

## **Implementing Student Enhancement Plans for Student Growth and Goal Attainment**

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### **Abstract**

As part of a National Science Foundation (NSF) Scholarships in STEM (S-STEM) grant, junior and senior grant recipients are asked to develop student enhancement plans (SEPs). Established as “stretch documents,” the SEPs contain goals that can be completed during the academic year as well as ones that demonstrate progress towards achievement of larger objectives that may span multiple years. These goals are meant to help students focus their activities to be better prepared to achieve their post-graduate career plans. At the end of the academic year, students will be asked to create a portfolio showcasing their achievements with respect to their personalized SEPs.

### **Keywords**

Student development, goal setting, professional development, personalized learning

### **Program Background**

Florida Gulf Coast University (FGCU), located in Fort Myers, Florida, was established in 1993 as the ninth member of the Florida State University System. A regional comprehensive university with a very high undergraduate enrollment profile, FGCU first opened its doors to students in 1997. The U.A. Whitaker College of Engineering (WCE) began as the U.A. Whitaker School of Engineering in 2005, incubated within the College of Business. In August 2011, the then School of Engineering became an independent College, and today it is home to four engineering programs; Bioengineering, Civil Engineering, Environmental Engineering and Software Engineering. The WCE currently has over 1000 undergraduate students, and 23 faculty across the four programs.

In Spring 2013, the co-authors of this paper were awarded a 5-year NSF S-STEM grant to **Encourage the Next Generation of Innovative iNtelligent Engaged Engineers to Reach Success (ENGINEERS)**. National Science Foundation S-STEM grants are focused on combining curricular and co-curricular activities to “positively affect retention, success, and graduation in STEM of academically talented students with demonstrated financial need.”<sup>1</sup> At FGCU, the ENGINEERS program is designed to give selected students the opportunity to augment their educational experience through enhanced academic mentoring and meaningful extracurricular activities tailored to their own requirements for professional development. In addition to financial support and extracurricular programming, the program seeks to develop diverse cohorts that meet or exceed national demographics for undergraduate engineering students with respect to gender, race and ethnicity. Now in its third year, the ENGINEERS program currently has 29 participants in four cohorts of students ranging from those in their first year of college to students who will graduate in May 2016. Students represent all four of the engineering programs at

FGCU with a diversity of 31% Bioengineers, 31% Civil Engineers, 14% Environmental Engineers, 10% dual Environmental and Civil Engineers, and 14% Software Engineers. The program is currently 52% female, which is well above the college average of 18% female and the national overall average of 21%<sup>2</sup>, and more closely aligned with the University average of 46% female STEM majors<sup>3</sup>. From a racial and ethnic standpoint the program comprises a diverse population of 14% Hispanics, 17% African Americans, and 3% American Indian or Alaska Natives. At a total of 34% this is slightly higher than the College average of 30% and the University STEM major average of 32% for underrepresented minorities including Hispanic, African American, Native American, Pacific Islanders, or those identifying with 2 or more groups. These numbers also favorably compare to the national averages for undergraduate engineering degrees awarded to Hispanic (10.1%), African American (3.5%), and American Indian (0.4%) students<sup>4</sup>.

### **Student Enhancement Plan Mechanics and Rationale for Development**

The Student Enhancement Plan (SEP) is a document that is developed by the participant in consultation with one of the two PIs prior to the start of both their junior and senior years. This document outlines SMART (specific, measurable, attainable, realistic and timely) goals focused on fulfilling short-term and long-term objectives consistent with their anticipated post-graduation career plans. The document specifically focuses on enhancement in three categories; academics, professional development and civic engagement. Activities within the ENGINEERS program and the WCE, as well as traditional engineering coursework, naturally address each of these sections; and these typically form the foundation of student SEP goals. Participants are also encouraged to augment these activities with more personalized optional pursuits as a methodology to allow them to focus on activities that will help them become more competitive in future endeavors (jobs, graduate school, etc.).

Although not a specific focus of this paper, in addition to the SEP students are currently being asked to develop, future iterations of this activity will also encourage students to develop a portfolio of work and personal reflection demonstrating how they are on track to accomplishing the goals and objectives outlined in their SEP and how these relate to their long-term aspirations. Not only will portfolio development serve to improve communication skills and provide participants with material that will prove useful when applying for internships, jobs, scholarships, etc., but portfolio creation and the associated personal reflection is a means of creating a more significant learning experience<sup>5</sup>. This portfolio will provide an opportunity for the students to see their work and accomplishments within a larger context, and supports more meaningful and concrete goal setting<sup>6</sup>. A “career portfolio” such as this is already being used by Dalhousie University to allow students to understand how their learning, knowledge and skills transfer to their career goals and aspirations. Dalhousie claims such an exercise will increase the students’ chances of finding a successful and meaningful career<sup>7</sup>.

### **Logistics and Implementation**

Directions and resources for SEP development can be found on the ENGINEERS Program Canvas site. Canvas is the Learning Management System (LMS) used at FGCU, and all program participants are enrolled in the site upon acceptance into the program, providing an online community for the group. Benefits of utilizing the site for SEP activities are that directions and

resources can be provided to all students in a centralized location, students can upload their personal plans which are viewable only by the PIs and them, and even the end of the year portfolios can be created within the LMS. While the creation of an SEP is highly encouraged for junior and senior students, the process and resources are available for freshman and sophomore program participants to access as well.

The main SEP page explains the nature of the SEP document, when this document should be developed, and instructions regarding scheduling a meeting with one or both of the PIs to discuss the creation of their SEP. A PowerPoint document explaining each of the different aspects of a SMART goal with select examples is provided to the students along with a list of action verbs they may find useful. They are also reminded that the University's Center for Academic Achievement hosts a workshop on developing SMART goals that they can choose to attend. With regards to the "timely" aspect of their goals, emphasis is placed on the fact that they can either be completed during the current academic year, or assist them in making progress towards larger objectives spanning multiple years. Students are reminded, both on this page and when meeting with the PIs that no "bonus points" are awarded for achieving everything on the list, and no "penalties" given for not achieving everything – this is simply a personalized "stretch" document for them. There are no set expectations for a given number of goals in each of the three categories, and the balance of goals in each category may vary from student to student depending on their post-graduation plans.

An example of the general SEP layout is provided on the Canvas page and includes five sections: header, strategic objective, academic goals, professional development goals, and civic engagement activities. The document itself should be no more than 2 pages, although it may be shorter depending on the scope of the student's activities. The header section provides general information including name, major, anticipated graduation date and current year and serves to lend a level of formality to the document. The strategic objectives section includes student's projected short and long term aims. Short term aims look at what they would like to do upon graduation (e.g. job, graduate school, armed forces, etc.). Long term aims should reflect thoughts on where they would like to be in approximately 5 years (e.g. licensed P.E., MBA, promotion, having started a business, etc.). While this section is only designed to be a paragraph or so in length, the inclusion is critical as it provides the "target" for which students are aiming. The last three sections include the specific goals of the students and include examples such as:

- Academic goals
  - Coursework leading to completion of major and/or minor
  - Dean's List and / or President's List
  - Independent Studies / Honor's Contracts
  - Participation in the Eagles Grand Challenges Scholars Program
  - Technical Writing Seminar or Similar Seminar / Workshop Activities
- Professional Development goals
  - Co-ops / Internships / Shadowing
  - Mentorships (with you as the mentee)
  - Research projects or similar activities with faculty members
  - Conference participation / presentations
  - Leadership activities
  - Involvement in Student Organizations

- Civic Engagement activities
  - Being a part of Engineering Ambassadors
  - Mentorships (with you as the mentor)
  - Tutoring
  - Service Learning activities
  - Outreach Initiatives (e.g. Eagle Expo, GEMS, CROP, Engineering Extravaganza)

Students are reminded that professional development goals should be focused on activities geared towards their short term aims from the strategic objectives section. The page also notes that the term civic engagement implies a more intentional involvement than merely service activities, and are cautioned to remember that while these are great to participate in, time is valuable and they should make sure that activities are meaningful to them.

One additional facet of the program related to the SEPs is the availability of professional development funds. Program participants have the ability to apply for up to \$500 per year in each of their junior and senior years in the program. Applications are accepted twice a year, with students having the ability to apply for full funding in a single cycle, or partial funding in two separate cycles. One of the main restrictions of this funding is that it must align with an explicit goal in their SEP. Examples of this have included the purchase of a specific software program for a course, buying FE review material and covering exam registration, support to attend a conference, the purchase of supplies to conduct various research activities, or even support to travel on a mission trip. Students are also made aware of other sources of funding both internal and external to the University that may be available to augment these funds. While many of the SEP goals do not have a funding requirement associated with them, the availability of these funds may reduce the barriers to student involvement in various activities or increase the chance of success in other endeavors.

### **Example Goals and Student Growth**

Currently, SEP development is focused on junior and senior level students. As the ENGINEERS Program is still in the developmental stage, the 2015 – 2016 academic year is the first in which both juniors and seniors are program participants. The first cohort (senior students) are in the second cycle of SEP development, while members of cohort 2 are developing their first SEPs. While SEPs are personal documents and contain specific goals for the individuals, other goals are more overarching and can be found in several students' documents.

From an academic standpoint, one of the most common overarching goals is that of either President's List (minimum of 12 credit hours successfully completed with a semester GPA of 4.0) or Dean's List (minimum of 12 credit hours with a semester GPA of 3.5 – 3.99). As this is one of the examples the inclusion is not surprising, however variations of the goal do exist between students. A junior Environmental Engineering major phrases it as “I would like to be on the President’s list at least one more semester and be on the Dean’s list at least two more times before I graduate,” while a junior Software Engineering major simply states “Remain on the Dean's List. Get on the President's List.” A junior Civil Engineering major expands on this goal by including that this “will be done by dedicating at least 2 hours every day to reviewing for my classes or reading to prepare for upcoming lessons/labs,” while a senior Civil Engineer notes that

making the Dean's List is “one of the several measures of how well a student understands and retains a subject's material.”

Other more personal academic goals include the following:

- “By the end of the semester, I should be able to decide whether I want to pursue dual majors in Environmental and Civil Engineering.” ~junior, Civil Engineering student
- “I want to begin and complete an independent Java program from scratch to further aid my knowledge in that area.” ~junior, Software Engineering student
- “Go to writing lab to improve papers and resume.” ~senior, dual Environmental and Civil Engineering student
- “Receive high marks on both the MCAT and the GRE.” ~junior, Bioengineering student

From their junior to senior years, many students were consistent in academic goals such as maintaining specific graduation dates, GPA or letter grade averages, or inclusion on the Dean's List. Some revised goals slightly, such as the Software Engineering major who planned “to study at least an hour a day” as a junior, while as a senior “want[s] to get into the habit of studying at least five hours per week.” From a growth perspective, one student wanted to “get on the President's List” as a junior and “remain on the President's List” as a senior. Another increased the specificity of the goal which as a junior was “maintain a reasonable GPA” and evolved to “maintain a 3.5 or higher GPA” as a senior.

In the category of professional development, many goals focused on engagement with discipline specific student organizations and attendance of relevant conferences. Examples include the junior Civil Engineering major who would like to “join ASCE and attend at least one conference before graduating,” to the junior Bioengineering student who plans to “attend [the] BMES conference.” Another junior Bioengineering major wants to be an “active member in BMES [and] SWE” while an Environmental and Civil major intends to serve as the treasurer for the Florida Engineering Society.

Internships and research are a second primary focus area within professional development, with goals such as:

- “Obtain an internship with an engineering firm this summer.” ~junior, Civil Engineer
- “During the next two summer[s], I am determined to find internships maybe one with [the] Army Corps of Engineers.” ~junior, Dual Environmental & Civil major
- “Engage in research with a professor (perhaps Dr. \_\_ with robotics).” ~junior, Software
- “I would like to get an internship at Algenol this summer (2015).” ~junior, Environmental Engineer
- “Begin researching in the Bioengineering department.” ~junior, Bioengineering major
- “Land an internship within a successful engineering firm that could help me achieve my long term goal of working overseas.” ~junior, Civil Engineering major
- “Participate in a summer REU Summer 2016/2017 ... focused on the cellular level of bioengineering” ~junior, Bioengineering major

Additionally, more individualized goals in the professional development section include:

## 2016 ASEE Southeast Section Conference

- “I want to make preparations to participate in Google's 'Summer of Code' event this year by learning a new programming language such as Python.” ~junior, Software Engineering major
- “While working on my engineering entrepreneurship project, I want to develop leadership skills as well as experiencing an environmental that resembles that of an engineer.” ~junior, Civil major
- “I want to develop a solid professional relationship with Hertz during the completion of my project in order to secure a job with them after I graduate.” ~senior, Software major
- “Win another Honorable Mention Award for our ASCE chapter.” ~senior, Civil major and President of the ASCE student chapter
- “I want to take and pass the FE exam during this upcoming January or February. Since I am not sure how much time I will require to study for this exam, I have already started going over all of the courses I have taken.” ~senior, Civil Engineer

Research and internships were a heavy focus in the junior year, with fewer senior goals in these areas. Participation in organization often evolved from simply being a member in the junior year to serving in an officer's position in the senior year. Several juniors are also serving in officer positions, but many of these were elected after SEPs were already submitted for the year.

The final focus area of the SEPs is that of civic engagement. This section contained the greatest variety of goals, although some trends were still evident. Completing service learning hours, for example, was a commonly mentioned goal. As the University requires entering freshman to complete 80 service learning hours prior to graduation, and those entering with an AA to complete 40 hours, it is not surprising for students to include earning a portion of these as part of their civic engagement goals. Mentoring was also commonly mentioned, either within the ENGINEERS program or through other avenues on campus.

Other more individualized goals in this area included:

- “Maintain my role as an Engineering Ambassador, as a founding member continue to help the program grow.” ~junior, Bioengineering major
- “Participate more in volunteer work in my local community or mission trips overseas in a third world country.” ~junior, Civil Engineering major
- “Through ASCE engage in meeting more of the younger engineering students and encourage them to develop relationships with faculty, invest in learning more about engineering, introducing them to opportunities and resources around them that will help them to succeed in their engineering classes.” ~senior, Civil Engineering major
- “I want to be involved in Engineering Extravaganza.” ~junior, Environmental Engineering major
- “Begin a community service project for the Honors Program.” ~junior, Software Engineering major

Several students integrated professional development goals with those of civic engagement, recognizing that select activities can serve both to strengthen their professional development and contribute positively to their community.

## Conclusion and Future Direction

Formal assessment of the SEP activity has not yet been conducted, but is planned for the end of this academic year in the senior exit interviews. Anecdotal evidence suggests that students find the activity a valuable component of the program that causes them to reflect on their ultimate career goals and tailor current activities to focus them on being prepared to achieve those goals. While some who have now completed the activity twice did not significantly revise their plans, others made substantial changes from one year to the next. Some of these were prompted by a realization that their focus needed to be shifted in order to balance their commitments and improve areas they identified as personal weaknesses. Others were based on the achievement of previous goals and the desire to recalibrate the “stretch” in the document.

As previously described, students this year will be encouraged to create portfolios demonstrating their achievement of their SEP goals. Inclusion of this activity should allow for additional opportunities for students to reflect on what they have accomplished and consider what they would like to accomplish in the future. Additionally the PIs are considering expanding the SEP activity to the freshman and sophomore cohorts in the ENGINEERS Program. While it was initially focused at the upper level to ensure preparation for graduation and post graduate activities, discussions with upper level program participants and others have resulted in the belief that the activity can benefit students at all levels. Consideration is also being given to the introduction of the activity in the introductory engineering course so that a wider population can potentially benefit from the activity.

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