Assessing Impact without Using Grades: Quality Review of Community Engagement

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The Scholars for Excellence in Engineering and Computer Science (SEECS) program was initiated in fall 2009 through NSF S-STEM grant funding. The interdisciplinary, multi-year, mixed academic-level program awarded scholarships to students based on academic merit and financial need. SEECS is an opportunity for students in the majors of computer science, electrical and computer engineering, environmental engineering, information systems, mechanical engineering, and software engineering at Gannon University. The goals of the scholarship program are (1) to increase the number of academically talented, but financially disadvantaged students in the stated majors, (2) to assist students to be successful in their undergraduate education, and (3) to foster professional development for careers or graduate education. These goals are realized through the students' shared interactions within the SEECS seminar.

Students awarded SEECS scholarships are required to attend a seminar where specific development and learning outcomes are realized in a team-based, project-based approach. The SEECS zero-credit seminar is structured around three components: engineering design, professional development, and personal development – with the design component absorbing 50% of the seminar's focus.

The design project is the kernel of the SEECS seminar. At this time, five design projects have been fostered through the SEECS seminar, three fully implemented, one in the design and deploy phase, and one in the identification stage. Each project supported different non-profit organizations, complemented different distributions of majors, and required different technical competencies. Although structurally vastly different, all five projects have achieved the aims of the SEECS program. Furthermore, the projects are more significant than simply a deliverable: (1) the students gain professional identity and confidence through its development; (2) the faculty enjoy the satisfaction of engaging students in the profession, (3) the project manifests the university's commitment to service and regional outreach, and (4) the regional non-profit values the expertise and professionalism delivered to their needs.

To date, however, no assessment of the projects as part of an engagement process has occurred. Rather, each project is viewed as successful upon completion of its structure and delivery of its functioning. As the SEECS faculty move forward with the seminar, a more complete and quantifiable assessment plan is defined. The assessment plan focuses not only on the product delivered but also appraises the process supporting the development of the product from initiation to delivery. A fundamental element of the process being appraised is the quality of the relationships between the site, the students, the SEECS faculty, and the university.

The following paper presents the assessment plan developed and deployed by the grant co-PIs to assess the projects and the processes. Elements of the assessment plan were conceived as a result of the guidance provided at the Engineering Faculty Engagement in Learning Through Service (EFELTS) Workshop, August 9-10, 2012, Houghton, MI. The workshop suggested a perspective for broadening assessment targets. With this, the SEECS seminar now employs a

more comprehensive quality-review process. Partial data for the five completed projects are presented and the value of the assessment strategy is discussed.

1 Introduction

One of the results of the American Competitiveness and Workforce Improvement Act of 1998[1] was the establishment of the "Scholarships in Science, Technology, Engineering and Mathematics" (S-STEM) program the National Science Foundation (NSF). In 2008, Gannon University's College of Engineering and Business was awarded an NSF S-STEM grant, specifically for academically talented students who exhibited financial need and wished to enroll in one of the majors of computer science, electrical and computer engineering, environmental engineering, information systems, mechanical engineering, or software engineering. The Gannon University scholarship program was given the name Scholars of Excellence in Engineering and Computer Science (SEECS) in Award No. 0806735. The SEECS program was initiated in fall 2009. The interdisciplinary, multi-year, mixed academic-level program awarded scholarships to students based on academic merit and financial need. The goals of the scholarship program are (1) to increase the number of academically talented, but financially disadvantaged students in the stated majors, (2) to assist students to be successful in their undergraduate education, and (3) to foster professional development for careers or graduate education. These goals are realized through the students' shared interactions within the SEECS seminar.

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The first fully implemented project was the redesign and construction of a new ramp for kayaks and canoes to support the activities of the Bayfront Maritime Center. BMC supports various organizations (high schools, middle schools, scouts, YMCA, etc.) with educational programs that build small watercraft.[4]

The second project undertaken and completed by SEECS students was the design and construction of a bicycle-powered electrical generator. The stakeholder for this project was

Gannon University, specifically the *Gannon Goes Green* initiative, a campus-wide effort to improve environmental sustainability.[5]

The third fully implemented project supports the mission and activities of Pennsylvania Sea Grant.[6] One of the functions of Pennsylvania Sea Grant is to monitor the water quality of the streams and creeks that flow into Presque Isle Bay and Lake Erie. The project created a device to collect suspended sediment from the creeks and streams for required analyses to ascertain sediment characteristics after storm events.

The project completing design and deployment supports the vocational services of the Barber National Institute,[7] which serves children and adults with disabilities. One of the ways adults with disabilities are assisted by the Barber Institute is by employment in the form of piece-work assignments while being supervised by Barber Institute professionals.[8] Kit assembly is a common packaging task for the workers. The SEECS project aims to build a device to assist an intellectually-disabled client handling a kit-assembly task.

The project currently in the identification and requirements gathering cycle is affiliated with Habitat for Humanity.[9] The home designs are standardized and aim to be highly energy efficient. The quality of the in-house ventilation of a home is the trade-off for a tightly constructed house. The design work involves (1) an assessment of the overall ventilation system of the home's design and (2) a proposition of an addition or modification to the ventilation components to help safe-guard the designed ventilation expectations.

Although structurally vastly different, all five projects have achieved the aims of the SEECS program. In addition, the projects provide a needed deliverable to a regional non-profit organization. Of additional significance: (1) the students gain professional identity and confidence through the development of the project; (2) the faculty enjoy the satisfaction of engaging students in the profession, (3) the project manifests the university's commitment to service and regional outreach, and (4) the regional non-profit sites values the expertise and professionalism delivered to their needs.

2 Need for Assessment

Industry has long embraced the need for quantitative assertions to describe the quality of processes, products, and personnel. Academic initiatives have lagged in incorporating such accountability. Traditionally, the realm of academic initiatives involving research efforts has had the inherent short-coming of unique, limited deployment. The need for cyclic quality assessments to improve the research *process and relationships* has been limited.

As voluntary (and recommended by their chairs and deans) participants in a Learning through Service (LTS) Faculty Fellows Workshop, two of the authors gained the assessment perspective offered through the sessions and have relayed the significance of the perspective to the entire

SEECS faculty team. The LTS workshop, offered in Houghton, MI, in 2012, was one of three offered across the U.S. to disseminate the best-practices of LTS efforts. (See [10] for a description of the LTS workshops and overall project goals.)

Advocated at the workshop was the perspective to embrace robust assessment of an LTS effort. In academia, the focus of much assessment is centered on the student, such as the students' interaction with one another, the students' evaluation of the instruction, the students' critique of the learning experience. LTS efforts expand the learning process beyond the classroom walls into community relations, administrative interactions, faculty involvement as well as student learning. With the SEECS design projects serving non-profit organizations, the projects are prime candidates for such in-depth, robust assessment practices.

The authors have defined five value-chains among various participants and components in the SEECS projects and have built assessments for these chains. The first chain evaluates the project itself in light of its ability to meet the underlying objectives of the SEECS grant. The second assessment focuses on whether the intrinsic nature of the students has been influenced: Do the students have an improved identity of themselves as a potential engineer and as a valuable contributor. Third, the satisfaction of the SEECS faculty with the project and the seminar and their repercussions is considered. Fourth, the quality of the service-learning – not the academic learning – is discussed. Finally, the quality of the relationship with the non-profit organization itself is evaluated. Each of these chains is explained in the following section.

3 Assessment Perspectives and Definitions

3.1 Project Quality Assessment

The engineering design aspect of the SEECS Seminar courses is a vital component of the overall SEECS project, inasmuch as it is meant to support several key objectives of the SEECS effort. Specific objectives of the design project are (1) encourage significant interdisciplinary work among students, (2) engage students in the profession of engineering, (3) provide students with a sense of professional identity, and (4) support the mission of the university and of the Catholic Church. As such, it is perhaps the most important single aspect of the SEECS seminar, and its assessment is of paramount importance. The quality of the project can be defined as an amalgam of measures of success on these four enumerated objectives. Since these are group projects, and in fact worked upon by three separate class groups over the two-year cycle, it is impossible to fully assess the project on a student-by-student basis. Instead, the project artifacts themselves are assessed, with the assumption that the artifact attributes necessarily correspond to student achievements.

Project objective (3) (professional identity) can be measured only subjectively. Whether or not students feel a sense of identity and community as a result of this project can be measured only

by gathering of student opinions. No further assessment methodology is utilized or planned for this aspect of the project. Project objective (4), (adherence to mission) is an immeasurable concept. The co-PIs attempt to ensure mission adherence through a project selection method. Through the selection method, the co-PIs work closely with the Gannon University Office of Service-Learning which in turn coordinates with the office of the Vice President for Mission and Ministry and with local non-profit agencies. In this way, the co-PIs reach out to the local community for projects which benefit the region and address basic human needs in accordance with the mission of the Catholic Church and Gannon University.

Project objectives (1) and (2), however, may each be measured objectively, though some of the measures are indirect. Effectiveness of achievement of interdisciplinary focus -- project objective (1) -- may be measured by use of two assessment tools: a faculty assessment of the significance of contributions to the project by major, and an assessment of student opinions of the project.

Interdisciplinary focus is an explicit goal in the choice of projects. Projects are chosen ideally to include components from each of the students' academic fields, with an eye upon the specific majors of those students who will be working the design task from start to finish. In a perfect world, then, successful completion is impossible without interdisciplinary cooperation. But such well-suited projects cannot always be chosen, and interdisciplinary needs may vanish as an evolving understanding of project needs drives the development of engineering specifications and design concepts. Thus, project selection itself does not prove interdisciplinarity. However, when one reviews the final artifact, it may be possible to gauge the interdisciplinary character of the project. If students have been forced either to work outside their comfort zone to a significant degree or if students of different majors have separately had to contribute from their own sphere of knowledge, then the project has required an interdisciplinary focus. Thus faculty members' assessment of the overall impact of separate disciplines on the final design and student opinions regarding their own experience in the design process can directly measure success in achieving interdisciplinary cooperation.

Success of the engagement of students in the profession of engineering -- project objective (2) -- can be measured indirectly, based upon the capability of the finished artifact to meet its engineering objectives. Assuming that the artifact is sufficiently original to justify its adoption as a SEECS project, and that the artifact is delivered and put into successful service, then it may be argued that professional experience has been provided to the students as a group. If the artifact meets or exceeds the engineering specifications developed in the course, then the engagement has produced successful results. Properly finalized engineering specifications are of course unambiguous and measurable. They are developed in consultation with the primary stakeholders of the project, and measurement of their satisfaction is mutually done by students in design and by primary stakeholders as the device is used in service. For example, it is easy for

students to say "Yes, the *design calculations* indicate less than 2 hp of power usage at full load," thus validating any such 2 hp maximum requirement by students. The user can measure whether the power limit has been satisfied and conclude that "Yes, the maximum power limit is satisfied *in practice."* -- or not, as the case may be.

On an individual student basis, participation can be measured through peer assessments of student inputs, which are gathered at the end of each semester. While this proves little by itself, it does indicate whether the student is actively engaged; if peers say not, then it is likely the student's need for professional identity has not been fulfilled.

Specifics of the assessments are as follows:
- Adherence to mission is merely assumed, so long as projects are chosen in collaboration with the relevant university departments and involve approved local non-profit entities as primary stakeholders.
- Development of professional identity is assumed, not really measured.
- Interdisciplinary focus can be measured on a yearly basis, as students who have worked on each project are polled with regard to their impressions of interdisciplinarity in the project work. It is further measured on a two-year (one assessment per project) basis by faculty members looking at the final artifact, and interpreting the input of each relevant discipline.
- Professional experience is assessed each semester, on a student-by-student basis, in the peer-provided assessment of student input.
- Professional experience is further assessed at the conclusion of each two-year design cycle (one assessment per year, as the SEECS program always has two overlapping design cycles ongoing) by review of the capabilities and limitations of each finished artifact in comparison to the agreed-upon engineering specifications.

3.2 Student Identity and Attitude towards Service Assessment

A conceptualization of the impact of project-based service-learning on the knowledge, skills, attitudes, and identity of the participants is presented by Bielefeldt et al.[11] and a general list of indicators (demographics, self-efficacy, attitudes towards learning, engineering learning outcomes, well-being, mindset, work and life, engineering identity, and intercultural competency) is presented by Patterson et al.[12] to study the impacts of learning through service. The extent to which each one of these dimensions/indicators is affected will depend on the level of complexity of the experience as well as the learning objectives defined by the course or environment in which the experience is executed. Therefore, the selection of projects is intimately linked to the development of students' dimensions. The academic structure of the SEECS seminars (see [2]) limits the breadth of the assessment and the faculty must be careful to select and define realistic student outcomes to assess. Figure 1 is Bielefeld et al.[11] graphical

conceptualization of the student outcomes which was employed during the selection of the indicators to assess elements of the SEECS program. The selected parameters are related to attitude and identity. These selected parameters are also related to two of nine indicators presented by Patterson et al.:[12] self-efficacy and engineering identity.

Figure 1 – Conceptual schematic of student learning outcomes (knowledge, skills, attitude and identity) as a function of the type of experience.[12]

Based on the structures of the SEECS seminar, four categories have been identified:
1. Engineering Environment
2. Engineering Identity
3. Attitudes
4. Skills

At the end of every academic year, students are given the *SEECS Seminar Participant Survey of Effectiveness* (presented in Appendix A). The first four questions of this survey, presented in Table 1, have been categorized into one of the four categories employed in this study and listed above. The open-ended questions on the survey provide a sense of students' satisfaction with the projects and activities.

Table 1 – First four questions of the *SEECS Seminar Participant Survey of Effectiveness* correlated to the selected four categories.

Overall, the seminar and its experiences	Category

… has been satisfying	Attitude
… has increased my appreciation for the aspects of engineering design	Engineering Environment
… has increased my awareness of the interdisciplinary interactions of engineering	Engineering Environment
… has increased my desire to be a graduate of an engineering and / or science program	Engineering Identity

An additional Likert survey, *Engineering Environment, Identity and Students' Attitudes towards Service-Learning: Participant Survey*, was developed and initially given in fall 2012 to assess students' perceptions of engineering identity and attitude towards service. These attitudes are self-perceptions and surveys are suited to gather information and measure these parameters. In addition to attitude and identity, two questions are related to skills (communication and teamwork). Table 2 presents these survey questions and their correlation to learning outcomes (i.e. categories). The survey is administered at the end of every semester.

Table 2 – *Engineering Environment, Identity and Students' Attitudes towards Service-Learning: Participant Survey* correlated to the selected four categories.

Overall, the seminar and its experiences	**Category**
… have provided opportunities to assess my abilities and interest in my chosen major and career	Engineering Identity
… have allowed me to understand the impact of engineering solutions in a societal context	Attitude
… have redefined engineering as a helping profession	Engineering Identity
… have improved my ability to communicate effectively	Skill
… have challenged my creativity	Attitude
… have improved my attitude towards community service	Attitude
… have increased my self-confidence to operate in multidisciplinary teams	Skill
… have increased my self-esteem	Attitude

3.3 Faculty Satisfaction Assessment

Faculty are typically not asked whether they value their contribution to educational goals. Implicitly, faculty are assumed to attribute value to their efforts because they continue to teach and to stay within the field of higher education. In reality, faculty assess their contributions on various dimensions depending on their institutional climate, their tenure and promotion status, and their personal values.

The Higher Education Research Institute (HERI) of UCLA and its Cooperative Institutional Research Program (CIRP) have been evaluating aspects of higher education since 1966. With

multiple surveys, HERI has conducted national longitudinal study of the American higher education system. Although participation in the surveys is an institutional decision, each survey and its explanation are available for understanding and access.[13,14]

The depth and detail of the HERI faculty satisfaction survey is more involved than required to assess the SEECS faculty satisfaction. The SEECS co-PIs are all based at the same institution, within the same academic school, under the same academic administration, and are all tenured. Hence, many of the demographic and attribute elements of the survey are irrelevant.

What is relevant are the elements questioning work effort relative to personal values. The *SEECS Faculty Satisfaction Assessment* (see Appendix B) uses a subset of questions from the HERI survey. To emphasize the association between the personal statement and the faculty member's perspective on the value of the SEECS work to realize the personal value, an emphasis aspect is included in the assessment. Hence, a faculty member is not only asked whether the personal statement is important, but also whether the SEECS program is viewed as being important relative to the statement. Essentially, if faculty members highly rate a value statement and if the SEECS program is assessed as influencing the value, then faculty members will be more satisfied with their involvement in the SEECS program.

In the future, the faculty satisfaction survey is to be assessed at the completion of each project. At that time, each of the co-PIs will have made a contribution to a project, will have mentored a cohort of scholars, and will have interacted with the stakeholder as a primary contact. To date, the survey has not been administered. However, a salient aspect of the co-PIs satisfaction is the reapplication for funding and pursuit of future funding beyond the grant's horizon.

3.4 Service-Learning and Engagement Assessment

The Office of Service-Learning at Gannon University defines service-learning on its web site as follows:

> " 'Service-learning is a credit-bearing, educational experience in which students participate in an organized service activity that meets identified community needs and reflect on the service activity in such a way as to gain further understanding of course content, a broader appreciation of the discipline, and an enhanced sense of civic responsibility.' Robert Bringle and Julie Hatcher, "A Service Learning Curriculum for Faculty." The Michigan Journal of Community Service Learning. Fall 1995. 112-122."

The design component of the SEECS seminar has focused on projects which apply STEM learning to support service-learning and community-based need. However, the assessment which SEECS scholars complete at the end of each semester had focused primarily on the

engineering and team-related interdisciplinary learning aspects of the projects and related activities.

However, research has found that adding a service-learning component to a project can enhance learning, especially in the areas of social and moral development.[10] In order to better assess outcomes enhanced by service-learning, the assessment completed for the most recent semester included questions to begin to address these outcomes.

Specifically, scholars were asked on the *Engineering Environment, Identity and Students' Attitudes towards Service-Learning: Participant Survey* (see Table 2) to rate the following on a six-point Likert scale (with 1 being "Strongly Agree" to 6, "Strongly Disagree"):

1. Overall, the seminar and its experiences have allowed me to understand the impact of engineering solutions in a societal context
2. Overall, the seminar and its experiences have improved my attitude towards community service

The two questions assess the students attitudes towards service-learning. No other aspect of service-learning is sought to be understood for the value-chain.

3.5 Non-Profit Site Relationship Assessment

Expanding the educational experience to include service is a growing movement in engineering education.[10] At Gannon University, service-learning, which includes service to the community, is a standard of the institution. In 2009-2010, Gannon students contributed over 70,000 hours of community service, with 32,200 hours occurring in academic service-learning courses.[15] Including service- learning as a strategic aspect, the university has been expanding the number of courses utilizing service-learning. Complementary to this mission, the design component of the SEECS program offers scholars the opportunity to apply their STEM learning in support of a service-learning, community-based, team-developed design project.

Projects are identified with the aid of the Office of Service-Learning (OSL), established in May 2006, acting as a resource for the SEECS program by identifying potential stakeholders and community-based projects. As part of its normal operations, the OSL compiles requests from non-profit and community organizations in need of engineering assistance and actively recruits projects from the community. Also, projects serving Gannon University directly provide a secondary source of projects.

The OSL offers community needs and initial introductions; the SEECS faculty identify suitable projects and manage all relationship interactions after the introduction. The SEECS faculty provide intermittent reports on the progress of any work to the OSL, but the OSL allows the SEECS program to own the specific project relationship with the non-profit.

As stated in [3], key elements need to be in place to maintain productive partnerships, namely:
- *Well-communicated expectations* regarding the delivery timeline and the focus of the students' educational experience.
- *Frequent and sufficient communication* with the non-profit stakeholder. Requirement clarification, additional information sourcing, site visits, and progress summaries are just the rudimentary points of the dialog.
- *Establishment of a rapport* between the co-PIs and the site. The co-PIs initially visit the site to understand the project and its needs. Depending upon the nature of the project, the co-PIs may need to repetitively re-connect with the stakeholders on site to reinforce the non-academic reality and importance of the project.

The core process to assess with respect to the non-profit is communication. Since communication implies a channel and potential exchanges, the assessment focuses on the presence, degree, and quality of the interactions. On a simple four-point Likert scale (with 1 being "Strongly Agree"), stakeholders are asked to evaluate the following five statements.

The interactions with the SEECS program, its faculty, and the scholars…
1. *Did allow the stakeholder to be informed*
2. *Did allow the stakeholder to participate in the design and development of the project*
3. *Did allow the stakeholder to offer feedback*
4. *Did allow the stakeholder to confirm the project had value to the students*
5. *Did allow the stakeholder to confirm the project had value to the SEECS program, in general*

By using an even-numbered Likert scale, the respondents do not have a neutral, middle-ground choice, but must make a decision towards one preference or the other.

The assessment is distributed to any individual at a project's non-profit site who had been in correspondence with the co-PIs. Ancillary individuals at a site who may have been introduced, but then decreased their participation because their range of influence did not interface with the project are not polled. The assessment is deployed online through the mechanisms offered by SurveyMonkey.com, LLC and sent semi-annually.

4 Assessment Results and Discussion

The *Engineering Environment, Identity and Students' Attitudes towards Service-Learning: Participant Survey* was administered for the first time in the fall of 2012; results are presented in Table 3. The results are clearly preliminary but they allow co-PIs gather information regarding the students' perceptions.

Table 3 – Fall of 2012 Survey Results: *Engineering Environment, Identity and Students' Attitudes towards Service-Learning: Participant Survey*. Mean responses to Likert scale of 1 (Strongly agree) to 6 (Strongly disagree), $N = 22$.

Overall, the seminar and its experiences	Likert Scale	Mean	Standard Deviation
… have been satisfying	Attitude	1.84	1.0279
… have increased my appreciation for the aspects of engineering design	Engineering Environment	1.76	0.8794
… have increased my awareness of the interdisciplinary interactions of engineering	Engineering Environment	1.60	0.7071
… have provided opportunities to assess my abilities and interest in my chosen major and career	Engineering Identity	1.60	0.866
… have increased my desire to be a graduate of an engineering and / or science program	Engineering Identity	1.52	0.5859
… have allowed me to understand the impact of engineering solutions in a societal context	Attitude	1.52	0.5859
… have redefined engineering as a helping profession	Engineering Identity	1.60	0.8165
… have improved my ability to communicate effectively	Skill	1.48	0.5859
… have challenged my creativity	Attitude	1.60	0.7638
… have improved my attitude towards community service	Attitude	1.63	0.7109
… have increased my self-confidence to operate in multidisciplinary teams	Skill	1.76	0.7789
… have increased my self-esteem	Attitude	1.76	0.8307

The survey ratings were based on a six-point scale from one (strongly agree) to six (strongly disagree). The average scores on the questions ranged from 1.48 to 1.84, with all averages indicating a range between "mid-agree" and "strongly agree."

The survey indicated, when rating the questions associated with *engineering environment,* that the scholars better appreciated the aspects of engineering design, and had an increased awareness of interdisciplinary interactions within the engineering field. The average scores for these questions indicate approval in the "strongly agree" range. A similar pattern occurs when rating the questions associated with identity, attitude, and skills.

The co-PIs are pleased with the results of this initial survey since it indicates that the program is achieving several of its learning objectives. A reasonable suggestion at this point is that the engineering community-based projects and the seminar activities have enhanced students' engineering identity and their attitude towards community service and engineering environment.

5 Future Plans and Lessons Learned

Lessons learned by professors of the SEECS program with regard to assessment are numerous, but the most significant one is to set forth assessment programs early in the process. This lesson may be obvious, but it is easier said than done when one embarks on a brand new paradigm. That is, engineering programs have established accreditation standards, and established measurement tools and techniques. Furthermore, with the number of peer institutions for any discipline, any program newly instituted at a school may access a template for assessment at the very outset of teaching. In the case of SEECS, the program is entirely novel, to our knowledge. It is not based upon or even similar to any program neither at Gannon University, nor at any other university of which the co-PIs are aware. The particular structure of SEECS did not lend itself to accessing tools from some other sources. The co-PIs would have done well to consider the assessment tools more fully when launching the SEECS program. With the renewal of the grant comes the opportunity to broaden the research elements to include a more robust assessment effort.

The immediate future plans for the SEECS program are driven by financial reality. Proper and positive assessment of the SEECS program is imperative at this time, because the SEECS program is in the last year of its initial funding cycle. Originally funded for admission of students in the fall of 2009, SEECS admitted its last cohort of new freshmen under the "old" grant in the fall of 2012. Further NSF funding has been secured in a follow-up grant, under the same "SEECS" title. Thus, funding is in place for admission of new freshman students through the fall of 2016. At present, co-PIs are considering opportunities for weaning the SEECS program from NSF funding over the next four years. The university has promised to continue to provide funds equal to NSF-granted funds to all continuing SEECS students at that time, but following the graduation of freshmen admitted in 2013, SEECS funding will need to be replaced.

In the interest of distancing the SEECS program from federal funding while also ensuring the continued existence of the program, several avenues need to be explored. Among those avenues

are: seeking corporate sponsorship, seeking additional partnerships with community agencies, and retention of the SEECS program with reduced or eliminated student scholarship support. Hence, the assessments conducted now are vital to the future of the program.

6 Acknowledgements

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Appendix A: SEECS Seminar Participant Survey of Effectiveness

Scholars of Excellence in Engineering and Science
AY 2011-2012 Assessment

Name: _____   Today's Date: _____

Major?   CS ☐   ECE ☐   EnvE ☐   IS ☐   ME ☐   SE ☐

SECTION (1) Seminar Activities

Provide a rating for the statements below that expresses your assessment.

	Strongly Agree 1	2	3	4	5	6	Strongly Disagree 7	Not applicable
Overall, the seminar and its experiences								
… has been satisfying	☐	☐	☐	☐	☐	☐	☐	☐
… has increased my appreciation for the aspects of engineering design	☐	☐	☐	☐	☐	☐	☐	☐
… has increased my awareness of the interdisciplinary interactions of engineering	☐	☐	☐	☐	☐	☐	☐	☐
… has increased my desire to be a graduate of an engineering and / or science program	☐	☐	☐	☐	☐	☐	☐	☐
The seminar and its activities….								
… provided support for graduate entrance examinations.	☐	☐	☐	☐	☐	☐	☐	☐
… paid the testing fee for graduate entrance examinations.	☐	☐	☐	☐	☐	☐	☐	☐
… provided a program of industry contact through site visits, speaker series, shadowing, and / or informational interviews	☐	☐	☐	☐	☐	☐	☐	☐
… provided the opportunity for all scholars to have internship or co-op experience	☐	☐	☐	☐	☐	☐	☐	☐
… enabled connections with employers through professional organizations, conferences, career fairs, and personal contacts	☐	☐	☐	☐	☐	☐	☐	☐
… arranged for workshops with the Career Development & Employment Services Center for assistance in career planning, resume preparation, or job search	☐	☐	☐	☐	☐	☐	☐	☐

… provided opportunities for the scholars to build a sense of community among the classes	☐	☐	☐	☐	☐	☐	☐	☐

For First-Year Recipients and Freshmen
SECTION (2) Advertising, Promotional, Marketing Activities

I was introduced to the scholarship and its opportunities through …								
… information from my guidance counselor / adviser	☐	☐	☐	☐	☐	☐	☐	☐
… materials displayed in my school / campus	☐	☐	☐	☐	☐	☐	☐	☐
… postcards received at my home	☐	☐	☐	☐	☐	☐	☐	☐
… materials sent with my Gannon University acceptance notice	☐	☐	☐	☐	☐	☐	☐	☐
… word-of-mouth contacts	☐	☐	☐	☐	☐	☐	☐	☐
… billboards in the area	☐	☐	☐	☐	☐	☐	☐	☐

SECTION: For Freshmen Only Freshmen Experience & Activities	Strongly Agree 1	2	3	4	5	6	Strongly Disagree 7	Not applicable
Freshmen sessions … … offered insights into the professional expectations and life of interns	☐	☐	☐	☐	☐	☐	☐	☐
… raised my awareness about stress and its management	☐	☐	☐	☐	☐	☐	☐	☐
… provided opportunities to assess my abilities and interest in my chosen major and career	☐	☐	☐	☐	☐	☐	☐	☐
… benefited from student mentoring of design aspects								

SECTION: For Sophomores Only Sophomore Experience & Activities	Strongly Agree 1	2	3	4	5	6	Strongly Disagree 7	Not applicable
Sophomore sessions …. … improved my understanding of the career-search process through career fairs	☐	☐	☐	☐	☐	☐	☐	☐
… raised my understanding of the value of emotional intelligence as a facet of professional competency	☐	☐	☐	☐	☐	☐	☐	☐
… benefited from student mentoring of design aspects	☐	☐	☐	☐	☐	☐	☐	☐

SECTION: For Juniors Only Junior Experience & Activities	Strongly Agree 1	2	3	4	5	6	Strongly Disagree 7	Not applicable
Junior sessions …. … increased my consideration of graduate school by enabling the graduate record examination	☐	☐	☐	☐	☐	☐	☐	☐

	Strongly Agree 1	2	3	4	5	6	Strongly Disagree 7	Not applicable
… raised my awareness about the variety of career options through career and graduate school fairs	☐	☐	☐	☐	☐	☐	☐	☐
… provided opportunities for networking with professionals and peers by conference participation	☐	☐	☐	☐	☐	☐	☐	☐
… reinforced design competency by providing mentoring	☐	☐	☐	☐	☐	☐	☐	☐

SECTION: For Seniors Only Senior Experience & Activities	Strongly Agree 1	2	3	4	5	6	Strongly Disagree 7	Not applicable
Senior sessions …. … provided support for job searching	☐	☐	☐	☐	☐	☐	☐	☐
... involving the Life Core Assessment exercise allowed me to reflect and / or balance my life	☐	☐	☐	☐	☐	☐	☐	☐
…involved with the FE exam or CSDE certification gave a valuable professional opportunity	☐	☐	☐	☐	☐	☐	☐	☐
… concerning participation in "Celebrate Gannon" was a good venue to showcase the community outreach conducted by the SEECS project	☐	☐	☐	☐	☐	☐	☐	☐
… reinforced design competency by providing mentoring	☐	☐	☐	☐	☐	☐	☐	☐

SECTION (3) Suggestions, Insights

What suggestions do you have to build a greater sense of community among the classes?
What suggestions do you have for enhancing interdisciplinary interactions?
What one aspect increased your overall satisfaction with the seminar?
What one aspect diminished your overall satisfaction with the seminar?

Thank you for your thoughtful and timely remarks.

Appendix B: SEECS Faculty Satisfaction Assessment

Indicate the importance to you personally of each of the following:	(4-point Likert Scale. Responses: *Essential, Very Important, Somewhat Important, Not Important)*	Assess the influence of the SEECS program in achieving the personal value statement (4-point Likert Scale. Responses: *Essential, Very Influential, Somewhat Influential, Not Influential)*
Becoming an authority in my field		
Influencing the political structure of the institution		
Influencing social values		
Raising a family		
Becoming very well off financially		
Helping others who are in difficulty		
Adopting 'green' practices to protect the environment		
Developing a meaningful philosophy of life		
Helping to promote racial understanding		
Integrating spirituality into my life		
Making a theoretical contribution to science		
Participating in a community action program		
Keeping up to date with political affairs		
Becoming a community leader		
Mentoring the next generation of scholars		

Indicate the importance to you of each of the following education goals for undergraduate students:	(4-point Likert Scale. **Responses**: *Essential, Very Important, Somewhat Important, Not important)*	Assess the influence of the SEECS program in achieving the education goal statement *(4-point Likert Scale.* **Responses**: *Essential, Very Influential, Somewhat Influential, Not Influential)*
Develop ability to think critically		
Prepare students for employment after college		
Prepare students for graduate or advanced education		
Develop moral character		
Provide for students' emotional development		
Teach students the classic works of Western civilization		
Help students develop personal values		
Enhance students' self-understanding		
Instill in students a commitment to community service		
Enhance students' knowledge of and appreciation for other racial/ethnic groups		
Help master knowledge in a discipline		
Develop creative capacities		
Instill a basic appreciation of the liberal arts		
Promote ability to write effectively		
Help students evaluate the quality and reliability of		

information		
Engage students in civil discourse around controversial issues		
Teach students tolerance and respect for different beliefs		
Encourage students to become agents of social change		