BOARD # 343: Community Partner and Institutional Stakeholder Perspectives on the Impact of the NSF-STEM Scholars of Excellence in Engineering and Computing Studies Program

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Abstract

The Scholars of Excellence in Engineering and Computing Studies (SEECS) program, funded by an NSF S-STEM grant, delivers engineering solutions that tackle community challenges while providing students with opportunities for professional and personal development and to develop technical skills. This study evaluates the program's impact from a stakeholder perspective, focusing on the contributions of SEECS projects to community, organizations, and student growth. Through surveys of intra-university and external stakeholders, the investigators assess the professionalism, technical expertise, and tangible outcomes delivered by SEECS scholars. Additionally, the study examines the program's broader value, including its effects on organizational efficiency, community improvement, and its alignment with the university's mission. By understanding the factors driving continued collaboration and the perceived benefits of the SEECS projects, this paper aims to share a road map to building a successful collaborative program that positively impacts both the community and partner organizations.

Introduction

The SEECS program has been in operation since the fall of 2009, with NSF S-STEM funding for all but one of those years. The grant activity has always had as a foundational element the university mission which prominently features service to others. This service component has been affected through community-based, engineering-forward projects completed by students in service of some unmet community need [1],[2],[3]. SEECS has collaborated with various external stakeholders on community-focused projects, engaging with organizations that support individuals with disabilities, at-risk youth, veterans, and environmental initiatives. Notable partnerships include the Regional Science Consortium (4 projects) and the Pennsylvania Soldiers and Sailors Home (2 projects). Other engagements include work with retirement communities, animal shelters, and global medical aid initiatives, demonstrating SEECS's broad impact across social, educational, and environmental sectors.

Design projects are selected in partnership with the community partner, whose role is to provide guidance with regard to their own needs, be available for consultation by students as potential solutions are developed, and to provide support during installation of completed projects. So far, projects have proceeded without requiring funding from the partner agencies beyond provision of materials already in-hand and available for use. At completion of the project, students hand over their completed artifact to the project client.

Normally, the projects would be completed within the first two years of a student's academic program, so that juniors and seniors who have already completed their projects will provide a useful experiential resource to freshmen and sophomores as they complete their work. Most projects have been delayed for practical reasons, such that it often happens that students are unable to receive feedback from clients in time for a revisionary grooming process. Thus, success of the projects can only be measured reliably by consulting with the client stakeholder. This paper reports on the feedback received from the internal and external stakeholders.

A second foundational element of the grant activity is support of students academically, such that retention and graduation rates will be improved, relative to the peer group students who are not part of the SEECS activity. Also, as the NSF goal for S-STEM programs includes placing newly minted, domestic students into the US STEM workforce, SEECS includes activities related to career preparation and job searching. As such, there are also internal stakeholders to be considered in the evaluation of this grant activity. These internal stakeholders also possess valuable information that may be used to improve the SEECS program activities and outcomes.

Internal Stakeholder survey summary

The internal stakeholders include various divisions at Gannon University that interact with the SEECS program. Key stakeholders include the Academic & Career Development Office, which supports professional development for SEECS students through mock interviews, resume assistance, and career readiness activities. The Financial Aid Office plays a crucial role in processing scholarships and awards for eligible students, while the Admissions Office provides information on incoming students that are eligible for SEECS scholarship. These divisions collaborate across several fronts, ensuring the success of the program. Additionally, four department chairs promote the program to prospective students and leverage this funding source during their recruitment efforts. Representatives of all of the departments responsible for the internal support noted above were asked for feedback via survey, along with department chairs. Responses were obtained from a representative from five of seven internal support departments; one chair responded to the survey request.

The survey of internal stakeholders was conducted to evaluate the impact and effectiveness of the SEECS program. The questions focused on the primary benefits of the program for the university, including its influence on student retention, university reputation, departmental collaboration, and community engagement. Stakeholders were also asked to assess the value of the scholarships and professional development activities provided by the SEECS program, as well as its impact on students' academic and professional outcomes. Additionally, the survey included questions to examine how stakeholders perceive the alignment of the SEECS program with Gannon's mission and goals, its impact on the local community, and opportunities for the program to further enhance its positive influence on the community.

The SEECS program offers several key benefits for Gannon University, as identified by respondents. A majority of respondents (66.67%, n=6) highlighted its impact on enhancing the university's reputation and visibility, while 50% noted its role in increasing student retention and success. Additionally, 33.33% of respondents emphasized the program's contribution to fostering greater collaboration among departments. The SEECS program is also seen as contributing to improved community engagement and partnerships (66.67%). The responses from internal stakeholders underscore the significant value and impact of the SEECS program.

Respondents found the scholarship and professional/personal/social development activities offered by the program to be highly valuable, with a significant positive effect on students' academic and professional outcomes. This aligns with the high rating of 4.17 given to the program for its ability to enhance students' academic and professional success. Stakeholders also viewed the resources provided as essential in supporting both the professional and personal growth of participants. Additionally, the program was well-regarded for its alignment with Gannon's mission and goals, earning a 4.17 rating. While the program received a slightly lower

rating of 3.83 for its support of Gannon's commitment to community outreach, it still affirmed its role in contributing to the university's service to the community, which was rated at 4. These ratings reflect stakeholders' strong belief in SEECS as a valuable and integral component of Gannon University's mission, particularly in advancing student success and fostering community engagement.

When evaluating the alignment of the SEECS program with Gannon's mission and goals, respondents felt it was well-aligned, contributing positively to the university's broader educational objectives. Regarding its impact on the local community, the program was recognized for increasing employability (66.67%), strengthening partnerships with local organizations (50%), and contributing to local workforce development (50%). To further enhance its positive impact on the local community, respondents suggested increasing connections with employers through internships, off-campus work-study positions, and full-time job opportunities. Additionally, involving local companies, non-profits, community leaders, and media in student projects was recommended to increase visibility and engagement.
The responses to the questions regarding the SEECS program's support for Gannon's commitment to community outreach and service reflect a positive assessment. A majority of respondents agreed that the SEECS program has effectively supported Gannon's community outreach efforts and its commitment to service. While specific suggestions for improvement were not provided, the overall feedback indicates strong endorsement of the program's impact on community engagement. This alignment with Gannon's values was recognized as a significant contribution to the university's broader community-focused goals.

External Stakeholder survey summary

The external stakeholders surveyed represent a diverse range of nonprofit organizations, including those focused on environmental and animal services, veteran services, and education. The survey was conducted to assess the impact and effectiveness of SEECS's community-service projects, gather feedback on the value of SEECS's contributions to their operations, and explore potential areas for further collaboration. Stakeholders were asked about their experiences with SEECS, including factors influencing their decision to collaborate, the specific outcomes of their partnerships, and their overall satisfaction with the program's support and professionalism.
Of the five external stakeholders surveyed, responses were received from three organizations. Efforts to gather input from the remaining two organizations were unsuccessful due to changes in personnel, such as individuals leaving their positions or retiring, and challenges in obtaining updated contact information. Due to the turnover at the client agencies, we were unable to reach some partners for feedback. Responses from three organizations were obtained.
Some partnerships with stakeholders date back to 2009, while others began in 2022, with some organizations still in the process of completing their projects. The survey responses are summarized based on the key questions asked, categorized into the most valuable aspects of the partnership, factors influencing collaboration, the program's impact on the local community, specific examples of success, and opportunities for enhancement.

Most Valuable Aspects of the Partnership

The survey question, "Which aspects of our partnership do you find most valuable?" allowed respondents to select multiple options, and the results highlighted the key strengths of the SEECS program. Access to engineering expertise, innovation in solutions provided, and

opportunities for collaboration and networking were the most valued aspects, with each receiving 75% (n=4) of the responses. These findings underscore SEECS's ability to deliver high-quality technical solutions while fostering meaningful partnerships with external organizations.

In addition to these strengths, responsiveness and support from the SEECS team were identified as valuable by 50% of respondents. While this reflects moderate satisfaction, it also indicates room for improvement in communication and responsiveness, particularly during critical project phases. Finally, alignment with our mission and the "other" categories received no responses. This result is unsurprising, as mission alignment is more of an internal consideration that is less visible or relevant to external stakeholders. Overall, the survey findings emphasize that SEECS is highly regarded for its expertise, innovation, and collaboration, though enhanced responsiveness could further strengthen partnerships.

Factors Influencing Collaboration

In response to the question, "What factors influenced your decision to collaborate with SEECS on multiple projects?" two external partners who had been involved in multiple initiatives provided valuable feedback. Quality of SEECS engineering solutions and positive past experiences with the SEECS team emerged as the most influential factors, each receiving 75% of responses. These results highlight that maintaining consistently high-quality deliverables and fostering positive working relationships are crucial for sustaining long-term collaborations. Other factors, such as strong understanding of the partner organizations' missions and needs and ongoing support and communication, were selected by 25% of respondents, suggesting that while these aspects are relevant, they are less influential compared to technical quality and prior positive experiences. Additionally, the "other" category was selected by 25% of respondents, with one participant indicating uncertainty due to the collaboration decision pre-dating their tenure at the organization. This highlights the importance of continuity and clear documentation in sustaining partnerships over time. The responses reinforce the idea that SEECS's reputation for delivering exceptional engineering solutions and fostering trust through prior successes is a key driver of collaboration, while mission alignment and ongoing communication, though less emphasized, remain important supplementary factors.

Impact on the Local Community

The question, "In your opinion, how has SEECS impacted the local community?" revealed significant contributions. Community collaboration stood out as the top impact, cited by 100% of respondents, highlighting SEECS's role in uniting organizations and individuals to tackle shared challenges. Addressing specific community needs was noted by 67%, demonstrating SEECS's effectiveness in resolving local issues. Additionally, 33% reported improved operational efficiency, access to technical expertise, and economic development, suggesting areas for growth in operations and expertise. One-third of respondents also mentioned other impacts, including economic development, though it remains a secondary goal. Overall, the findings affirm SEECS's success in fostering collaboration and addressing key needs while indicating room for enhancing technical and operational contributions.

Specific Examples of Impact

Respondents provided qualitative feedback illustrating the benefits of SEECS projects for the local community. One participant praised a student presentation as "delightful," emphasizing its

role in helping the community identify and address specific needs. Another respondent highlighted the program's contribution to improving the quality of life for veterans, specifically citing completed projects such as therapeutic planter boxes. Additionally, a stakeholder described their experience with SEECS as "outstanding," noting the extensive impact of class projects on nonprofit services. This respondent suggested that the program should serve as a standard for future classes, recognizing it as a point of pride and a valuable community resource.

Project performance aspects

The survey evaluated key aspects of SEECS project performance, including communication, professionalism, expertise, and tangible outcomes. Stakeholders generally rated communication positively, with 75% agreeing that they had sufficient opportunities to provide input throughout the project phases, highlighting the program's emphasis on collaboration and open dialogue. Professionalism was another strong area, with 75% of respondents expressing satisfaction with the conduct of scholars, reflecting the program's success in preparing students to meet industry and community expectations. Additionally, 67% of stakeholders praised the technical expertise of SEECS scholars, emphasizing the program's ability to deliver practical, engineering-based solutions tailored to organizational needs. Tangible outcomes of projects were also well-received, with stakeholders citing examples such as improved quality of life for veterans and innovative solutions that enhanced community well-being and organizational operations. Overall, the data reflects SEECS's effectiveness in delivering impactful projects, while also identifying opportunities to further strengthen engagement and collaboration throughout the project lifecycle.

Overall Feedback and Opportunities for Enhancement

Overall, stakeholders expressed high levels of satisfaction with their experiences partnering with SEECS. The program was consistently viewed as a positive and impactful resource for community enhancement, delivering high-quality engineering solutions and fostering meaningful collaborations. However, respondents identified areas for potential improvement, including increasing the number of projects, enhancing communication and responsiveness, and exploring new opportunities for collaboration. These enhancements would allow SEECS to scale its impact and address evolving community needs while maintaining its reputation for excellence.

Conclusion

The paper presents results of a survey instrument delivered to and by project stakeholders, regarding engineering projects undertaken by students in an NSF S-STEM program. Stakeholders include both internal partners who are impacted by the projects as the projects are leveraged for student learning and marketing efforts, and external stakeholders, who receive the final engineered products. In general, stakeholders seem satisfied with many surveyed aspects, but at the same time were not universally positive in all aspects. Lessons for SEECS include speeding things up a bit and making sure to maintain close contact with external partnering agencies. The perceptions of stakeholders will be used to modify the project selection and execution components of the SEECS program. It is hoped that seeing the report of stakeholder satisfaction will provide guidance to other S-STEM administrators who may be interested in incorporation of a community project-based component into their own S-STEM activities.

Acknowledgment

References

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