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Increasing the Relevance of Shared Course Content through a Student and Academic Affairs Collaboration

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Abstract

This evidence-based practice paper describes the collaborative effort between Student and Academic Affairs at a small, private, technological institution.

First-year introductory engineering courses have become commonplace for engineering programs of all types. Typically, these courses are taught by the engineering departments and used to improve engineering student retention and/or help undecided students choose a branch of engineering as their major of study. Tangentially, many universities have developed a first-year student seminar course to aide students in the transition to the university's learning environment. These courses are delivered in a wide variety of formats, and the process and criteria for selecting instructors differs from school to school. As different as they may be, the underlying purpose of a first-year seminar is to introduce new students to topic areas that promote student success in the first year, thereby improving first-year student retention. At Florida Institute of Technology, all students are required to take University Experience, a one-credit first-year seminar. Likewise, undecided freshman-engineering students are required to take Introduction to Engineering, a broad three-credit first-year engineering course as part of the General Engineering program. In Fall 2015, the Introduction to Engineering students were grouped as a cohort and were registered for the same section of University Experience. By grouping the students together, the instructors of both courses were able to collaborate on topics and assignments, and jointly develop materials. The goal of this collaboration was to help students realize that many of the concepts learned about and discussed in one course are relevant outside of that particular class, and in particular, that much of the information taught in those two courses are related. By covering the same topics in both courses, it is proposed that students will better be able to see the relevance and the relationship between student success and their engineering education, improving the net benefit of these individual courses.

Section 1: Introduction

Amongst the most powerful high-impact practices discussed in the higher education literature, working towards creating seamless learning environments on college campuses may arguably be one of the most important with regard to student and institutional gains[1, 2, 3]. At a minimum, seamless learning environments involve the intentional, collaborative efforts of institutional leaders, staff, and faculty, and a shared focus on student engagement, which facilitates a student's potential to learn, grow, and persist at a given institution[1, 2, 3, 4, 5, 6]. To date, one of the most common and effective partnership programs on college campuses are learning communities[7].

The current paper describes a small-scale collaboration between two historically unconnected first-year courses at Florida Institute of Technology: University Experience and Introduction to Engineering. Florida Institute of Technology is a small, private, technological institution in

Melbourne, Florida. There are just under 5,000 students enrolled in on-campus degree programs with over 50% of those students in the College of Engineering. The University enrolls approximately 700 first-time-in-college freshmen students every fall.

University Experience (ASC 1000), the university's first-year seminar, is a one-credit, semester-long course. This course is a graduation requirement across all undergraduate degree plans at the university and its primary aim is to assist new students during their initial academic and social transitions to the university. Students enrolled in the course receive information about campus and academic resources, and highly encourages participation in and out of the classroom. The course is taught by full-time staff who represent most of the student service areas on campus, (non-engineering) faculty, and upper administration. The course is coordinated by the Associate Director of Transfer and Transition Programs in the office of First Year Experience, a department that reports to the Vice President of Student Affairs.

Introduction to Engineering (EGN 1000), a first-year engineering course, is a unique three-credit program requirement for General Engineering majors[8]. EGN 1000 gives undecided engineering students the opportunity to survey a number of fields and majors during their first semester. Limited technical content is included as the focus is on providing students an overview of what engineering is and what the different fields of engineering are. A lab component is included in order to cover common engineering tools such as: Excel, CAD, 3D Printing and microcontrollers.

As dissimilar as these courses may be, both courses cover aspects of the same topics including: time management, productive study habits, effective interpersonal communication, the importance of student involvement, and ethics. However, students tend to see the information taught in either course as mutually exclusive and do not always see the information as transferable.

This student mindset lead the authors to discuss opportunities for collaboration between the two courses. The following sections describe this collaborative effort in greater detail. Section 2 covers a brief review of previous literature. Section 3 describes the methodologies used in this study. Discussions of the study's results are included in Section 4, with conclusions being presented in Section 5.

Section 2: Literature Review

Seamless Learning Environments and Successful Collaboration

With any effective partnership, the institution's unique culture, environment, and constituents need to be considered. Seamless learning environments are vital to undergraduate student learning, success, and overall collegiate experience. The power of intentional and meaningful partnerships between student and academic affairs units has been identified as an effective means of creating seamless learning environments and fostering student engagement. Successful collaboration among campus partners working together towards shared goals of improving student learning, success, and the overall collegiate experience[2, 6, 7, 9]. It should be no surprise that the benefits of successful collaborations and the benefits of creating seamless learning environments are inextricably tied[1].

Learning Communities

Learning communities are approached in a variety of ways; however, they all share the same underlying purpose. According to Smith et al. (2004), learning communities intentionally restructure "students' time, credit, and learning experiences to build community, enhance learning, and foster connections among students, faculty, and disciplines" (p. 67). Laufgraben, Shapiro, and Associates (2004) identified four of the most frequently described models: "(1) paired or clustered courses, (2) cohorts in large courses or FIGs (freshman interest groups), (3) team-taught programs, and (4) residence-based learning communities" (pg. 5). The curricular structure of the current collaboration most closely resembles a paired course learning community. The format, delivery, level of faculty involvement and coordination, as well as the strength of the student and academic affairs collaboration, mostly depend on the institutional environment and the characteristics of the students, faculty, and staff who will participate[12, 13].

First-Year Seminars

Since the late 1800s, the primary focus of first-year seminars has been to assist students during their adjustment to college and to increase their chances of being successful[14] (Boyer, 1987). Gardner (1986) contends that students are much more likely to be successful throughout college if a strong foundation is provided during their first year. As such, the purpose of first-year seminars is to help students establish a connection with the college as well as their peers. A general assumption is that students will acquire skills and knowledge associated with college success through the instruction of trained faculty[16, 17].

First-year seminars are delivered in a wide variety of formats that differ from school to school. Typically, the unique needs of a given institution inform the seminar's focus and course content, as well as the process and criteria for selecting instructors[18]. First-year seminars range from optional to required, from zero to three credits, and from pass/fail to traditional grading[19]. Another differentiating factor is the administrative unit that the university's FYS reports to: student affairs or academic affairs[20].

Introduction to Engineering Courses

In 1990, on behalf of the ASEE Engineering Deans' Council Pipeline Implementation Committee, Bickart (1991) made a call to action to increase retention rates of undergraduate engineering students. Engineering deans were asked to focus their efforts on building strong, measurable retention programs at their given institutions. The first task identified by the Committee included the development of first-year programs that introduce students to engineering and offer them opportunities to engage with their peers, faculty, and staff. As a result, introduction to engineering courses became common practice in engineering education. Although the content, structure, and focus of these introductory courses vary from institution to institution, these courses are generally expected to give students the opportunity to engage in hands-on engineering experiences and gain an understanding of what is necessary to become a successful engineering student and future professional[22, 23].

Section 3: Methodology

What is unique about the current collaboration is the unit in which ASC 1000 is housed. Typically, a department or group of departments within an institution's academic affairs unit is responsible for coordinating its first-year seminar program. Student affairs professionals may

take on instructor roles or serve on an instructional team that includes a faculty member as the primary point of contact. Since the course's inception, it has been housed under the student affairs umbrella. Faculty members teach a few sections of the course every year, however, the level of collaboration between academic affairs and students affairs had never gone beyond teaching assignments. Until now, partnerships and/or coordinated efforts between ASC 1000 and major-specific introductory courses had never been established. Table 1 describes the timeline of the collaboration from its early stages through the course of the semester.

Table 1: Collaboration Timeline

When	What
April 2015 (four months before start of semester)	Collaborators met to discuss, in general, the possibility for such a collaboration. As a result of meeting, logistics regarding section scheduling were worked through.
June 2015	Collaborators met to compare syllabi and identify potential topics to align. Assignments and in-class activities that carried over from one course to the other were established.
End of July 2015	Collaborators met to solidify syllabi.
Mid-August 2015 to December 2015 (throughout the semester)	Collaborators maintained open lines of communication via email, phone calls, and in-person meetings to ensure they were on the same page. Instructors were also physically present in one another's classrooms, oftentimes referencing material from the other's course.

This past fall, General Engineering students were enrolled in the same ASC 1000 section. By grouping the students together, the instructors of both courses were able to collaborate on topics and assignments, and jointly develop materials. Additionally, the course was scheduled such that ASC 10000 met only two hours prior to EGN 1000. 16 of the 21 General Engineering students were enrolled in the same ASC 1000 section, while five enrolled in different sections of ASC 1000 due to scheduling conflicts. The scheduling conflict arose with students who were enrolled in Calculus 2 as opposed to Calculus 1 due to their advanced math placement.

This collaboration most closely resembles the paired courses approach to learning communities, which typically involves making a curricular or skill-related connection between two independently taught courses[11, 13]. However, after reviewing related literature and information available on institutions' websites, it is clear that the common thread in many of these collaborations are specific to writing and math skills, which the current collaboration is not.

Unlike most common learning communities, the current collaboration involves two courses that already included a number of similar topics in their curriculums across both academic affairs and student affairs. Time management, productive study habits, effective interpersonal communication, the importance of student involvement, and ethics are all included in some form in each course, with EGN 1000 typically providing a more engineering focus to the topics. Table

2 illustrates the topics covered in each course for the entire 15-week semester. Minimal changes to the timing of topics were needed in order to have both courses more closely aligned. Careers in Engineering was moved to week 3 in order to accommodate the ASC 1000 instructor presenting in week 7. Guest speaker presentations in EGN 1000 were given by each engineering department in order to provide the students information about each engineering option available to them. The highlighted weeks (2, 6, 7 & final exam) include topics with direct tie-in between the two courses. Other weeks have little to no direct correlation between topics in the same week.

Over the course of the semester, four topics/assignments were interwoven into both courses in a variety of ways: time management, career planning, personal ethics, and a design project that incorporated teamwork and communication skills. First, time management was introduced in the second week of EGN 1000. Students sat through lectures and completed a homework assignment wherein they were to schedule what they expected to be a typical week. The students were given general guidelines focusing on how to succeed in an engineering program (how many hours to budget for studying, relaxing, etc.), and the students had to comment on how sustainable their proposed schedule would be. The homework assignment was graded but never returned. Four weeks later, the EGN 1000 homework assignment was returned at the beginning of the ASC 1000 class. That day's topic was time management skills with a similar type of assignment given as homework. The students were encouraged to look back at what they believed their weekly schedule would be based on limited college experience. This allowed the students to reflect on the first third (roughly) of the semester and adjust habits accordingly. At this iteration, no forced reflection or follow-up was included in either course.

Career planning was addressed in both courses by utilizing the University's fall career fair. Students were required to attend the career fair and speak to, at a minimum, two different employers about what the company does and what opportunities exist for engineering students (internships, co-op positions, full-time, etc.). Students were required to document their career fair participation by writing an essay with the answers to some common general questions and whatever specific questions the students also asked. This essay was a graded assignment in both courses and class time was given to the students in order to attend the career fair.

Table 2: Comparison of topics covered in EGN 1000 and ASC 1000 over the 15-week semester

Week	EGN 1000	ASC 1000
1	Syllabus, Introduction Presentations; Success as an Engineering Student	Syllabus, Course Introduction
2	Engineering History; Engineering Ethics/Student Ethics (2 hours after ASC 1000 presentation)	Guest Speaker: Academic Honesty & Plagiarism Introduce Group Project (group project counted for ASC 1000 & EGN 1000)
3	Careers in Engineering; Profiles of Engineers	Learning Styles Goal Setting
4	Engineering Design Process	Safety, Wellness, & Seeking Help
5	Problem Solving; Guest Speaker	Note Taking & Test Taking Strategies
6	Problem Solving; Teamwork	Effective Communication

	Career Fair Report assigned	Time Management HW assigned & reviewed in EGN 1000 EGN 1000 Preliminary Report due date reminder
7	Guest Speaker; ASC 1000 Instructor: Time Management Presentation (ASC 1000 instructor presented in EGN 1000 classroom)	Career Fair (EGN 1000 instructor took class during ASC 1000 class time)
8	Peer review Preliminary Design Reports; Midterm exam	Guest Speaker: Career Services
9	Guest Speaker	Healthy Habits Stress Management
10	Guest Speaker; Guest Speaker	How to Calculate Your GPA Money 101
11	Guest Speaker; Guest Speaker	Advising & Registration
12	Guest Speaker; Guest Speaker	Sustainability
13	Guest Speaker; Holiday	Holiday
14	Guest Speaker; Project Work Day	Preparing for Final Exams Guest Speaker: Study Abroad
15	Engineering Work Experience Opportunities	Holiday
	Final Exam/Project Presentations on December 11, 2015 at 8-10am (ASC 1000 instructor was present for this)	

The ethics collaboration included a discussion on plagiarism and the student code of conduct, in addition to professional ethics typical of engineering societies. In ASC 1000, a presentation on academic integrity was given to all students. Later that same day, students participated in a mock internship hiring activity where their personal opinions and views on ethical behaviors, specifically engineering students actions towards obtaining an internship, were explored, discussed and challenged by the instructors of both classes. After the in-class activity, where the students were broken into groups in order to act as a hiring team for an engineering firm, students were given one week to submit an individual essay. The essay asked them to reflect on their initial opinions about the four hypothetical student resumes. The students were also asked to discuss their group's internal debate over the ranking of the candidates and how those rankings changed as additional information was revealed about the candidates. This additional information was included in a class discussion that was led by the instructors, wherein the "gray" areas of ethical behavior and decision-making were proposed to the students.

Lastly, a group design project, which has been a tradition in EGN 1000 for the past several years, was included as an assignment in ASC 1000. The group project consisted of the students designing and building a mini golf hole. Students needed to meet certain design requirements including a maximum allowable footprint of the hole, a design related to that year's theme (toys), and a 3D printed part. Each group was required to submit a mid-term design report, final design report with reflections, and group presentation. The ASC 1000 instructor was present for final presentations and the project grade was used in both courses. The project replaced the standard ASC 1000 group project and communication assignments.

The purpose of this collaboration was to improve the benefit of these individual courses and the following questions were of particular interest:

- If the same topics were covered in both courses, albeit with an engineering focus in EGN 1000, would the students be better able to see the relevance between ASC 1000 and EGN 1000?
- How would the collaboration be perceived by students enrolled in the General Engineering section of ASC 1000?
- Is the satisfaction level different for students enrolled in the General Engineering section of ASC 1000 versus a non-major specific section of ASC 1000?
- Are students more likely to feel a greater sense of support from their ASC 1000 and EGN 1000 instructors if they are enrolled in the General Engineering section of ASC 1000?

In order to begin answering these questions, an end of course survey was given to the students in EGN 1000. Questions included:

1) How aware were you of the collaborative efforts between your EGN 1000 and ASC 1000 courses?
2) Please circle/rate how extensive you believed the collaboration to be on a scale of 1 to 5, with 5 being the highest level of collaboration
3) Please circle/rate your satisfaction level of each course on a scale of 1 to 5, with 5 being the highest level of satisfaction.
4) Collaborations like that between EGN 1000 and ASC 1000 are common at Florida Institute of Technology.
5) I liked ASC 1000 more because my classmates were all General Engineering majors like me.
6) I was able to get to know my classmates better because we were enrolled together in EGN 1000 and ASC 1000.
7) Because of the collaboration between EGN 1000 and ASC 1000, I feel a greater sense of support from my instructors than if the courses were taught independently.
8) I feel more connected to my EGN 1000 and ASC 1000 instructors than my other instructors.
9) I believe the collaboration between EGN 1000 and ASC 1000 should be implemented next year.
10) Overall, I benefited from being in a major-specific section of ASC 1000.
11) I would recommend the General Engineering program to a new, incoming student.
12) I would recommend the General Engineering program to a new, incoming student because of the collaboration between EGN 1000 and ASC 1000.
13) What, if any, benefits do you feel you received from being enrolled in ASC 1000 with fellow General Engineering majors?
14) What topics, if any, do you feel were covered in both EGN 1000 and EGN 1000? (Coverage of topics did not have to occur simultaneously.)
15) Keeping the collaboration in mind, what would have been cool to see/do in either class?

Questions 4-12 used a 5-point Likert scale ranging from strongly disagree to strongly agree. Questions 13-15 were free response questions. A similar survey was given to the 5 students that were not in the General Engineering section of ASC 1000 with the questions modified to reflect the fact that they were in a traditional ASC 1000 section. Survey results will be summarized and discussed in the following section.

Section 4: Results

A variety of methods were used to observe the results of this evidence-based collaborative effort including some anecdotes from the joint ethics assignment, end of course survey results, and course evaluations.

The ethics activity was assessed through observation/collection of the student's thoughts and rankings during the in-class activity, as well as through a post-activity reflection essay. During the in-class discussion, one professor acted as the lead moderator while the other professor took notes of the entire discussion. As an example, when students were asked to share their group's re-ranked order of candidates, their simplistic matter-of-fact responses were indicative of (dualistic) black and white thinking. Generally speaking, they viewed the unethical behaviors as either very really bad or not that bad. When the lead professor started asking the class to consider the scenarios in a more human way, offering potential rationale for the unethical behavior, the students' demeanors and the content of some of the side chatter changed, even resulting in some groups wanting to revise their choices yet again. The two instructors noticed a marked difference in the students' interest level in the activity and topics as the discussion wore on and new points were introduced. This was confirmed in the post-activity reflection essay, which provided great insight into the students' thought processes when ranking the candidates on their own and how the participation in a group impacted their initial thoughts and rankings. The students' essays were used to gauge students' connections of student ethics (cheating, plagiarism, etc.) to professional ethics, hopefully realizing the two are not independent of one another. Nearly all students included basic understanding of the assignments goals (understanding lying on the resume was wrong and upon finding out about it they modified their opinions of the students' qualifications). What stood out was that some of the students began to connect the academic dishonesty lecture to the resume activity, while tying in the NSPE code of ethics into their essay. Many of the students began to have a more broad perspective of these topics, rather than the typical 'don't cheat on an exam' mindset.

As previously mentioned, a survey was administered to the students in EGN 1000 at the end of the semester. This survey was used to help answer the research questions related to this collaboration, as well as help guide how to improve the courses for next year. Table 3 summarizes the collaborative course survey, which was given to all students that were enrolled in the General Engineering section of ASC 1000. Table 4 summarizes the results of the survey administered to the students who had the traditional mixed major section of ASC 1000. While neither survey had a significant number of respondents, some encouraging trends can be observed warranting continuation of these activities. It should also be noted that five students were not enrolled in the common ASC 1000 section.

First, questions 3a and 3b in Table 3 indicate a high student level of satisfaction of both courses when collaborating together. When compared to questions 1a and 1b in Table 4, no significant

difference exists with the satisfaction of EGN 1000; however, the satisfaction level is significantly lower for ASC 1000 in the traditional mixed-major model. The five students did, however, have a different ASC 1000 instructor. As such, it is unclear if the satisfaction level is lower due to the different instructor, or due to the lack of collaboration.

Table 3: Summary stats of the course collaboration survey (n = 14)

Question #	Average	StDev
1	4.43	0.65
2	4.14	0.86
3a	4.71	0.47
3b	4.57	0.51
4	3.57	0.85
5	4.64	0.84
6	4.64	0.84
7	4.21	0.80
8	4.36	0.63
9	4.64	0.63
10	4.36	0.93
11	4.71	0.47
12	4.14	0.95

Table 4: Summary stats of the independent courses survey (n=5)

Question #	Average	StDev
1a	3.80	0.45
1b	4.80	0.45
2	3.40	0.89
3	4.20	0.45
4	4.20	0.45
5	4.00	1.00
6	3.60	0.55
7	3.60	1.14
8	4.00	1.00
9	3.80	1.30
10	4.20	0.84
11	4.40	0.55
12	3.80	0.84

Similarly, question 7 on Table 3 asks the students if they felt a greater sense of support from their instructors because of the collaboration, while on Table 4 questions 3 and 4 ask the student's rate the level of support they feel from each instructor. While the students believed the collaboration increased their sense of support (average 4.21 indicating a greater than agree statement), the students in the traditional model more than agreed they felt a sense of support from each instructor independently (average 4.2/5).

In the free response questions of the survey, students in the collaborative section generally stated that they felt they were able to better connect with their classmates because they knew they had something in common. Eight of the fourteen students had similar responses, which included: "We all had something in common", "Getting to know classmates better", "Friendship and make me feel more comfortable in class with them." Study habits/time management was the most common response to what topics were jointly covered, while ethics/academic integrity was not mentioned. No common themes emerged from the five students not enrolled in the collaboration section.

Students in both courses also completed the university wide course evaluations. The paper evaluations are completed voluntarily by each student in class and turned in to each department directly. The instructor never touches the completed surveys in order to promote honest feedback of the course and the instructor. Condensed summary statistics for both courses are included in Table 5.

Table 5: Summary data of EGN 1000 and ASC 1000 course evaluations

Question	EGN 1000 Average (n=16)	ASC 1000 Collaboration Average (n=15)	ASC 1000 All Other Sections Average (n=449)
Organizes and plans the course effectively.	4.91	4.6	4.71
Makes the goals and objectives of the course clear.	4.91	4.33	4.7
Is enthusiastic about the subject.	4.64	4.53	4.54
Employs tests and graded material relevant to the course content.	4.8	4.53	4.61
Interacts effectively with the students.	4.82	4.6	4.68
I found the course intellectually stimulating.	4.33	3.93	3.12
I learned a great deal in this course.	4.5	4.13	3.39
Rate the OVERALL QUALITY OF INSTRUCTION in this course as it contributed to your learning.	4.55	4.53	4.28
Rate the OVERALL VALUE of this course to you as it contributed to your learning.	4.67	3.86	3.32

Longer-term plans for evaluating this collaboration include continuation of the surveys and assignments previously discussed, as well as comparing student performance data such as GPA and retention.

Section 5: Conclusions

This paper discussed the development of a collaboration between two first-year courses: EGN 1000, an academic-based introduction to engineering course taught by an engineering faculty member, and ASC 1000, a first-year seminar taught by a full-time staff member. The purpose of the collaboration was to reinforce material that was already being covered in both courses to increase the perceived relevance of content. Areas of collaboration included: identifying topics previously approached from different perspectives at different times, aligning the timing and introduction of these topics, and creating joint assignments.

The two instructors were able to accommodate the collaboration without making significant changes to the existing courses, and a cohort of 16 students were able to engage in these topics together and in a (potentially) more meaningful way. In order to promote seamless transfers in student learning, faculty and staff must be willing to communicate and collaborate, especially in the coordination of first-year course curriculums and programs.

Course surveys were administered to obtain initial feedback on the collaboration. While only a limited number of students were enrolled in collaboration this year (16), initial feedback was encouraging. Student satisfaction was very high in both courses, and appeared to be higher in the cohort section of ASC 1000 when compared to other sections. Likewise, student free responses indicated that they felt a better sense of community and friendship because they were co-enrolled in both courses.

Further study is needed to fully understand the impact and success of this collaboration, including increased participation/enrollment and analysis of additional data points related to student success and retention. These activities are planned for future semesters and possibly collaboration with other institutions with similar courses.

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