BOARD # 389: Leveraging ACCESS for Student Success: An NSF-Sponsored Initiative to Support Low-Income, Academically Talented Engineering Technology Students

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Dr. Wilburn's expertise includes Robotics, Automation, Mechanical Design, and Artificial Intelligence. He is passionate about advancing STEM education and creating industry partnerships. In addition to his teaching and coordination roles, Dr. Wilburn serves as Chair of the Appreciative Advising Committee and is an active member of various other university-wide committees. Committed to fostering innovation, he strives to equip students with the practical skills needed to address real-world challenges in engineering technology.

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Aligning Career & Campus Experiences for Student Success (ACCESS): An NSF S-STEM Initiative

Introduction

Formed in 2022 through the integration of California, Clarion, and Edinboro universities, Pennsylvania Western University (PennWest) is a public institution with campuses spanning [redacted]. The university is recognized for its 175-year legacy of academic excellence, nationally accredited programs, and commitment to career-focused education. PennWest is a Predominantly Undergraduate Institution (PUI) that serves as a vital educational hub, particularly for students in rural and economically challenged regions, providing accessible pathways to success in STEM fields and beyond.

The Aligning Career & Campus Experiences for Student Success (ACCESS) project, funded by the National Science Foundation's S-STEM program, is an ambitious initiative at [redacted]. ACCESS specifically aims to transform the educational and professional trajectories of low-income, academically talented (LIAT) students in engineering technology disciplines. The project addresses key findings from the National Academies Press report, *Promising Practices for Strengthening the Regional STEM Workforce Development Ecosystem*. Notably, the report highlights that many STEM graduates lack the technical and employability skills needed to thrive in the workplace. ACCESS directly tackles these gaps by equipping students with critical problem-solving, teamwork, communication, and technical skills, preparing them to succeed in the competitive STEM workforce. [1] The project targets three pivotal programs—Electrical, Computer, and Mechatronics Engineering Technology—fields essential to addressing national security concerns, advancing manufacturing innovation, and driving technological progress. By combining comprehensive financial support with tailored academic and professional development, ACCESS seeks to empower students to achieve academic excellence, strengthen career readiness, and contribute to workforce development in economically challenged regions, such as southwestern Pennsylvania .

Project Goals and Objectives

ACCESS is guided by the following strategic goals:
1. Recruit and provide scholarship support for a minimum of 12 low-income, academically talented (LIAT) students across two cohorts (two cohorts of 6 students), ensuring equitable access to higher education in engineering technology fields. Scholarships of $10,000 annually will address unmet financial need, reducing the necessity for students to work during the academic year.

2. Retain and graduate a minimum of 80% of participating LIAT students by leveraging comprehensive support services such as Appreciative Advising, Supplemental Instruction in foundational courses, and access to campus resources.

3. Establish a robust network of pre-professional and career development activities, including seminar series, workplace tours, directed internships, and senior capstone projects. These activities are designed to bridge classroom learning with professional environments, equipping students with the skills and experiences needed to thrive as STEM professionals.

Key Activities and Innovations

Reducing barriers to education with financial support: Financial barriers are among the most significant obstacles for LIAT students [2], and ACCESS directly addresses this challenge by awarding up to $10,000 annually per student. This funding alleviates the financial burden of tuition, fees, and related expenses, enabling scholars to focus on their academic and professional growth. Since its inception, the program has successfully enrolled two cohorts comprising 12 scholars, achieving a retention rate exceeding 80%. Notably, the scholarships reduce the need for students to take on external employment, which can detract from academic engagement.

Personalizing academic journeys with appreciative advising: At the core of ACCESS is the innovative Appreciative Advising model, which fosters meaningful, strength-based relationships between advisors and students. This approach is structured into six phases—Disarm, Discover, Dream, Design, Deliver, and Don't Settle—allowing advisors to build trust, understand students' aspirations, and co-create actionable plans for success. [3] Faculty trained in this methodology reported in an institutional survey that over 75% of their advisees demonstrate marked improvements in academic performance and personal growth, particularly in overcoming barriers related to confidence and resource access.

Supplemental Instruction: Enhancing Academic Performance

According to Dawson and colleagues [4], students who take part in Supplemental Instruction (SI) tend to earn higher average grades, experience fewer course failures and withdrawals, and demonstrate stronger retention and graduation outcomes. ACCESS leverages SI as a cornerstone of academic support, targeting historically challenging courses such as Circuit Analysis and Programming Fundamentals. SI leaders, who are trained peer mentors, facilitate collaborative learning sessions designed to deepen understanding and improve problem-solving skills. Surveys conducted within the institution over three years have shown that more than 80% of SI-supported courses successfully reduced the percentage of students withdrawing or earning D or F grades, with some courses achieving significant improvements. This success builds on initiatives funded

through a continuation of PennWest's Title III grant, which underscores the institution's commitment to supporting academic performance.

Professional Development: Building Career Competencies

Professional development within ACCESS is multifaceted, encompassing a range of activities designed to prepare students for real-world STEM careers:

Workplace Tours: Early exposure to industry settings through site visits introduces students to the practical applications of their studies, fostering an understanding of diverse career pathways.

Seminar Series: These workshops and guest lectures are conducted one event (guest lecture or workshop) per semester and cover essential workforce skills, including communication, teamwork, critical thinking, and adaptability. Participants report a 96% increase in confidence regarding career readiness and job opportunities.

Capstone Projects: All PennWest students enrolled in the Computer, Electrical, and Mechatronics Engineering Technology degree programs complete a two-semester Capstone Project during their senior year. These projects are conducted in teams and may be interdisciplinary in nature, although that is not a requirement. Final projects are publicly presented to the Advisory Boards and degree faculty at the end of the senior year. Additionally, ACCESS Scholars observe Capstone Project Proposal presentations during their sophomore year, allowing them to gain insight into the proposal process and expectations for their future projects.

Bridging academia and industry with directed internships: Directed internships are integral to the ACCESS model, offering students immersive, hands-on experiences aligned with their career aspirations. These internships are currently in the planning phase, as the oldest ACCESS cohort consists of sophomores. Once implemented, these internships will be designed in collaboration with industry partners to ensure that students gain practical, marketable skills. In the future, Scholars will leverage these experiences to inform and enhance their senior capstone projects, resulting in a seamless integration of academic knowledge and professional practice.

Evaluation Highlights

Recruitment and retention success: ACCESS has consistently met its recruitment targets, enrolling two cohorts of scholars despite external challenges such as changes in FAFSA and Pell eligibility. The program's holistic approach—combining financial aid, academic advising, and experiential learning—has been instrumental in maintaining retention rates above 80%. This success underscores the importance of addressing financial, academic, and professional barriers simultaneously.

Academic growth: The integration of SI and proactive advising has yielded significant improvements in academic performance. Scholars participating in SI sessions report higher grades and greater engagement in their courses. Faculty advisors note that the structured support provided by SI not only enhances academic outcomes but also builds students' confidence in their abilities to tackle challenging material.

Professional readiness: Feedback from participants highlights the transformative impact of ACCESS's professional development initiatives. Surveys indicate that over 95% of students feel better prepared for their careers after participating in workplace tours and seminars. These activities provide critical exposure to industry expectations, helping students align their academic efforts with professional goals. As shown in **Figure 1**, most respondents agreed that attending ACCESS program events increased their knowledge and confidence relating to their future careers. For instance, 75% of students strongly agreed that they learned more about job opportunities available with their degree, and 67% strongly agreed that they better understood the connection between classroom learning and future careers. This evidence underscores the program's success in fostering career readiness among scholars.
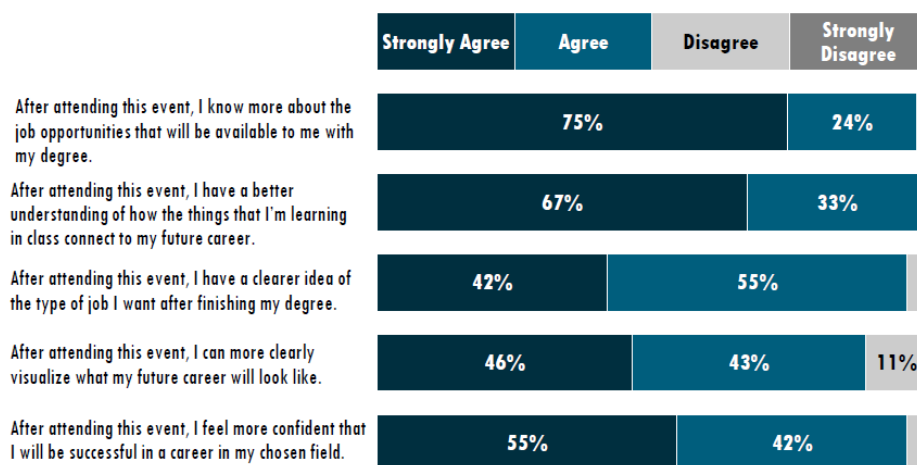

Strongly Agree	Agree	Disagree	Strongly Disagree

After attending this event, I know more about the job opportunities that will be available to me with my degree. — 75% / 24%

After attending this event, I have a better understanding of how the things that I'm learning in class connect to my future career. — 67% / 33%

After attending this event, I have a clearer idea of the type of job I want after finishing my degree. — 42% / 55%

After attending this event, I can more clearly visualize what my future career will look like. — 46% / 43% / 11%

After attending this event, I feel more confident that I will be successful in a career in my chosen field. — 55% / 42%

Figure 1. Professional Readiness Survey Results from External Evaluator [5]

Lessons Learned and Implications

Addressing Recruitment Challenges: Initial recruitment efforts revealed several barriers, including a lack of awareness about the program and misconceptions about the application process. Future initiatives will include targeted outreach to underserved communities, streamlined application procedures, and partnerships with high schools and community organizations to broaden the applicant pool.

Enhancing Student Engagement: Engaging first-generation and underrepresented students remains a priority. Strategies such as peer mentorship programs, cohort-based social events, and

the integration of career exploration activities into coursework are being explored to foster a stronger sense of belonging and purpose among scholars.

Expanding Industry Partnerships: The success of ACCESS's professional development initiatives highlights the value of robust industry collaborations. Expanding these partnerships will enable the program to offer a wider range of internship opportunities and ensure that students are well-prepared to meet evolving workforce demands.

Future Directions: ACCESS aims to amplify its impact through the following initiatives:
1. Expanding the scope of guided internships to provide all scholars with transformative, hands-on industry experiences.
2. Leveraging advanced data analytics to evaluate long-term student outcomes and refine program interventions.
3. Hosting an annual Scholar Showcase to celebrate student achievements and strengthen connections with potential employers.

Acknowledgments

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