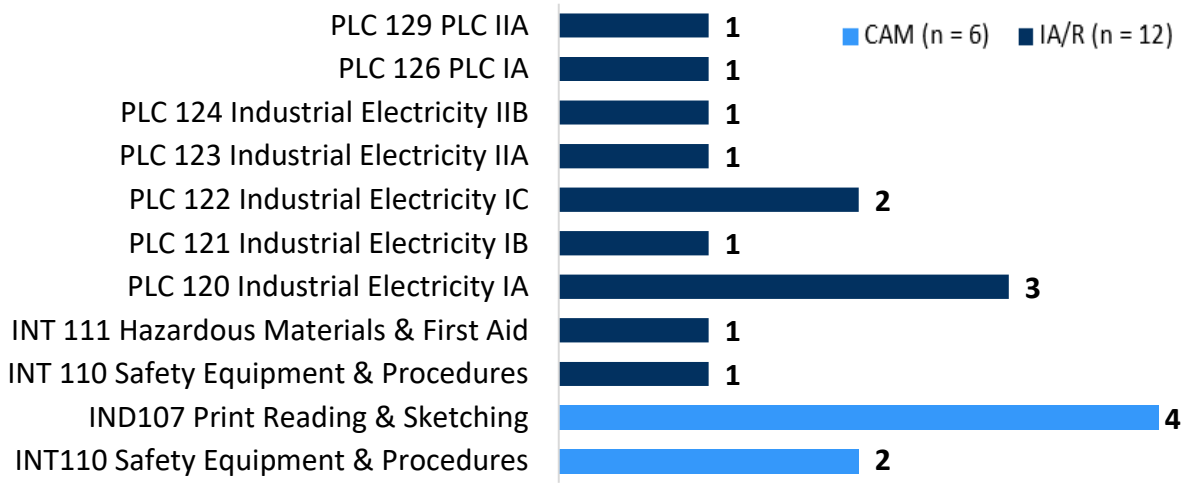
RQ6: What role did the programs play on student outcomes?

Key Findings

- A total of 52 students enrolled in hybrid/accelerated courses over the course of the grant and the student survey was completed a total of eighteen (n = 18) times across both programs.
- Student survey respondents agreed or strongly agreed that they were satisfied with the courses they completed.
- All survey respondents (100%, n = 18) indicated that they would recommend the course they completed to other students, highlighting the flexible scheduling, easy to follow course content, valuable knowledge gained, and helpful instructors.
- As a result of course completion, students felt more prepared to work in the CAM or IA/R industry and felt the courses will help them reach their career goals at a faster pace.

All students (n = 52) enrolled in any of the hybrid/accelerated courses were encouraged to complete the student survey at the end of each course completion. A total of six (n = 6) survey responses were received for the computer aided manufacturing (CAM) survey, of which two responses (n = 2) indicated they were enrolled in the CAM certificate program. A total of twelve (n = 12) survey responses were received for the industrial automation/robotics (IA/R) survey, of which eleven responses (n = 11) indicated they were enrolled in the IA/R certificate program (see Figure 1).

Figure 1. Number of hybrid/accelerated courses completed by students survey respondents

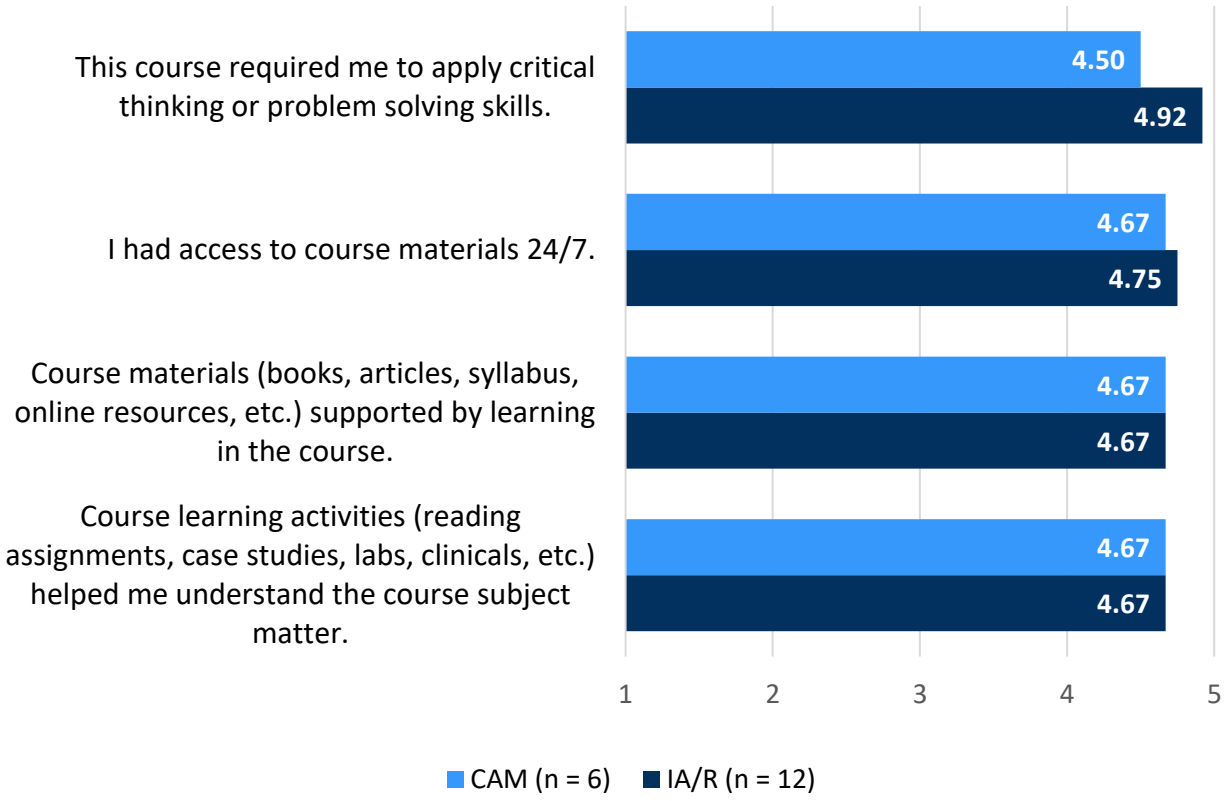


On average, students completed hybrid/accelerated courses in 3.33 weeks, with a completion range of 1 to 6 weeks. CAM courses had a mean completion rate of 5.17 weeks and IA/R courses had a mean completion rate of 2.42 weeks. Out of the eighteen survey responses across both surveys, four survey responses (n = 4) indicated that they did not complete the courses within the timeframe they expected, noting work, family obligations, and a physical accident as reasons.

RQ6 a. What implementation efforts were most effective at playing a role in student outcomes?

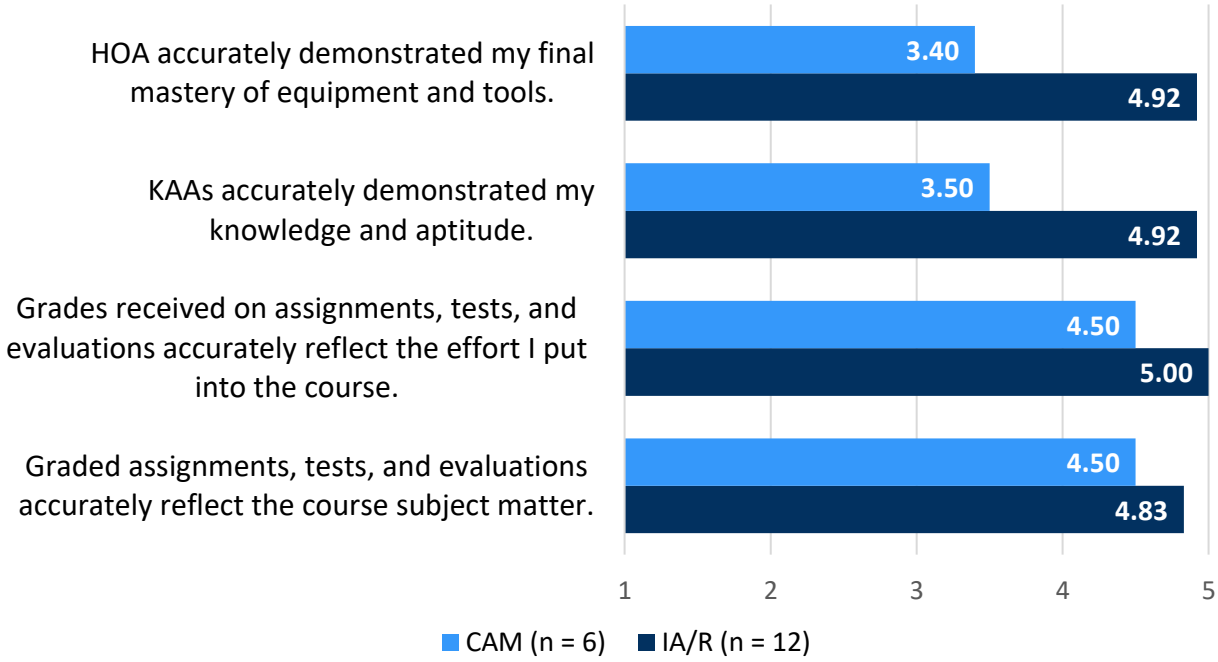
The survey asked student respondents to rate their level of agreement on a 5-point scale. Student respondents agreed or strongly agreed that the courses required critical thinking and problem-solving skills, materials were accessible 24/7, course materials supported learning, and course learning activities helped students to understand the course subject matter (see Figure 2).

Figure 2. Average rating of survey items related to course content on a 5-point scale (1 = Strongly Disagree, 5 = Strongly Agree)



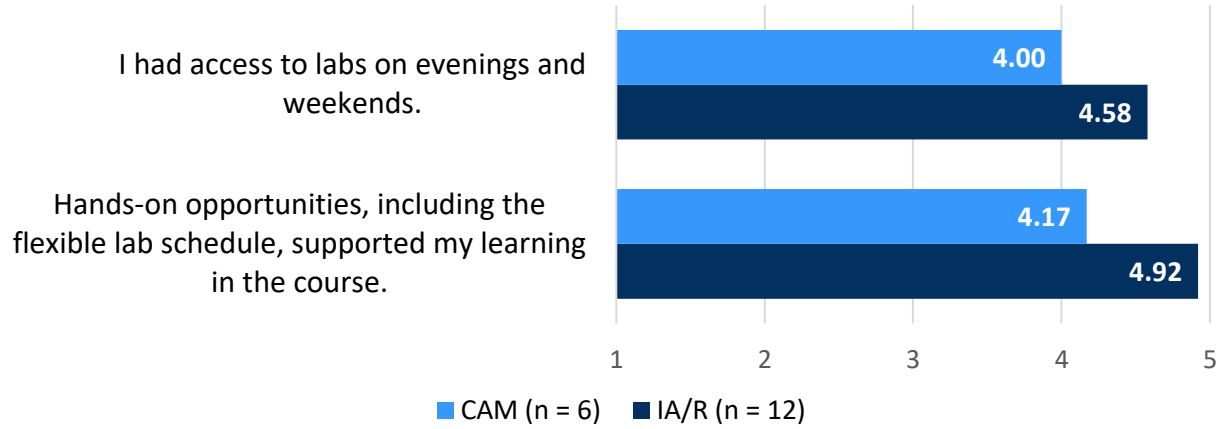
Regarding grades and assessments, student respondents for CAM courses were neutral or agreed that the KAAs accurately demonstrated their knowledge and aptitude, and the Hands On Assessments (HOAs) accurately demonstrated their mastery of equipment and tools. Student responses for the IA/R courses strongly agreed the KAAs accurately demonstrated their knowledge and aptitude, and the HOA accurately demonstrated their mastery of equipment and tools. Student respondents in both program courses agreed or strongly agreed that grades accurately reflected the effort put into the courses and assignments, tests, and evaluations accurately reflected the course subject matter (see Figure 3).

Figure 3. Average rating of survey items related to grades and assessments on a 5-point scale (1 = Strongly Disagree, 5 = Strongly Agree)



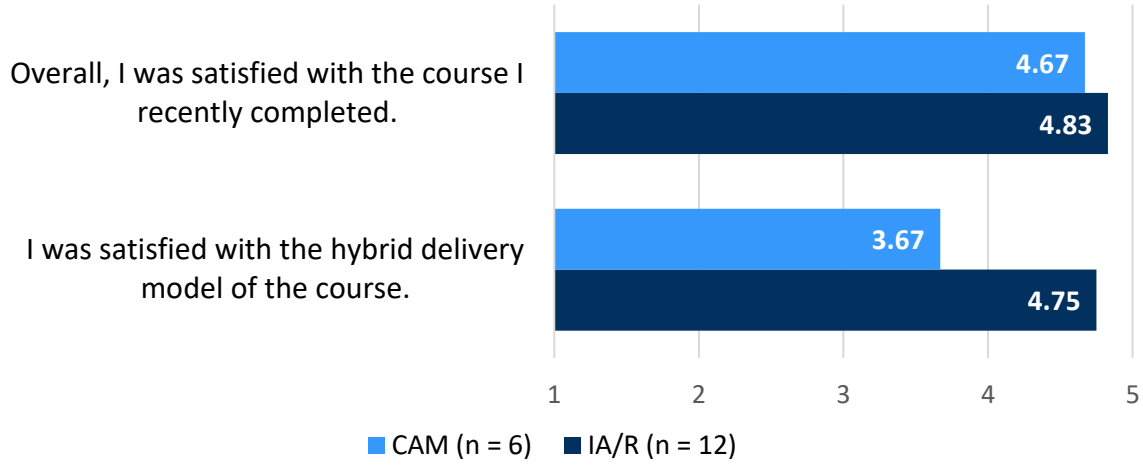
Student respondents for CAM courses agreed and student respondents for IA/R courses strongly agreed that they had access to labs in the evenings and weekends and hands-on opportunities, including the flexible lab schedule, supported their learning in the courses (see Figure 4).

Figure 4. Average rating of survey items related to lab access on a 5-point scale (1 = Strongly Disagree, 5 = Strongly Agree)



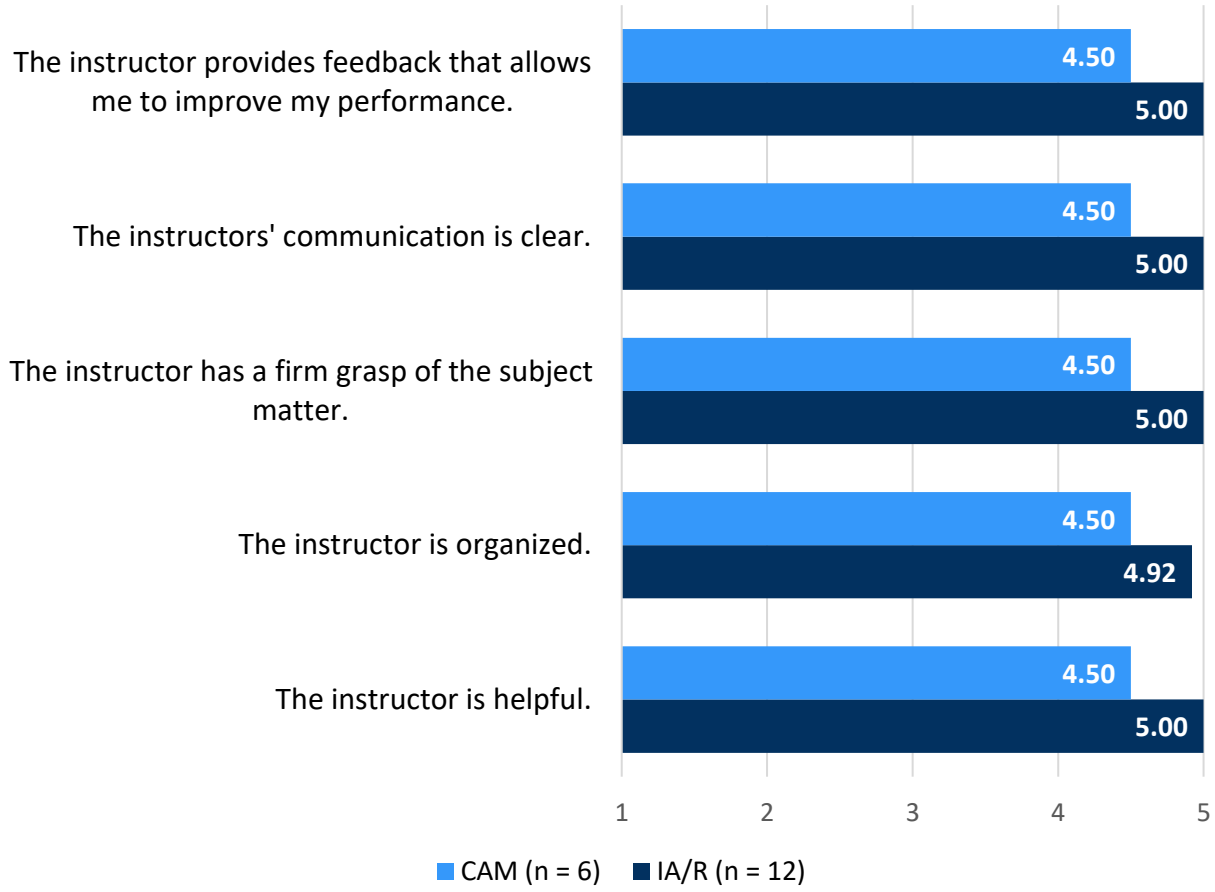
Across both programs, student respondents agreed or strongly agreed that they were satisfied with the courses they completed. Student respondents in CAM courses were neutral or agreed that they were satisfied with the hybrid delivery model. Student respondents in IA/R courses agreed or strongly agreed that they were satisfied with the hybrid delivery model (see Figure 5).

Figure 5. Average rating of survey items related to course satisfaction on a 5-point scale (1 = Strongly Disagree, 5 = Strongly Agree)



Across both programs, student respondents rated various aspects of instructor effectiveness as high on a 5-point scale. Student respondents in CAM courses agreed or strongly agreed and student respondents in IA/R courses strongly agreed that the instructor provided helpful feedback and clear communication, the instructor had a firm grasp of the subject matter, and the instructor was organized and helpful (see Figure 6).

Figure 6. Average rating of survey items related to instructor effectiveness on a 5-point scale (1 = Strongly Disagree, 5 = Strongly Agree)



All survey respondents (100%, n = 18) indicated that they would recommend this course to other students. When asked why they would recommend the course, students (n = 10) highlighted the flexible scheduling, easy to follow course content, and valuable knowledge gained. Students used the terms informational, challenging, relevant, flexible, organized, detailed, and great to describe the courses. Students reported that the instructors were responsive, helpful, and clearly communicated expectations for assignments and feedback. Students also appreciated how they could complete coursework at their own pace and multiple noted how it worked well for their non-traditional schedule. Two students indicated that the hybrid/accessible courses worked well and did not interfere with the military commitment.

> *"I would recommend this course because it's flexible scheduling and format made it easier to fit into my work schedule and complete the assignment when I had time." – Student Survey Respondent*

"The course was easy to follow and the learning material directly correlated to the assignments." – Student Survey Respondent
"I found myself genuinely interested and the instructor was patient, thorough, and relatable." – Student Survey Respondent
"Very detailed explanation of the material by the instructor and very flexible to complete on your own time." – Student Survey Respondent
"It gives valuable knowledge to anyone looking to go into the engineering field and is a great introduction to college level online classes." – Student Survey Respondent
"It is a challenging and relevant course that I feel is well organized with many resources." – Student Survey Respondent

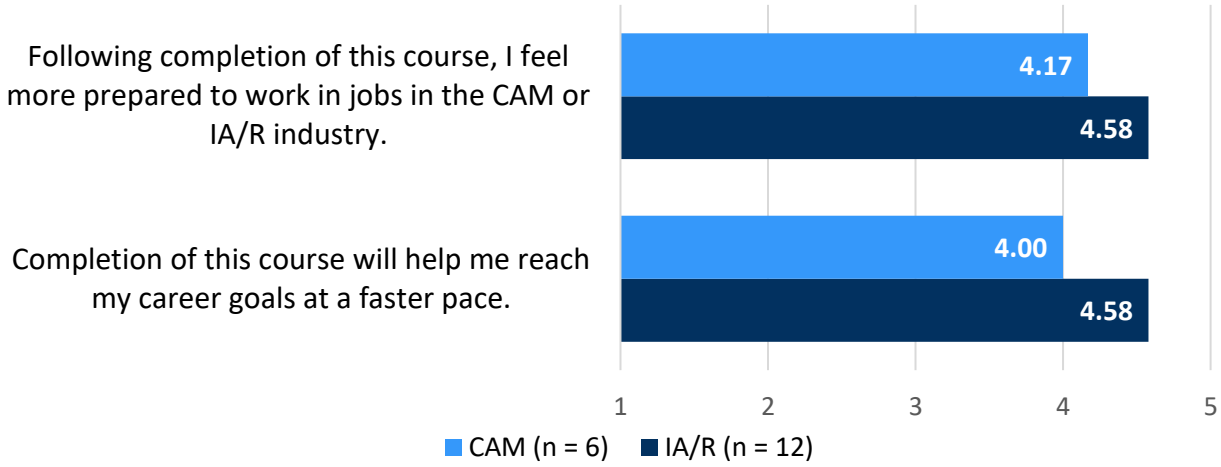
RQ6 b. In what ways did the credentials help students attain employment?

A total of 15 out of 18 survey respondents indicated that they were currently employed, with zero respondents (n = 0, 0%) indicating employment in the CAM industry and seven responses (n = 7, 58.3%) indicating employment in the industrial automation/robotics industry. None of the student survey respondents indicated that they received a job in the CAM or IA/R industries since completing a course, however students indicated that the knowledge gained from course completion would help them obtain employment in the future (see more below under RQ6 c.).

RQ6 c. In what ways are students prepared to attain employment in computer automated manufacturing or industrial automation/robotics?

As a result of completing a CAM course, CAM students agreed that they felt more prepared to work in the CAM industry. Similarly, CAM students agreed that course completion will help them reach their career goals at a faster pace. As a result of completing an IA/R course, IA/R students agreed or strongly agreed that they felt more prepared to work in the IA/R industry. Similarly, IA/R students agreed or strongly agreed that course completion will help them reach their career goals at a faster pace (see Figure 7).

Figure 7. Average rating of survey items related to career benefits on a 5-point scale (1 = Strongly Disagree, 5 = Strongly Agree)



When asked how participation in the courses will help them obtain employment, students (n = 10) shared that the courses will help them to advance in their careers by providing them with practical knowledge, serve as a step toward receiving their Heating, Ventilation, and Air Conditioning (HVAC) certification, obtain the skills needed for their desired job, increase their understanding of what is involved in the field, bring them closer to completing their degree, and explore career opportunities.

"It has provided me with practical knowledge to accompany my job duties." – Student Survey Respondent
"I believe that the course will help me be more proficient with the skills needed for the job." – Student Survey Respondent
"It gives me an idea of what's involved in the field that I want to pursue and brings me closer to getting a degree." – Student Survey Respondent

Lessons Learned and Recommendations

1. While great effort was put into building out technological systems to house the one-credit course content and updating financial aid and registrar policies and procedures to accommodate the one-credit, 6-week course schedule, the complex nature of trying to fit a new process into existing systems was ultimately unsustainable and negatively impacted student enrollment. NSCC learned from this experience and was able to adjust their strategy from the one-credit course model to a three-credit course model while keeping the hybrid/accessible aspects of the courses to provide students with increased flexibility. This change led to greater eligibility among NSCC students to enroll in these courses and made the process of enrollment more seamless.

2. The new hybrid/flexible model will provide greater accessibility and flexibility for all learners to accelerate their education and job potential, however, it takes time to see results of these programs in supporting economic mobility and bringing more skilled workers into these high-need industries. While NSCC had high hopes for recruiting around 128 students over the life of this grant initiative by funneling students into the programs through forging partnerships with employer partners and community partners, NSCC did not see student enrollment as quickly or to the extent they had expected. It took NSCC time to learn how to clearly and effectively communicate how these new hybrid/accelerated programs were different from traditional and hybrid-only programs and how they can benefit potential students.

3. Faculty identified specific competencies for each one-credit of course content, and designed competency-based assessments to assess student progress to create a streamlined stackable course progression from start to finish for each program. Feedback from the student survey indicated that students' experience with the courses aligned with the intention of creating streamlined course content. Students indicated that assignments were aligned with course learning materials and course content was clear, informative, and easy to follow. Students also indicated that the course structure and lab requirement, in their experience, were as flexible in practice as NSCC intended. As more students complete these hybrid/accelerated courses and word spreads of the flexible nature of these courses and programs, NSCC anticipates greater enrollment in the hybrid/accelerated certificate programs. As demand for these programs grows, NSCC will need to ensure that they have the capacity to sustain the increased level of flexibility it has been able to provide through these courses thus far.

Conclusion

NSCC completed the development of the two, short-term certificate programs in computer-aided manufacturing and industrial automation/robotics they set out to create through the SCC training grant. Findings from interviews with NSCC faculty and staff, industry partners, and community partners indicate that the hybrid/accelerated programs are well designed to address the workforce deficit and skills gap in Northwest Ohio's advanced manufacturing industry. NSCC met its target for two out of three grant outcomes having successfully completed the development of two new accelerated programs with a total of 37 one-credit courses and creating an advanced manufacturing steering committee with eight industry employer partners to inform program development. NSCC made progress toward its third grant outcome of engaging workforce development, industry partners, and community partners to recruit students into the programs, enrolling 52 students in hybrid/accelerated courses over the timeline of the grant. NSCC made strategic changes to intended grant activities to address the limitations contributing to low student enrollment within their control. Halfway through the grant timeline, NSCC received great support from leadership and increased the breadth and depth of its student recruitment strategies. Most notable, NSCC shifted from the one-credit model to a three-credit model while maintaining the hybrid/accelerated features of the programs and opened up the hybrid/accelerated courses to be available to all NSCC students (including CCP students).

PRE conducted annual phone interviews with faculty and staff, industry partners, and community partners involved in the NSCC SCC program initiative. Findings from this evaluation show that NSCC used grant funding to invest in hiring new faculty, building out technological systems to house hybrid course content, develop an open-lab model schedule, purchase training equipment, and make strategic pivots to align the programs with the LMS and registration systems to benefit student enrollment and course experience. NSCC training equipment aligned with current industry standards and increased their capacity to provide students with hands-on experience. NSCC worked closely with industry partners to embed industry credentials and competencies throughout course content to meet the direct needs of industry partners and increase student employability. NSCC faculty and staff and industry partners agree that the hybrid/accelerated model, self-paced courses, and flexible open-lab schedule have potential to bring more students (including adult-learners, working individuals, high school students, etc.) into the program and address the shortage in skilled labor within the advanced manufacturing industry workforce.

Industry partners involved in the advanced manufacturing steering committee are optimistic that the two hybrid certificate programs will effectively prepare students to successfully enter the advanced manufacturing industry, increasing their employability and economic mobility. Student survey findings indicate that upon course completion, students are feeling more prepared to work in the advanced manufacturing industry. Overall, student survey respondents agreed or strongly agreed that they were satisfied with the courses they completed, echoing that the course met their expectations, provided them with the ability to complete the course content at their own pace around their non-traditional schedules, and that course completion will help them reach their career goals at a faster pace. All students indicated that they would recommend the course they completed to other students, highlighting the flexible scheduling, easy to follow course content, valuable knowledge gained, and helpful instructors.

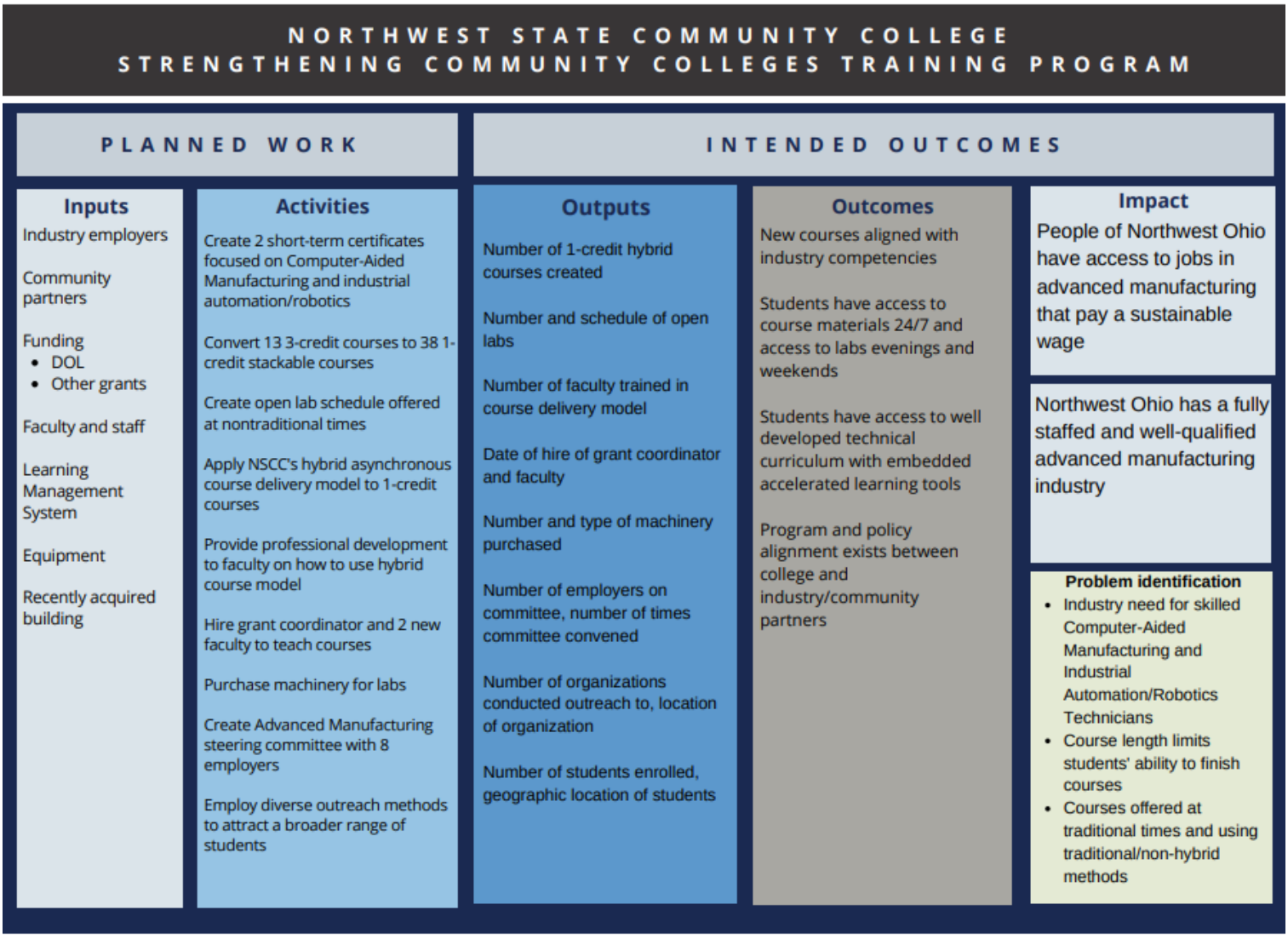
Findings from this evaluation show that NSCC's efforts to create two certificate programs that were hybrid and accelerated are meeting the needs of students by providing a more accessible and flexible educational option to advance in their careers within the advanced manufacturing industry. As awareness grows among industry partners, community partners, high schools, and within the NSCC student community, interest in the hybrid/accelerated courses is likely to grow. Through trial and error, NSCC faculty and staff feel they have a better understanding of how to implement the hybrid/accelerated model in a sustainable way that aligns with institutional systems, and they see potential for the hybrid/accelerated model to be applied across other programs at NSCC. As they progress into the future, NSCC intends to continue to gather information regarding employment outcomes of students who complete these hybrid/accelerated courses and hopes to see an impact on the local workforce deficit.

Limitations

NSCC faced challenges with student recruitment during the first half of the grant timeframe and as such experienced lower levels of student enrollment. As a result, student survey data for this evaluation was limited. Delayed student enrollment and limited survey responses made it difficult to answer specific research questions about the impact of the programs on students' ability to attain employment and the effectiveness of courses at adequately preparing students for jobs within the computer aided manufacturing and industrial automation/robotics industries. While initial findings show promise, future evaluation efforts may be needed to better understand the impact of these programs on student employability, student worksite preparedness, and the industry workforce deficit at large.

Appendices

Appendix A: NSCC SCC Program Logic Model



Appendix B: Interview Guides

Faculty/Staff Interview Questions

1. Please start by sharing your role with the NSCC SCC project.
    - When did your involvement begin?
    - Are you involved with computer-aided manufacturing, industrial automation/robotics, or both?

2. First, I am going to ask you questions about the hybrid delivery model of program courses. What types of infrastructure has your college adopted through the grant to facilitate hybrid delivery?
    - Have you received training on the hybrid delivery model?
        i. What were the strengths and areas for improvement of the training?
    - Did NSCC hire new faculty/staff that are supporting the delivery of hybrid courses?
    - What are the strengths of the hybrid delivery model?
        i. How is the machinery purchased supporting student learning?
    - What are the areas for improvement of the hybrid delivery model?

3. Have you been involved in developing stackable courses for the program(s)?
    - What was the process for developing the stackable courses?
        i. How were credentials identified?
    - What are the strengths of stackable courses?
    - How can stackable courses be improved?
    - How are stackable credentials preparing students for their careers?

4. In what other ways is NSCC preparing students for employment in computer-aided manufacturing and/or industrial automation/robotics?

5. How is NSCC recruiting students to participate in the program?
    - What are the strengths and areas for improvement regarding this method?

6. How is the NSCC collaborating with the workforce development program? (i.e., Providing career counseling/job search support to program participants, Connecting program students to work-based learning opportunities, Contributing tuition for students to participate in the program, Other areas).
    - How is this supporting students? What about the local industry?
    - What are the strengths and areas for improvement of this collaboration?

7. Overall, what are the strengths of the NSCC SCC programs at this time?
    - What are the barriers or challenges of the programs?

8. Do you have any other comments about the NSCC SCC project?

Industry Partner Interview Questions

1. Please start by sharing how you have been involved with the NSCC SCC project.
    - When did your involvement begin?
    - Are you involved with computer-aided manufacturing, industrial automation/robotics, or both?

2. What activities have you been focused on since you partnered with NSCC? Please discuss progress in these areas in which you have been involved.
    - Selecting industry competencies
    - Assisting with student recruitment
    - Interviewing or hiring a program participant
    - Providing work-based learning opportunities
    - Contributing tuition for employees to participate in the program
    - Designing curriculum
    - Other areas

3. *Partners who indicated they were involved with selecting industry competencies will be asked:* What was the process for selecting industry competencies?
    - How do the new credentials align with industry competencies?
    - How are new credentials enhancing student career readiness?

4. What other methods is NSCC using to prepare students for employment in computer-aided manufacturing and/or industrial automation/robotics?

5. What factors have contributed to your involvement in the project?
    - Prior to the grant, did you have a partnership with NSCC? How has your involvement with the college changed since working on the SCC project?
    - What contributions that you have made have been most critical to the grant program so far?
    - What are the strengths and areas for improvement in terms of communication between colleges and partners?

6. Overall, what are the strengths of the NSCC SCC project at this time?
    - What are the barriers or challenges of the project?

7. Do you have any other comments about the NSCC SCC project?

Community Partner Interview Questions

1. Please start by sharing how you have been involved with the NSCC SCC project.
    - When did your involvement begin?
    - Are you involved with computer-aided manufacturing, industrial automation/robotics, or both?

2. What activities have you been focused on since you partnered with NSCC? Please discuss progress in these areas in which you have been involved.
    - Assisting with student recruitment
    - Providing career counseling/job search support to program participants
    - Connecting program students to work-based learning opportunities
    - Contributing tuition for students to participate in the program
    - Other areas

3. How is NSCC preparing students for employment in computer-aided manufacturing and/or industrial automation/robotics?

4. How is NSCC recruiting students associated with your organization to one of its SCC programs?
    - How is your organization collaborating with NSCC to recruit students to the program?

5. What factors have contributed to your involvement in the project?
    - Prior to the grant, did you have a partnership with NSCC? How has your involvement with the college changed since working on the SCC project?
    - What contributions that you have made have been most critical to the grant program so far?
    - What are the strengths and areas for improvement in terms of communication between colleges and partners?

6. Overall, what are the strengths of the NSCC SCC project at this time?
    - What are the barriers or challenges of the project?

7. Do you have any other comments about the NSCC SCC project?

Appendix C: Student Surveys

Student Survey Questions: Computer Aided Manufacturing

Background

1. Are you enrolled in the Computer Aided Manufacturing Accelerated Program?
    - Yes
    - No
    - I'm not sure

2. Please select the course you most recently completed:
    - INT 110 Safety Equipment & Procedures
    - INT 111 Hazardous Materials & First Aid
    - INT 107 Print Reading & Sketching A
    - INT 108 Print Reading & Sketching B
    - INT 109 Print Reading & Sketching C
    - INT 112 Principles of Machining A
    - INT 113 Principles of Machining B
    - INT 114 Principles of Machining C
    - INT 115 Solidworks A
    - INT 116 Solidworks B
    - INT 117 Solidworks C
    - INT 118 Solidworks D
    - INT105 Industrial Safety
    - IND107 Print Reading & Sketching
    - IND140 Principles of Machining
    - CAD213 CAD III Solidworks
    - MET222 Programming CNC
    - MET223 CAM I
    - INT 124 CAM IA
    - INT 125 CAM IB
    - INT 126 CAM IC
    - INT 127 CAM ID

3. How long did it take you to complete this course?
    - 1 Week
    - 2 Weeks
    - 3 Weeks
    - 4 Weeks
    - 5 Weeks
    - 6 Weeks
    - 7 Weeks
    - 8 Weeks
    - More than 8 Weeks

4. Did you complete the course within the timeframe you expected?
    - Yes
    - No

5. *(Respondents who select No to the previous question will be asked the following questions)*: What prevented you from completing the course within the timeframe you expected? (Open ended)

6. Please select Yes or No to the following questions about your current employment status:
    - Are you currently employed?
    - Are you currently employed in the Computer-Aided Manufacturing industry?
    - *(Those currently employed in the industry will be asked the following question):* Were you already employed in the Computer-Aided Manufacturing industry before entering into the program at NSCC?

Program Entry (page Break)

7. How did you hear about the Computer-Aided Manufacturing program? (Check all that apply.)
    - My employer/work colleague
    - Friend or family
    - Job and Family Services (JFS)
    - OhioMeansJobs (OMJ)
    - Someone at NSCC
    - Other_____

8. Were you already planning to attend NSCC regardless of the offerings in Computer-Aided Manufacturing?
    - Yes
    - No

Career Plans (page Break)

9. Please rate your level of agreement with the following statements (Strongly disagree, Disagree, Neutral, Agree, Strongly Agree)
    - I plan to pursue a career in Computer-Aided Manufacturing.
    - I plan to pursue a career in Computer-Aided Manufacturing in this region.
    - I believe there is a local demand for workers in the Computer-Aided Manufacturing industry.
    - The likelihood that I will pursue a career in Computer-Aided Manufacturing has increased since participating in the program at NSCC.
    - I am more likely to get a local job in the Computer-Aided Manufacturing industry because of my participation in the program at NSCC.

10. *(Respondents who indicated they are employed will be asked the following question):* I am more likely to get a salary increase at work due to my participation in this program.
    - Yes
    - No

11. How has participation in the course you completed helped you obtain employment? (Open ended)

Course Feedback (page Break)

12. Please rate your level of agreement with the following statements regarding the course you **recently** completed at NSCC as part of the Computer-Aided Manufacturing program (Strongly disagree, Disagree, Neutral, Agree, Strongly Agree):
    - Course learning activities (reading assignments, case studies, labs, clinicals, etc.) helped me understand the course subject matter.

- Course materials (books, articles, syllabus, online resources, etc.) supported my learning in the course.
- Hands-on opportunities, including the flexible lab schedule, supported my learning in the course.
- Graded assignments, tests, and evaluations accurately reflect the course subject matter.
- Grades received on assignments, tests, and evaluations accurately reflect the effort I put into the course.
- KAAs accurately demonstrated my knowledge and aptitude.
- HOA accurately demonstrated my final masterly of equipment and tools.
- This course required me to apply critical thinking or problem solving skills.
- Completion of this course will help me reach my career goals at a faster pace.
- Following completion of this course, I feel more prepared to work in jobs in the Computer-Aided Manufacturing industry.
- I had access to course materials 24/7.
- I had access to labs on evenings and weekends.
- I was satisfied with the hybrid delivery model of the course.
- Overall, I was satisfied with the course I recently completed.

13. If you selected Disagree or Strongly Disagree with any of the previous statements, please explain. (Open ended).

14. Would you recommend this course to another student?
    - Yes
    - No
    - I don't know

15. (For those that select "yes" to question 14): Why could you recommend this course? (Open ended)

16. (For those that select "yes" to question 14): Would you give us permission to share the feedback you provided above for recruitment purposes? We are working on recruiting new students to the program, and any information you provide would remain anonymous; your name would not be attached to any information that is shared.
    - Yes – I give permission
    - No – I do not give permission

17. Please rate your level of agreement with the following statements about the instructor of the course you recently completed at NSCC as part of the Computer-Aided Manufacturing program. (Strongly disagree, Disagree, Neutral, Agree, Strongly Agree):
    - The instructor is helpful.
    - The instructor is organized.
    - The instructor has a firm grasp of the subject matter.
    - The instructor's communication is clear.
    - The instructor provides feedback that allows me to improve my performance.

18. If you selected Disagree or Strongly Disagree with any of the previous statements, please explain. (Open ended).

Course Feedback Continued **(page Break)**

19. How will participation in the course you completed help you obtain employment?
20. What are the strengths of the hybrid delivery model? (Open ended)
21. How could the hybrid delivery model be improved? (Open ended)

22. What were the strengths of the course you recently completed? (Open ended)
23. How could the course be improved? (Open ended)
24. Please provide any additional comments about the course (Open ended)

Student Survey Questions: Industrial Automation and Robotics

Background

25. Are you enrolled in the Industrial Automation/Robotics Accelerated Program?
    - Yes
    - No
    - I'm not sure

26. Please select the course you most recently completed:
    - INT 110 Safety Equipment & Procedures
    - INT 111 Hazardous Materials & First Aid
    - PLC 120 Industrial Electricity IA
    - PLC 121 Industrial Electricity IB
    - PLC 122 Industrial Electricity IC
    - PLC 123 Industrial Electricity IIA
    - PLC 124 Industrial Electricity IIB
    - PLC 125 Industrial Electricity IIC
    - PLC 126 PLC IA
    - PLC 127 PLC IB
    - PLC 128 PLC IC
    - PLC 129 PLC IIA
    - PLC 130 PLC IIB
    - PLC 131 PLC IIC
    - PLC 132 PLC IIIA
    - PLC 133 PLC IIIB
    - PLC 134 PLC IIIC
    - PLC 135 Servo/Robotics A
    - PLC 136 Servo/Robotics B
    - PLC 137 Servo/Robotics C
    - IND105 Industrial Safety
    - IND120 Industrial Electricity I
    - IND121 Industrial Electricity II
    - PLC200 Programmable Controller I
    - PLC210 Programmable Controller II (AB)
    - PLC220 PLC III
    - PLC230 Servo/Robotic Systems

27. How long did it take you to complete this course?
    - 1 Week
    - 2 Weeks
    - 3 Weeks
    - 4 Weeks
    - 5 Weeks

- 6 Weeks
- 7 Weeks
- 8 Weeks
- More than 8 Weeks

28. Did you complete the course within the timeframe you expected?
    - Yes
    - No

29. *(Respondents who select No to the previous question will be asked the following questions)*: What prevented you from completing the course within the timeframe you expected? (Open ended)

30. Please select Yes or No to the following questions about your current employment status:
    - Are you currently employed?
    - Are you currently employed in the Industrial Automation/Robotics industry?
    - *(Those currently employed in the industry will be asked the following question):* Were you already employed in the Industrial Automation/Robotics industry before entering into the program at NSCC?

Program Entry **(page Break)**

31. How did you hear about the Industrial Automation/Robotics program? (Check all that apply.)
    - My employer/work colleague
    - Friend or family
    - Job and Family Services (JFS)
    - OhioMeansJobs (OMJ)
    - Someone at NSCC
    - Other_____

32. Were you already planning to attend NSCC regardless of the offerings in Industrial Automation/Robotics?
    - Yes
    - No

Career Plans **(page Break)**

33. Please rate your level of agreement with the following statements (Strongly disagree, Disagree, Neutral, Agree, Strongly Agree)
    - I plan to pursue a career in Industrial Automation/Robotics.
    - I plan to pursue a career in Industrial Automation/Robotics in this region.
    - I believe there is a local demand for workers in the Industrial Automation/Robotics industry.
    - The likelihood that I will pursue a career in Industrial Automation/Robotics has increased since participating in the program at NSCC.
    - I am more likely to get a local job in the Industrial Automation/Robotics industry because of my participation in the program at NSCC.

34. *(Respondents who indicated they are employed will be asked the following question):* I am more likely to get a salary increase at work due to my participation in this program.
    - Yes
    - No

35. How has participation in the course you completed helped you obtain employment? (Open ended)

Course Feedback **(page Break)**

36. Please rate your level of agreement with the following statements regarding the course you **recently** completed at NSCC as part of the Industrial Automation/Robotics program (Strongly disagree, Disagree, Neutral, Agree, Strongly Agree):
    - Course learning activities (reading assignments, case studies, labs, clinicals, etc.) helped me understand the course subject matter.
    - Course materials (books, articles, syllabus, online resources, etc.) supported my learning in the course.
    - Hands-on opportunities, including the flexible lab schedule, supported my learning in the course.
    - Graded assignments, tests, and evaluations accurately reflect the course subject matter.
    - Grades received on assignments, tests, and evaluations accurately reflect the effort I put into the course.
    - KAAs accurately demonstrated my knowledge and aptitude.
    - HOA accurately demonstrated my final masterly of equipment and tools.
    - This course required me to apply critical thinking or problem solving skills.
    - Completion of this course will help me reach my career goals at a faster pace.
    - Following completion of this course, I feel more prepared to work in jobs in the Industrial Automation/Robotics industry.
    - I had access to course materials 24/7.
    - I had access to labs on evenings and weekends.
    - I was satisfied with the hybrid delivery model of the course.
    - Overall, I was satisfied with the course I recently completed.

37. If you selected Disagree or Strongly Disagree with any of the previous statements, please explain. (Open ended).

38. Would you recommend this course to another student?
    - Yes
    - No
    - I don't know

39. (For those that select "yes" to question 14): Why would you recommend this course? (Open ended)

40. (For those that select "yes" to question 14): Would you give us permission to share the feedback you provided above for recruitment purposes? We are working on recruiting new students to the program, and any information you provide would remain anonymous; your name would not be attached to any information that is shared.
    - Yes – I give permission
    - No – I do not give permission

41. Please rate your level of agreement with the following statements about the instructor of the course you recently completed at NSCC as part of the Industrial Automation/Robotics program. (Strongly disagree, Disagree, Neutral, Agree, Strongly Agree):
    - The instructor is helpful.

- The instructor is organized.
- The instructor has a firm grasp of the subject matter.
- The instructor's communication is clear.
- The instructor provides feedback that allows me to improve my performance.

42. If you selected Disagree or Strongly Disagree with any of the previous statements, please explain. (Open ended).

Course Feedback Continued **(page Break)**

43. How will participation in the course you completed help you obtain employment?
44. What are the strengths of the hybrid delivery model? (Open ended)
45. How could the hybrid delivery model be improved? (Open ended)
46. What were the strengths of the course you recently completed? (Open ended)
47. How could the course be improved? (Open ended)
48. Please provide any additional comments about the course (Open ended)

Final Evaluation Briefing Slides

DOL-SCC Grant Project, Northwest State Community College

Prepared by Pacific Research and Evaluation, LLC
and Northwest State Community College

1

Opening & Background

- Northwest State Community College (NSCC) was awarded a Strengthening Community Colleges (SCC) training grant in 2021.
  - Created two **short-term certificate programs** (computer-aided manufacturing and industrial automation/robotics) to address the **workforce deficit and skills gap** in Northwest Ohio's advanced manufacturing industry
- Grant activities included:
  - Development of **single-credit stackable courses**
  - Formation of a **steering committee** of key industry partners to inform curriculum development
  - **Recruitment efforts** through partnership with employers and community partners

Purpose of the Study

- Pacific Research and Evaluation (PRE) partnered with NSCC.

- Conducted a *participatory* evaluation to:
    - Assess NSCC's efforts in **developing and implementing** the program
    - Understand the effects of the program on **students and industry partners**
    - Assess NSCC's progress toward their intended grant activities and outcomes from a **formative and summative lens**
        - Used both *qualitative* and *quantitative* methodologies

Data Gathering & Analysis

- PRE conducted annual **phone interviews** of:
  - Faculty and staff
  - Industry partners
  - Community partners
    - Findings from the qualitative data emerged through a **thematic analysis** and have been reviewed by the NSCC project team.
- A **student survey** was conducted to ask students questions:
  - **Their experience** in the hybrid/accelerated courses
  - **Strengths and weaknesses** of the hybrid/accelerated courses
  - To what extent the courses will **aid in their employment** in the advanced manufacturing industry.

Overview of Findings

- **Investments to infrastructure** included hiring new faculty, building out technological systems to house hybrid course content, developing an open-lab model schedule, purchasing training equipment, and updating financial aid and registrar policies and procedures to accommodate the new program schedule.
- The new hybrid/flexible model will provide **greater accessibility and flexibility** for adult learners.
- Aligning one-credit courses with the registration system and learning management system (LMS) proved to be more labor intensive than expected and ultimately unsustainable, leading the college to pivot to **bundled three-credit courses** instead.
- NSCC identified **eight key industry partners** to include on the steering committee to provide continuous employer feedback through program development and align with industry standards and needs.

Overview of Findings (cont'd)

- NSCC engaged in outreach efforts with **community partners**, including five Jobs and Family Services offices, two Veterans Affairs offices, and the Region Seven and Eight Local Workforce Development Boards.
- **Recruitment of students** was slow to start, and it was more challenging than anticipated to create a recruitment funnel through employer partners and community partners.
- In grant years 3 and 4, NSCC increased student recruitment efforts including conducting **outreach to over 50 industry employers and high schools**. NSCC has also increased internal recruitment efforts of NSCC students through **advising.**
- A total of **52 students enrolled** in hybrid/accelerated courses over the course of the grant and the student survey was completed a total of eighteen (n = 18) times across both programs. Student survey respondents agreed or strongly agreed that they were **satisfied with the courses** they completed.

Insights & Takeaways

- Great effort was put into **building systems** to accommodate the one-credit, 6-week course schedule, but the **complex nature** of trying to fit a new process into existing systems was ultimately unsustainable and negatively impacted student enrollment.
  - NSCC **adjusted their strategy** from the one-credit course model to a **three-credit course model** while keeping the hybrid/accessible aspects of the courses, leading to greater eligibility among NSCC students to enroll.
- The new hybrid/flexible model will provide **greater accessibility and flexibility** for all learners to accelerate their education and job potential.
  - It takes time to **see results** of these programs; while hoping to recruit 128 students, NSCC did not see student enrollment **as quickly or to the extent** they had expected. It took time to **clarify the message and benefits** of these new programs.

Insights & Takeaways (cont'd)

- Faculty identified **specific competencies** for each one-credit of course content and designed competency-based assessments, creating a **streamlined, stackable** course progression.
  - Students' experience with the courses **aligned with the intention** of creating streamlined course content that was **clear and flexible.**
  - As demand for these programs grows, NSCC will need to ensure that they have the **capacity to sustain** the increased level of flexibility.
- NSCC's efforts to create two certificate programs that were hybrid and accelerated are **meeting the needs of students.**
  - Interest in the hybrid/accelerated courses is **likely to grow.**
  - Faculty and staff feel they have a **better understanding** of how to implement the hybrid/accelerated model.