



Two-Year College and External Project Manager: An Innovative Partnership for Implementing a Federal Grant Project

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Abstract

The objective of this paper is to share a case study of a rural community college who partnered with an external project manager to implement a large grant project. The project was funded by a three-year federal grant, with a budget over half a million dollars. The external project management partnership, though not planned in the original project proposal, increased the capacity of the college to manage a project at this scale. Over time, it also increased the capacity of the grant's Principal Investigator (PI), a faculty member who brought over 30 years of industry experience but had not yet led a grant project. This material is based upon work supported by the National Science Foundation's Advanced Technological Education Program under Grant No. 1801177. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

Project COMPLETE is a collaboration between Louisiana Delta Community College (LDCC) and Louisiana Tech University (LA Tech) to expand instrumentation workforce pathways for high school students in Louisiana. The project brought together a multitude of external partners, including the external project manager, pilot high school partner Bossier Parish School for Technology & Innovative Learning (BPSTIL), additional high schools, industry partners, a diversity consultant, and local non-profits focused on student training and workforce development in high-need career fields.

This paper presents a detailed account of the project's management, including role definition of the external project manager, PI, Coordinator, and Co-PIs; benefits and costs of working with an external project manager; communication methods and frequency at different stages of the project; management challenges faced by a project this complex; accomplishments by the team and partners (including growth of the project's PI); and lessons learned throughout the project.

The fidelity and impact of Project COMPLETE's efforts were assessed by an external evaluator, AROS Consulting. The primary intended outcomes were to a) develop and market two post-secondary academic and career pathways for instrumentation technicians in rural communities of North Louisiana, b) reach a total of 26 high school teachers/counselors and their 500 students, increasing awareness of engineering technology career pathways, and c) expand the student pipeline into Ruston, Louisiana's two post-secondary instrumentation technology programs, thereby increasing enrollment in each program. Results and evaluation of the project are presented.

Background

The role of two-year colleges in the United States has grown in the last 30 years. Enrollment has grown 53% from 5.3 million in 1990 [1] to 8.1 million in 2020 [2]. This can partially be attributed to the growing and constantly changing workforce needs in our technology-driven

society. The World Economic Forum's 2020 *Future of Jobs Report* predicts that "[i]n addition to the current disruption from the pandemic-induced lockdowns and economic contraction, technological adoption by companies will transform tasks, jobs and skills by 2025" [3]. In addition, two-year schools have helped to make access to higher education more equitable. About 67% of public two-year college students have family incomes under \$50,000; and 45% of students enrolled in community college are from underrepresented groups (specifically Asian, Black, or Hispanic) [4].

As the importance and role of two-year colleges have grown, more federal funding has been directed toward community and technical colleges throughout the US. Federal agencies such as the National Science Foundation (NSF) have begun prioritizing funding to support the mission of two-year schools through competitive grant programs. One program in particular, the Advanced Technological Education program (ATE), began in 1994 with an annual budget of \$13.5 million [5]. In the 2022 fiscal year, the budget is \$75 million [6]; and Advanced Technological Manufacturing Act bills have been introduced in both the House [7] and the Senate [8] to authorize an even higher ATE budget in the future (up to \$150 million per year).

While more funding is a welcome support for two-year schools around the nation, many of these schools have not had the infrastructure in place to smoothly apply for and/or manage federal competitive grants of this magnitude. Especially compared to research universities, two-year colleges have not historically pursued federal competitive grants and often do not have experienced and available faculty, staff, and systems to do so. Two-year faculty teaching loads average higher than universities, at five three-credit courses per semester [9, 10]. And it has been our personal experience that administrators and staff at two year schools "wear many hats" compared to university staff.

So how can a two-year college build capacity, both short-term and long-term, to pursue more competitive federal funding in support of its mission to educate and train its local community? Our paper presents a solution to build a rural community college's capacity for writing and managing a federal grant funded by the NSF ATE program. By partnering with a local but external project manager, the community college and its Principal Investigator (PI) were able to successfully secure grant funds and carry out the project to its completion in the midst of many barriers and setbacks throughout the project. In addition, the project manager was able to "bridge the gap" between the community college and main university partner as they learned together how each institution works and the differences and strengths of the two institutions.

Project and Partners

The overall goal of Project COMPLETE was to expand instrumentation workforce pathways for high school students in Louisiana. The project included many "moving parts," which made the addition of an external project manager necessary because no one internal faculty or staff member had the time, experience, and relationships to manage the full project. Please see **Figure 1** for an overview of Project COMPLETE's partners.

The Project COMPLETE team along with these partners developed an Arduino-based high school curriculum for basic electrical and instrumentation, integrated industry-based certification

options, created dual enrollment and articulation agreements, developed and built hands-on project kits for high school classrooms, held professional development workshops for teachers and counselors, coordinated industry experiences for students, and even created a “virtual field trip” when the COVID-19 pandemic made in-person field trips difficult.

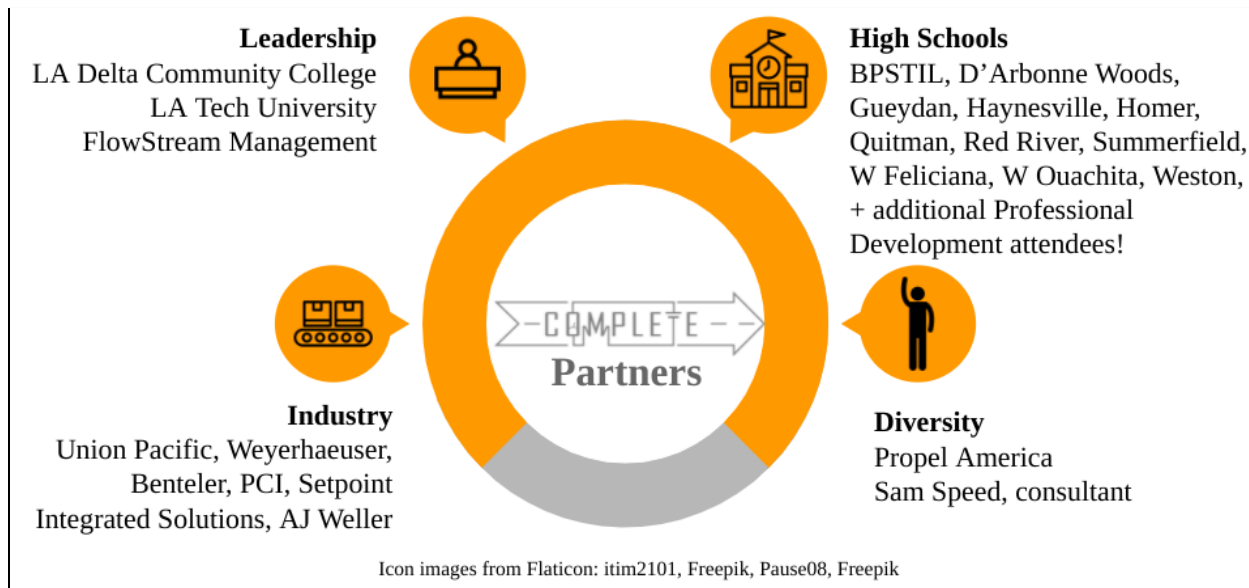


Figure 1: Project COMPLETE partners.

Project COMPLETE’s lead grantee was Louisiana Delta Community College, specifically the campus located in Ruston, LA. Across all campuses, the LDCC Industrial Instrumentation Technology program has relationships with over 20 local manufacturing companies. Educational facilities include a 4,700 sq-ft instrumentation lab housing trainers valued at over \$1.1 million, a majority of which has been supplied by industry partners.

The university partner was Louisiana Tech University, a four-year research university based in Ruston, LA. LA Tech offers a bachelor’s degree in Instrumentation & Control Systems Engineering Technology that covers a combination of engineering theory, mathematics, and hands-on applications. Application-focused student experiences have continued to expand over the past ten years through ongoing assessment and evaluation by Industrial Advisory Boards.

The external project management partner was FlowStream Management, LLC, also located in Ruston, LA. FlowStream’s owner acted as the Manager for Project COMPLETE. She has earned degrees in both engineering and education, holds the Project Management Professional (PMP) certification, and offered over 13 years of professional experience. With her experience came a network of relationships and lessons that proved to be invaluable to the project.

Project COMPLETE’s external evaluator was AROS Consulting, a faculty-supervised and student-led consulting group within LA Tech’s Industrial-Organizational Psychology doctoral program, leveraging the energy, expertise, and creativity of its graduate students. These students are well-versed in the theory and practice of program evaluation and have been through intensive courses on qualitative and quantitative research methods.

Many other organizational partners were involved in Project COMPLETE, including:

- Bossier Parish School for Technology & Innovative Learning, our pilot high school partner. BPSTIL is a Career Technical Education (CTE) hub for the Bossier Parish School Board. BPSTIL students combine academic skills learned in the classroom with practical experience in shop/lab settings. **Figure 2** shows BPSTIL students working on an Arduino project from our curriculum.
- 30+ additional high schools across the state of Louisiana. Schools participated in Project COMPLETE at various levels according to each school's situation, needs, and teacher capacity/interest.
- Louisiana Ag Teachers Association, with whom we collaborated to host two summer professional development workshops for high school ag teachers.
- Six local industry partners, who provided input to the high school curriculum and additional support through speakers, scholarship funding, and field trip opportunities.
- North Louisiana Economic Partnership, who hosts an annual Manufacturing Week to raise high school students' awareness of manufacturing occupation needs and possible careers.
- Mr. Sam Speed, who acted as a diversity consultant on the project to help advertise and connect the project with the needs of underrepresented high schools.
- Propel America, a nonprofit partner that recruits and coaches low income students to career paths in high need.

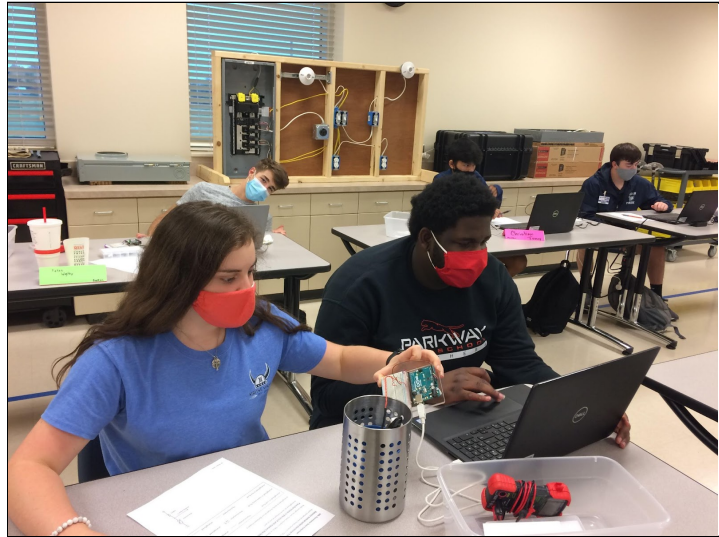


Figure 2: High school student participants.

Our Project Management Strategy

Role Definition

One of the most valuable recommendations from our Evaluator after the first year of the project was to clearly define (and/or re-define) roles for each team member on the project. We found that some roles shifted from year to year, depending on the needs of the project and the capabilities of each team member. In any case, communicating at the beginning of each project year and deciding responsibilities together helped to clarify for each person their roles and responsibilities for the coming year. We used a spreadsheet format to list tasks on the left side and people's names across the top; then we checked off who was responsible for each task.

The External Project Manager's ongoing role was to plan and lead bi-weekly management meetings, lead dissemination efforts for the project (such as writing papers and attending conferences), coordinate with the Evaluator, and manage any conflicts and challenges. She also coordinated the writing of the annual progress report to the National Science Foundation, with input from the rest of the leadership team and a growing contribution of writing from the PI over time.

The PI communicated with NSF, led the technical direction of the project, attended bi-weekly management meetings, provided input to high school curriculum development, and contributed to project dissemination through writing papers and attending conferences. He also spoke at teacher professional development workshops and in high school classrooms, coordinated purchasing of kit materials, and helped coordinate the creation of dual enrollment and articulation agreements. Over time, he took over as the project's industry engagement "point person" and took on a greater role in writing reports for the project.

The Project Coordinator attended bi-weekly management meetings and was the project's "point person" for high school engagement. She communicated with high school teachers and counselors, sent monthly newsletters to all project stakeholders, and coordinated registrations for professional development workshops. She also answered questions as needed, processed travel and stipend paperwork, created marketing materials and press releases, maintained the project website, coordinated field trips, and attended conferences for the project.

LA Tech's Lead attended the project's bi-weekly management meetings, planned and led curriculum team meetings, assisted with project dissemination through papers and conferences, and visited the pilot high school to speak to students. The project's Co-PIs, who were all located at LA Tech, were responsible for the development of the high school curriculum and the hands-on, Arduino-based project kits. They also helped to lead professional development workshops for teachers and counselors.

Communication Throughout Project

As with any project involving more than one person, communication was vital. Since the beginning of Project COMPLETE, the team members worked in different locations. Because of this, emails, texts, and phone calls quickly became an important part of communication between members. The PI, LA Tech Lead, Project Manager, and Project Coordinator began the project by meeting in person. For the first year, these in-person meetings were on a monthly basis, with emails and phone calls on an "as needed" basis. As the project gained momentum and became busier, our Evaluator recommended that we increase the frequency of these meetings to bi-weekly. These bi-weekly in-person meetings continued until the COVID-19 pandemic made in-person meetings impractical, and our meetings were switched to virtual. The virtual meetings, via Zoom, continued to the end of the project. When in-person meetings were absolutely necessary, we met at a designated place, usually at LDCC strictly observing CDC distancing guidelines.

Switching to virtual meetings allowed us to continue operating. The entire team quickly adapted, and even learned to appreciate the convenience of Zoom. When issues arose between regular

meetings that required a group response, emails were the “go to.” These emails were usually initiated by our project manager as a means of keeping the project on course. For more pressing matters, if emails were not sufficient, phone calls were made, or if a challenge presented itself that required a more “one-on-one” discussion, in-person meetings were then employed.

Benefits and Costs of Working with an External Project Manager

One vital element contributing to the success of this project was incorporating an external project manager. Having the prior knowledge and experience of working on other federal grant projects, our project manager played a major role in keeping our team focused and on track. A project manager is more likely to stay focused on the stated purpose of the project, and less likely to experience “mission creep” since the project manager probably has fewer related interests at the institution(s). The project manager can oversee tasks and deadlines, so that the PIs and other personnel at the institutions can feel less overwhelmed by the total scope of the project all at once. At the same time, our project manager had the ability to see the “big picture,” helping the other team members to avoid tunnel-vision. PIs usually have several other jobs they are trying to do simultaneously (teaching, administration, research, lab improvements/upkeep, etc.) The project manager can increase the level of perceived urgency for the project so that it gets the proper amount of attention relative to the many other responsibilities of the PIs. And when circumstances beyond our control (such as employee turnover, work overload, or even a pandemic) threatened to cause a major disruption in project activities, our project manager prioritized activities and made adjustments along the way to keep the project moving. Finally, a project manager helps to collect documentation regarding all of the different types of impacts resulting from the project. PIs are often more focused on doing the work, so they may be less focused on being able to show external stakeholders all of the various benefits that come out of the work.

Working with an external project manager can also have its costs. Being from the outside, the PM might need time to learn the culture, systems and rules of a particular community college in order to become effective. Having an external project manager might require allocating a higher budget than would be necessary for an internal manager or the PI. There can also be confusion at times between the roles of an external project manager and the PI in terms of who is actually “leading” the project. This particular challenge was met in our case by making decisions as a team with everyone’s input.

Challenges Faced

The Project COMPLETE management team faced three main challenges throughout the project. First were assumptions and expectations regarding the two types of higher education institutions involved in the project. We quickly realized that a community college and university, though both in the same town, operate very differently. Understanding the mission and strategy of each institution took time and many conversations over the course of the project.

One idea that became more fleshed out, and hopefully communicated to prospective students, is that a two-year degree and a four-year degree are two parallel paths with different goals. This idea was presented clearly by one of our industry partners in a virtual panel for our high school

teachers [11]. High school students should be exposed to both pathways and helped to choose the best path for them because, the way the programs are set up at this time, the full two-year courseload does not transfer into a four-year program.

Another challenge faced throughout the project was turnover both within and outside of the project team. It was our experience that changes in staff are common at community colleges and high schools, so we needed to keep thorough documentation of all project activities and decisions in order to protect against knowledge loss as the project progressed and changed with different people. Many of our high school contacts became unresponsive, either because they had changed schools or because their workload had increased due to one or more colleagues leaving. Implementing new curricula in a classroom is difficult, and it can be quickly deprioritized with changes in staff.

The final challenge was, of course, the COVID-19 pandemic. We had planned more workshops, speakers, and field trips to provide students and teachers with real industry experiences; however, all visiting opportunities were halted with the pandemic. We pivoted to offer a “virtual field trip,” where an industry partner toured their facility on camera and then answered questions from our team [12]. A few teachers shared the video in their classrooms, but the pandemic had also added stress to teachers through constantly-changing requirements on virtual learning, state testing, masking, quarantining, etc. Few teachers possessed the bandwidth to do anything “extra.”

Accomplishments and Growth of PI

The Project COMPLETE team and its partners have reached over 40 teachers from over 30 schools, and will have reached over 750 students either directly or indirectly. The curriculum team created over 40 lessons plus assessments, which are publicly available at the project’s website [13]. A Project COMPLETE School Implementation Form is also available on the project website; high school counselors and administrators can use this form to plan how they will implement Project COMPLETE for their school’s specific situation.

The Project COMPLETE team held seven professional development workshops for high school teachers and counselors. They also created 12 videos for a virtual, “flipped” workshop during the COVID-19 pandemic. The project yielded both a dual enrollment agreement between LDCC and interested high schools, and an articulation memo between LDCC and LA Tech. According to a survey used by AROS to gauge the fall 2020 curriculum’s impact on students (38% response rate), nearly all the students surveyed were satisfied with the curriculum’s content and would recommend the course to other students interested in instrumentation technology. All of the students agreed that the course met their developmental needs and the materials were not too difficult to grasp.

A main accomplishment of Project COMPLETE was the growth of the project’s PI. As mentioned, the present PI came on board in the second year of the project with no prior grant experience. What he brought to the table was a general knowledge of industrial technology, as well as a grasp of the practical skills needed to help students be competitive in the technological job market. After over 30 years working in the field of industrial instrumentation technology, he

made a career change and became an instructor of instrumentation technology at LDCC. After the departure of the original PI, he accepted the role as PI for Project COMPLETE.

What the PI found most challenging in this new role was simply being willing to step outside of his “comfort zone” and risk failure. Speaking in front of people had always been a particular challenge for him, but he had recently met this challenge head-on when he decided to leave the industrial workplace and become a full-time instructor. As an instructor of industrial instrumentation technology, he realized that the field itself was somewhat ambiguous. The exact job description of an I/E technician did not seem to be common knowledge, and the objective of Project COMPLETE was to bring an awareness of this field to high school students. It would have been hard to imagine having an opportunity to work on a project that was more in line with his own goals as an instructor.

With the support and commitment of the Project COMPLETE team, the PI soon found himself assisting with the writing of a curriculum designed to give high school students an introductory knowledge of industrial instrument technology. Other contributions include making training videos and workshops designed to assist high school teachers and counselors to teach the curriculum.

The PI shared, “If I come out of this experience with any semblance of success, it will be in large part due to the dedication of everyone on the Project COMPLETE team. Our project manager in particular is not only extremely capable in her own role, but also very willing to give others the opportunity to grow. Her encouragement to expand coupled with her willingness to help is truly a winning combination. My Co-PI (the LA Tech Lead) brings to the table almost everything that I lack. His confidence and practical experience in the field of education have made him one of my greatest resources. And our project coordinator does an amazing job of follow-up and follow-through. She keeps communication going not only between project team members, but also industry partners, who are a vital part of the project.”

Please see the Evaluation section below for more project results.

Lessons Learned

The first lesson, especially relevant when team members are in different locations at different institutions, was the intentionality required to keep communication open among team members. We acknowledged the value of building personal relationships through our bi-weekly meetings, especially since we were not all on the same campus. For this reason, even if there was “not much” on the agenda for a given meeting, we would usually still hold a short meeting in order to keep our team dynamic strong.

The LA Tech Lead, in particular, learned many internal differences between the project’s University management and Community College management. First, the rate at which personnel changes occur seems to be faster at the Community College relative to the University. The Budget Manager, the PI, the head of the Ruston campus, and even the Chancellor all changed during the timeline of this project. At LA Tech, it seems that personnel changes at a significantly slower pace. Typically, a lot of practical project management at the University is based on

relationships and informal mutual understandings. These are made possible by longer-lasting working relationships. When it is expected that personnel will change rapidly, it is more important to define roles and expectations in writing. Another lesson was that methods of accounting for time and effort are different at the Community College relative to the University. The system at the Community College is more of an “hourly” system, while at the university it is based more on a “percent of effort.” Next, the value placed on securing a competitive federal grant is smaller at the Community College relative to the University. At the University, securing grants that must compete with other proposals on the basis of intellectual merit is one form of career currency. This dynamic does not appear to be present at the Community College. The University has negotiated a much higher “indirect” rate than the Community College, and this fact may account for some of the discrepancy. Finally, the way of approaching education is different at the Community College than at the University. At the Community College, the focus is to expedite getting student’s hands on equipment that resembles that which they are most likely to see wherever they are most likely to work. At the University, the focus is to build up students’ foundational theoretical knowledge in the early part of their curriculum while generalizing lab experiences. Connections with industry are more localized for the Community College, while they spread over a larger region for the University. At the Community College, mathematics is covered on more of an “as needed” basis, while the University intentionally includes more mathematics for its own sake, or “in case you might need it.” More students at a Community College are “trying it out” as opposed to being highly focused on a desired career goal. At the University, some of the students are trying things out, but more of them have a higher level of focus on more specific career goals.

If we were to implement this project again, we would build more robust capacity building activities into the project from the beginning. The main resources offered to high school teachers and counselors were the online curricula (slides, videos, assessments) and a few in-person workshops. However, this was not enough to keep most schools engaged given the multitude of other challenges they were facing. We would consider adding more elements of Pact’s capacity development framework [14], including consulting on specific problems, mentoring teachers, modeling specific lessons, and providing more frequent opportunities for peer learning (even virtual). We would also consult with the school’s administration to choose the right teacher for the program, as we learned this was a big factor in continued engagement. We believe offering these structured capacity development activities would extend the momentum of schools that show initial interest.

A final lesson is the acknowledgement that because of this project, the two institutions are better prepared for future collaborations. Before Project COMPLETE, the two institutions had not pursued a grant project together even though they are located in the same town. However, another funded grant collaboration has already grown out of this one.

A future project idea is for the two institutions to come together and build a true “2+2” pathway between LDCC and LA Tech. In this pathway, a student could begin at LDCC for two years, earn an Associate’s degree in Industrial Instrumentation Technology, transfer to LA Tech for two additional years, and earn a Bachelor’s degree in Instrumentation and Control Systems Engineering Technology. As described in detail earlier in the paper, the two programs are currently not aligned in mission or strategy. We would need to start by establishing both

programs' accreditation requirements and programmatic needs, then work on moving learning outcomes and activities around among both programs' courses. Given the lessons learned on this project, we do not take this challenge lightly and are well aware that it would need to be the focus of a full project. We also are aware that any pathway created may not be transferable to other community colleges or universities.

Evaluation of Project

Evaluation of the grant team's activities was performed by an external evaluator, AROS Consulting, for the duration of Project COMPLETE. The results presented below have been extracted from external evaluation reports provided by AROS and are based on data gathered through project documentation, participant surveys, stakeholder interviews, and institutional records.

Goals

The early goals of the project were to increase awareness of engineering technology careers and develop pathways to both LA Tech and LDCC for 26 of the region's high schools. The ultimate goals were to increase enrollment in the two higher education institutions bolstering the local economy by providing a larger and more informed workforce in the fields of technology and engineering.

Results

Regarding enrollment in the LDCC Industrial Instrumentation Technology program, enrollment has remained relatively steady at the LDCC campus closest to the partner university. For the entire LDCC system, enrollment spiked as the concentration was expanded to more campuses from the 2017-2018 to the 2018-2019 academic year. Since that time, enrollment remained has shown a 36%, 3%, and 15% decrease each year, respectively.

| Academic Year | Total LDCC Enrollment | Instrumentation Technology All LDCC Campuses | Instrumentation Technology Ruston LDCC Campus |
|----------------------|------------------------------|---|--|
| 2021-2022 | 5,303 | 93 | 34 |
| 2020-2021 | 5,318 | 109 | 37 |
| 2019-2020 | 6,161 | 112 | 38 |
| 2018-2019 | 5,588 | 175 | 32 |
| 2017-2018 | 5,266 | 56 | 0 |

The decrease in students in Instrumentation Technology would be alarming, but when considering the overall number of students has decreased 14% since the 2019-2020 academic year, the numbers in the concentration of interest appear sufficiently strong.

Next we present results regarding enrollment at LA Tech. Two years prior to the start of this project, LA Tech established its Instrumentation and Control Systems Engineering Technology (ICET) program. Graduate totals for both ICET and its precursor, the Electrical Engineering Technology (ELET) program, are reported here.

| Year | All Engineering | ELET | ICET | Total % ELET/ICET |
|-------------|------------------------|-------------|-------------|------------------------------|
| 2021 | 328 | 2 | 7 | 2.8% |
| 2020 | 376 | 8 | 12 | 5.3% |
| 2019 | 398 | 15 | n/a | 3.8% |
| 2018 | 355 | 14 | n/a | 3.9% |

Over the project's duration, overall graduation rates for the LA Tech college of engineering show an increase over 2018-2019 and then a decrease in both 2020 and 2021 to its lowest of all four years. The graduation rate for those in related programs rose 43% from 2018 to 2020, that is, 14 to 20 graduates. This positive trend dropped to 9 in 2021. The number of first-year students that declared majors in the ELET/ICET programs was 5 in 2018 and then dropped to 1 in 2019. In 2020, the number of students jumped to 4, and in 2021 6 students declared an ELET or ICET major.

Another result of the project was an articulation agreement between LA Tech and LDCC, which was finalized in the spring 2020 semester. This agreement established a new understanding of reciprocity in which courses in instrumentation technology at each institution will be acknowledged and accepted for credit at the partnering institution.

In July 2020, the team shifted its focus from dual enrollment to “industry-based certifications” (IBCs). The NSF approved the decision by the team to move this direction because the team has found that IBCs are more fitting to the Louisiana Department of Education’s strategic plan and funding incentive program for high schools. Therefore, more high schools are interested in an “IBC option” of the curriculum instead of dual enrollment. BPSTIL students completed the National Center for Construction Education & Research (NCCER) Electricians Helper IBC modules during the fall 2020 semester, and BPSTIL switched to using the Electrical Training Alliance (etA) Interim Credential during the spring 2022 semester. West Feliciana used the curriculum in conjunction with the NCCER Electrical 1 certification; the high school did not fully implement the curriculum due to COVID-19 restrictions and Project COMPLETE’s hands-on, in-person nature. Currently, there are three students at BPSTIL who are dually enrolled with LDCC.

Evaluation Comments

Though the effects of the COVID-19 pandemic stymied their project, the project team was still able to impact 16 high schools, with two partially implementing the curriculum and four fully implementing the curriculum. In the current academic year, the curriculum is being used at several high schools across the region, and two schools are again repeating full implementation with a total of 63 students. In addition, a new partner school is integrating the curriculum into their physics classes, and at this one school, over 330 students will be offered the opportunity to take enrichment classes in instrumentation.

The development and implementation of the curriculum were only made possible with intentional support and ongoing interactions with the partner high school counselors and teachers. Throughout the project, the team has sent out 18 newsletters that are available on their website, offered a variety of workshops (dissemination, curriculum development, and training), and made curriculum videos, slides, documents, activities, and supplemental materials openly available to educators. Several workshops occurred throughout the first year (2018-2019) that allowed for the curriculum development team and high-school teachers to work together in person on the course creation. Three more workshops occurred in 2020-2021. The team also made themselves available to teachers who had questions or needed assistance on an ongoing basis.

Interviews of the stakeholders indicate that Project COMPLETE did an excellent job of communicating with the educators. Each interviewee indicated that the project team clearly communicated their expectations, objectives, and timelines while also allowing them the freedom and autonomy to make the curriculum their own.

Regarding reach and impact, the team implemented various virtual dissemination efforts such as website updates and newsletters to showcase the project. The team made instructional content accessible online for use by partner schools after the grant period. The addition of a consultant to reach underrepresented minority groups was a positive step in the plan to disseminate the project in the region.

COVID-19 significantly impacted the extent to which students were exposed to the industry through field trips and other events. Education partners' suggestion was to market directly to parents and provide live online Q&A panel sessions, which the team was not able to implement due to low communication levels from high schools toward the end of the project. Also, stakeholders suggested more direct marketing, such as flyers to students, even to schools currently implementing the curriculum. In response, flyers were mailed to seven schools in spring 2022.

During the period in the project when industry partner engagement and field trips should have been at its height, restrictions due to COVID-19 had limited field trip options and other in-person industry interactions. The project contacted industry partners about the possibility of virtual field trips. Several partners agreed to discuss the next steps, and one virtual field trip did occur in the Spring 2021 semester. One industry partner, Union Pacific Railroad, granted five scholarships at LA Tech and five at LDCC. AROS has surveyed partners on multiple occasions and the results indicate an above-average level of understanding, support, perceived efficacy, awareness, and

intended collaboration with the project, with support of the project's purpose ranking as the highest category.

The project team has met the original objective of establishing dual-enrollment and articulation agreements. In addition, the team met their new goal of having a partner school integrate an industry-based certification into the curriculum. They also have prepared instructions for educators on how to integrate Project COMPLETE into their existing IBC programs. Based on the education partner's interest in the curriculum, we predict that participation in IBCs and dual-enrollment will increase as COVID-19 social-distancing protocols are relaxed at schools. Project COMPLETE's financial support of the Propel students in LDCC's workforce program demonstrates the team's eagerness to impact students' lives and the region's economy.

Before COVID-19's full effects were realized, the project was on target to meet its stated goals. In the 2019-2020 year alone, the project reached over 300 students at the seven schools they were partnered with at the time. AROS concluded through educator interviews that many more schools would have implemented or still intend to implement the curriculum. Schools identified the multiple waves of pandemic variant outbreaks as the cause for non-partnership. Student absences and short-staffing at the schools made the idea of starting something new daunting or the reality of implementing a new curriculum unfeasible.

In July 2020, a workshop with 31 teachers representing 25 schools increased awareness and dissemination. The following year the project team released a course of professional development videos for teachers and counselors in the state in order to prepare them for a hands-on workshop in July 2021. The workshop took place at the Louisiana Ag Teachers Association summer conference. The team was able to talk through the curriculum and assist with their accompanying kits. Over the course of the grant, the team has disseminated what they have learned at four different academic conferences and even returned to some to present updates. In addition to providing all resources and the full curriculum on their website, the team uploaded videos and transcripts of interviews with students and industry partners.

The team also took proactive steps to target schools composed of underrepresented students in the STEM field. These students have not historically matched their population ratio in the STEM workforce; typically, women, racial, ethnic, and other minority groups. The project team expanded their reach into these schools by hiring a consultant/liaison that was able to reach out to rural and underserved schools. His computer science background and his current role as a dean in a higher education institution made him a great additional partner to the Project COMPLETE team. He reached out to seven schools and six have shown interest in joining because of his outreach and relationship building. He has also shared with two non-traditional (homeschool) groups and they are currently considering the curriculum. One high school has started partially implementing the curriculum in two classes. In an effort to disseminate the efforts further, he also participated in a video interview during the summer of 2020 about supporting underrepresented students. He reported that enthusiasm for Project COMPLETE is high, but implementing something new since the beginning of the COVID-19 pandemic has been impractical since "Most schools are just trying to survive... something new seems too hard when everything feels new right now."

The project team has strived to meet the original goals of the grant while contending with the vast and profound impact that the COVID-19 pandemic has had on primary, secondary, and higher education. The team has demonstrated flexibility and resilience in continuing the project effectively despite the many unforeseen obstacles and potentially diminished interest and access to the curriculum. The team persisted in disseminating the curriculum and made apparent efforts, such as moving the Spring 2020 semester workshop to July 2020 because of COVID, to fulfill the grant's objectives. They strove to meet the original goals of the grant while shifting to efficiently meet the needs and legitimate desires of stakeholders in the targeted area. The shift to industry-based certifications demonstrates that the grant team is proactively working to make a positive impact, rather than passively carrying out grant objectives. The project team's interest in targeting underrepresented schools was an effective attempt to further the impact of this grant.

The external project manager has been noted in surveys and interviews across stakeholders as organized and good at communicating. Observations from AROS would add to these an ability to maintain a network of stakeholders and adaptability. The rest of the grant team has also been efficacious, even as their roles have shifted over time. The team's cohesion and apparent trust have allowed them to collaborate to make many decisions, sometimes delegating and sometimes cooperating to accomplish tasks.

The team's continued collaboration with one of its pilot schools, BPSTIL, and its primary educator, has afforded a secondary education perspective that has proved valuable. Their partnership with a STEM-oriented school afforded continuous and effective curriculum development.

Lastly, the team's willingness to adapt, aside from the changes precipitated by COVID-19, has consistently proven beneficial. As they have received formative feedback from AROS, they have taken steps to correct or adjust their processes, communication, and anything else that would further the effectiveness of Project COMPLETE.

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