



Academic Advising and Student Affairs Working Together to Improve First-year Experience of Engineering Students

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Motivation

In this evidence-based practice paper, we describe a joint effort by Northwestern University's new student affairs (New Student and Family Programs) and engineering academic advising offices to create and implement a seminar course for first-year engineering students. For many years our University, like many others, has held orientation activities for incoming students before the start of fall classes. Groups of eight to twelve first-year students in the same college are led by a peer adviser throughout the week as the students learn about University resources and enroll in courses. Four years ago, we noted anecdotally that many of these groups met together informally throughout the first year to support each other as they transitioned to college. Around the same time, student exit surveys showed that many graduating engineering students were unhappy with the level of support that they received in the first year in areas like finding academic resources, choosing a major, and managing their workload.

We were thus motivated to formalize the informal meetings of the orientation groups to ensure that all first-year engineering students could benefit from them and to include programming relevant to their experiences in engineering. The result is a required peer-led seminar that meets every other week throughout the first two quarters of the first year. This paper will describe the genesis and evolution of the course, challenges in implementation, and survey responses from students who have taken the course. By listening to student feedback, we have been able to increase student satisfaction with the course. Students who took the course during its first offering will be graduating this spring and we are hopeful that senior exit surveys will show increased satisfaction with engineering as a whole.

Background

To help students effectively transition into college, academic institutions have adopted various strategies such as academic advising, supplemental instruction and personal counseling. Most popular among these strategies are first-year seminar courses designed to help first-year students develop the requisite skills and attitudes needed to effectively transition into and succeed in college [4], [6].

First-year seminar courses are widely offered at U.S. universities and colleges. Their characteristics vary in areas such as content [1], [7], [10], instruction, length of course [2] and target student population [5], [8], [11]. For example, based on their content, first-year seminars are classified into four general categories. Academic seminars focus on the development of skills such as critical thinking and written and oral communication. Basic study skills seminars focus primarily on the development of study skills, grammar, and note taking. Discipline-specific seminars introduce students to specific majors and their related curricular demands. Extended orientation seminars emphasize adjustment to college and include an introduction to institutional policies, procedures and resources, time-management and learning strategies [1]. Most first-year seminars are a hybrid mix of these four categories and many are combined with other courses as part of learning communities [3].

Instructors for first-year seminar courses vary from institution to institution. Faculty and administrative staff with specialized training are the preferred instructors but in many cases instructors include graduate students and upperclassmen [9].

First-year seminars target different student populations. Institutions utilize first-year seminar courses broadly to address issues with retention; in which case, the academically underprepared students are prioritized. Many institutions, however, offer first-year seminar courses to all incoming freshmen. Another distinguishing factor among first-year seminar courses, is the resident status of students. Some courses target mainly on-campus residents, while others serve off-campus residents [9].

The length of the course, start-date and credit weight are other varying parameters among first-year seminar courses. Some are credit-bearing and others offer no credit. Grading is done either on an A to F scale or on a pass/fail basis. Course length varies from few weeks to an entire first term, with start dates ranging from a few weeks before the start of the first term to the beginning of the first term [2]. Whatever the structure of the seminar, they are typically seen as a way to increase student retention and GPA. The literature, however, is mixed as to the effectiveness of seminars in bringing about these increases [9]. At Northwestern, engineering student retention to the second year is quite good (>80%) so we did not expect to see changes in retention or GPA. When the first students to participate in this seminar graduate later this year, we can retrospectively look for changes in these measures. Our first-year seminar has focused on increasing both connection to community and awareness of important opportunities and resources. It is an extension of a University-wide first-year orientation program and unlike other first-year seminars [2], it runs for two consecutive terms.

Methods and Assessment

The first-year seminar for engineering students was initially developed by New Student and Family Programs (an office in Student Affairs) in consultation with engineering academic advisers. The following learning goals were developed.

As a result of this course, students will:

- Develop, apply, and adapt appropriate academic strategies to their courses and learning experiences.
- Identify relevant academic policies, processes, and procedures related to advising, course planning, and major exploration.
- Identify and apply strategies to effectively manage time and priorities.
- Identify resources to assist in academic success including support from academic advisors, faculty and staff, utilizing professors' office hours, tutoring resources, and more.
- Identify appropriate campus resources and opportunities that contribute to their educational experience, goals, and campus engagement.
- Develop and apply skills that contribute to building positive relationships with peers, staff, and faculty.
- Examine how their background and experiences impact their values and assumptions and explore the influences these have on their relationships with others.
- Develop, adapt, and apply strategies to support overall wellness

These learning objectives have guided the initial design of the course and subsequent changes to content and delivery.

Selection of appropriate peer advisers (PAs) to lead the program was crucial to the success of the first-year engineering seminars. New Student and Family Programs, which has had a well-established process for selecting and training PAs, continues to lead in this area. PAs must apply in the winter of their first, second, or third year and interview with Student Affairs staff in order to be selected. During the spring quarter, all PAs are trained in student development theory, how to act as a mentor, and how to respond to emergency and non-emergency situations. Because of their increased responsibilities compared to peer advisers in other schools on campus, engineering peer advisers are paid a small honorarium at the conclusion of the course.

Groups of eight to twelve first-year students in the same School at Northwestern are paired with a single peer adviser in early July, and these groups communicate through social media over the summer before orientation. Before the existence of the first-year seminar, these peer advisers led summer and orientation activities with incoming first-year students. Further connection throughout the school year was largely informal and depended upon the peer adviser's efforts. During the week-long on-campus orientation, first-year students within PA groups follow the same schedule of events, and thus form strong bonds with each other and their peer adviser. Early in the process of designing the first-year engineering seminars, the decision was made to continue these PA groups through the first year, in the hopes that the groups would continue to strengthen socially. All engineering students (420-480 per year during the four years that the course has run) are automatically enrolled in their first-year seminar section with their PA group before they enroll in other courses. In the third year of the engineering seminars (2016-2017), registration for other classes by peer advising group at the same time during orientation was implemented. This has allowed PAs to aid their students in the course registration process and has led to many students in the same group enrolling in the same section of large first-year courses - an inadvertent benefit.

Initial content for the engineering seminars was determined largely by the new student office, but has evolved through the years to include a balance of academic (academic strategies, major selection) and student affairs (wellness, consent, identity) content. Initially in 2014-2015, the student affairs office planned all sessions with consultation with engineering academic advisers. During the current academic year (2017-2018), each office has created content for two sessions each quarter (Tables 1 and 2).

Finding the right number of meetings per ten-week quarter took three years; six to seven meetings proved too frequent for the ten-week quarter, while two to three meeting were too infrequent for social bonds to form. Through student surveys, the ideal number of meetings per quarter was determined to be four, provided that all of these sessions were in a format that allowed for small group conversation. This was determined through feedback from interviews with peer advisers, who indicated that the type of activity was key, and that students preferred and even sought out small group settings over the larger (albeit more fun) social events organized by student affairs.

The seminar is a registered course with satisfactory/unsatisfactory grading determined by attendance. Students may miss one session with no consequence, but if they miss two sessions they are required to meet with their engineering academic adviser. During this meeting, the adviser may discover that the student is experiencing broader problems that have caused the absences. It is a two-quarter sequence (fall and winter quarters) to offer structured support for the first two quarters of their University experience. Most students report that after two quarters they have good support in place and that formal meetings with their PA group are no longer needed.

Table 1: Weekly schedule for the fall quarter of the first-year seminar for the last four years. Sessions created by the New Student and Family Programs office are in *italics*.

Week	2014-15	2015-16	2016-17	2017-18
1				
2	<i>Personal Expectations and Campus Involvement</i>	Campus Involvement and Redefining Expectations	<i>Priorities and Values</i>	<i>Navigation and Time Management</i>
3	<i>Campus Resources, Stress Management, Learning Styles Inventory</i>	Group Advising	Group Advising	Group Advising
4	<i>Time Management</i>		Academic Culture and Study Skills for Higher Education	
5	<i>Group Advising</i>	<i>Campus Culture/ Alcohol</i>		Academic Culture and Strategies for Success
6	<i>Transition to College and Homesickness</i>		<i>Healthy Relationships and Consent</i>	
7		StrengthsFinder		De-stressor/ Check-in
8	<i>Finals Preparation, Reflection on Personal Health</i>		Tackling Academic Challenges: Fixed vs. Growth Mindset	
9	<i>Introduction to Major Selection</i>	<i>Mental Health/ Stress Management</i>		Tackling Academic Challenges: Fixed vs. Growth Mindset
10				

Table 2: Weekly schedule for the winter quarter of the first-year seminar for the last four years. Sessions created by the New Student and Family Programs office are in *italics*.

Week	2014-15	2015-16	2016-17	2017-18
1	<i>Reflection on Fall Quarter</i>	Learning Styles		
2	<i>StrengthsQuest</i>		Academic Strategies	Academic Strategies
3	Major Fair Preparation	Group Advising	Group Advising	Group Advising
4	Major Fair	Major Fair	Majors Selection Reflection	
5	Group Advising	Major Reflection		Academic Directions
6	<i>Resilience, Using Strengths</i>	Stress Management	<i>Wellbeing: PA Buddy Group</i>	
7				<i>Diversity and Inclusion</i>
8	<i>Finals Preparation, Reflection on the Engineering Experience</i>		<i>Wellbeing: Self-care Wheel</i>	
9				<i>Wellbeing</i>
10	<i>Finals Preparation</i>	Final Reflection		

The timing for the delivery of content associated with the small group meetings has also been key. Academic content has to be provided largely in the first five weeks of the quarter, as increasing demands on student time during the last weeks of the quarter often made it difficult to ensure their engagement with content. Fall academic content consists of a reflection of the differences between high school and college academic culture, timed in week three or four; too early, and students do not yet have enough experience to describe the differences.

Winter academic content consists of academic strategies in week two, asking students to reflect back on their performance in the fall quarter and consider one or two key changes to study habits or time management. In week five, content covering the selection of an engineering major is introduced, and potential activities are recommended to those who have not yet selected an engineering major.

Implementation of the first-year seminar, from an attendance, timing and content perspective, relies entirely on the peer advisers. Peer advisers are given license to adapt any given session, but are asked not to move sessions within a given quarter, as timing of the activity is so critical to content resonating with first-year students. Peer advisers are coached that the most important parts of the seminar are to connect with the first-year students and watch for changes in the students that might be signs of other issues. Peer advisers reach out to engineering academic advisers and necessary support services when they are concerned about any particular student

and receive ample training from student affairs in this. In order for PAs to give feedback on the course and their students, they meet with a PA coordinator (a graduate student intern or experienced PA chosen for the role) at least once per quarter for a face-to-face interview.

At the end of each quarter of the seminar, all first-year engineering students are given an electronic survey with a mix of questions with answers on a rating scale (e.g., strongly agree to strongly disagree) and questions with open-ended responses. These surveys have changed from year-to-year though some questions have remained constant. The student feedback has been crucial as we have made changes to course content and structure.

Results

Based on feedback from students, peer advisers, and staff and faculty in New Student and Family Programs and engineering academic advising, changes were made to both the structure and content of the first-year seminar. In this section, we show year-by-year results of surveys and interviews.

Surveys about the course as a whole

The same survey questions were asked after each quarter of the first year of the course (2014-15) and then after each subsequent fall quarter. The questions focus on student adjustment to college. The survey asked students to rate their response to five questions using a five-point scale, with 1= strongly disagree and 5 = strongly agree, and the average scores are shown in Table 3. Based on student and PA feedback in this survey and one-on-one interviews, respectively, the StrengthsQuest inventory was dropped after fall quarter 2016.

After the first year, a different set of survey questions were asked at the end of the winter quarter. The survey asked students to rate their response to five questions using a five-point scale, with 1= strongly disagree and 5 = strongly agree, and the average scores from winter 2016 and 2017 are shown in Table 4. Winter 2018 results were not available at the time of this writing.

Surveys about specific course content

At the end of each quarter from fall 2015 to present, students were asked to “identify the class meetings which proved beneficial to their ongoing transition to the University (mark all that apply).” The results of this question directly led to changes in course content. Results are shown in Table 5.

Surveys about student development

At the end of the course each winter, students were also asked about their development in specific areas. On a four-point scale from “Not at all” to “A lot” students were asked to consider how the course specifically contributed to their development in the specified areas. Average responses are shown in Table 6.

A big change in the course and School of Engineering occurred in the winter 2017 quarter. A new session on exploring majors was implemented. For years the School of Engineering held a Majors Fair during which each department representatives sat at a table in the engineering building lobby to answer questions about their available majors. Neither students nor departments were happy with this arrangement, so the Major Fair was cancelled after 2015-2016.

In winter 2017, PAs led student reflection on their choice of major and a discussion of possible next steps in their exploration of their major or possible majors. Each department provided major descriptions and lists of people (undergraduates, staff) who could answer more specific questions over email.

Open-ended survey questions

Students were also asked in each survey about the most valuable thing they learned from the course. Three themes have emerged consistently over the years. First, students highly value the community of their group and PA. Through conversation in the course, they appreciate that many of their peers are also struggling to adjust to college and that alone can help a student feel better. Second, students find discussions on grades and different expectations in college versus high school to be very helpful. Many students will be earning Cs or Bs for the first time in the fall or winter quarter of their first year of college. Finally, skills and strategies for time management and balancing academic and extra-curricular activities is considered very valuable by our students.

Table 3: Average responses to survey questions regarding the course as a whole for each fall quarter and winter 2015. Available responses were on a five-point scale, with 1= strongly disagree and 5 = strongly agree.

Quarter	fall 2014	winter 2015	fall 2015	fall 2016	fall 2017
Responses	177	144	51	284	384
The course provided you with information on campus resources that aided in your transition to the University and School of Engineering.	3.5	3.0	3.6	3.9	3.8
Your peer adviser provided support to you in your transition to the University.	4.5	4.2	4.3	4.5	4.5
As a result of being in the course, you feel comfortable asking others in the group (peers, PA, and instructor) for help, support, and guidance.	4.1	3.9	3.7	4.2	4.1
The course helped to support your overall well-being (mental, physical, emotional) as a first-year student at the University.	3.6	3.5	3.4	3.7	3.7
The discussions on StrengthsQuest in the course provided me with a better understanding of how I can apply my personal talents at Northwestern.	NA	3.1	3.1	3.3	NA

Table 4: Average responses to survey questions regarding the course as a whole for winter 2016 and 2017. Available responses were on a five-point scale, with 1= strongly disagree and 5 = strongly agree.

Quarter	winter 2016	winter 2017
Responses	255	211
My group gave me a sense of community.	4.2	4.0
I socialized with individuals from my group outside of the course.	3.9	3.8
I reached out to my peer adviser for help outside or course sessions.	3.5	3.6
I talked about issues with my group that I had not talked about outside of the group.	3.2	3.1

One-on-one peer adviser interviews

Each peer adviser was interviewed by the PA Coordinator for 15-30 minutes during each quarter. General trends from those interviews are included here. Many peer advisers had difficulty rescheduling class meetings to accommodate evening midterm exams. Over 70% of the peer advisers reported that at least some of the students in their group are close. A similar percentage reported that their students often study together outside of the first-year seminar for their other courses. During winter quarter, a handful of peer advisers experienced attendance issues when some of their students chose to go to fraternity/sorority recruitment events instead of their first-year course.

Some peer advisers wanted more structure to the course meetings to fill the scheduled time, while others thought that the extra time was useful for the students to vent about their worries. Finally, peer advisers expressed some concern over the attendance policy for the course. Many students and peer advisers were confused about which sessions were mandatory and what to do when scheduled meetings conflicted with evening midterm exams.

Discussion

Students surveys consistently show that the Peer Advisers are the strength of the first-year seminar. The average score when students are asked to agree with the statement “Your peer adviser provided support to you in your transition to the University and School of Engineering” are greater than 4.2/5 in every quarter (Table 3). With this in mind, much of the effort of the engineering academic advising team has focused on increasing Peer Adviser satisfaction. The position of the PA Coordinator was created to help coordinate communication between New Students and Family Programs, engineering academic advising, and PAs. The PA Coordinator is an additional resource for PAs looking for help with content, students of concern, and rescheduling. We have also been able to provide for each PA a restaurant gift card so that the PA can take their students to dinner. A final change has been to schedule combined training for both academic and student affairs content at the beginning of each quarter. In one two-hour session, representatives from engineering and the

Table 5: Responses to question asking students to mark all class meetings that proved beneficial to their ongoing transition. The number of students and percentage of response for each class are listed.

fall 2015		fall 2016		fall 2017	
Responses	44	Responses	305	Responses	384
Class topic	count (%)	Class topic	count (%)	Class topic	count (%)
Campus Involvement & Redefining Expectations	28 (64)	Academic Culture and Study Skills for Higher Education	185 (61)	Navigation and Time Management	214 (56)
Campus Culture	22 (50)	Healthy Relationships and Consent	106 (35)	Academic Culture	174 (45)
StrengthsFinder	13 (30)	Fixed vs. Growth Mindset	133 (44)	De-Stressor/Check-in week	248 (65)
Stress Management & Mental Health	25 (57)			Fixed vs. Growth Mindset	116 (30)
winter 2016		winter 2017			
Responses	255	Responses	211		
Class topic	count (%)	Class topic	count (%)		
Learning Styles	145 (57)	Academic Strategies	151 (72)		
Major Reflection	175 (69)	Major Reflection	155 (73)		
Stress Management	161 (63)	Peer Adviser Buddy Group	130 (62)		
		Self-care Wheel	118 (56)		

new student office discuss the quarter’s curriculum with the PAs and listen for feedback from the previous quarter.

One learning goal of the first-year seminar is to create students who are comfortable self-advocating and finding campus resources. Over the last two years of surveys, the average score when students are asked the extent to which they agree with the statement “The course provided me with information on campus resources that aided in my transition to the University and School of Engineering” was greater than 3.8/5 (Table 3). Also, students also tend to agree that “As a result of being in the course, you feel comfortable asking others in the group (your peers and peer adviser) for help, support, and guidance” (average scores greater than 3.7/5, see Table 3).

An additional goal of the course is for students to develop positive relationships with peers. The winter quarter surveys (Table 4) show average scores of 4.0 or greater on the five-point scale. They also report that by talking to other students and coming to understand that many

Table 6: Average responses to survey question asking students about their development in specific areas. Available responses were on a four-point scale, with 1= not at all and 4 = a lot.

winter 2016		winter 2017	
Responses	255	Responses	211
Area		Area	
Recover from disappointment and continue to work successfully	2.5	Develop effective study skills	2.3
Handle stress better	2.5	Set realistic academic goals	2.6
Know what major to choose	2.4	Understand the majors available to me	2.9
Understand my learning styles better	2.5	Seek information to inform my major selection process	2.7
Became more involved on campus	2.3	Identify campus resources that I need	3.0
Recognize strengths	2.6	Take steps to seek help for my needs using campus resources	2.7
Select campus resources to solve problems	2.6		
Set realistic academic goals	2.7		
Develop effective study skills	2.4		

other students are facing challenges in their transition to college, they feel better about their own transition. One unforeseen consequence of the course is that many PA groups become study groups for other courses in the School. Whereas many students do not feel comfortable forming groups with acquaintances from class, they find it easy to work with the people in their group.

As mentioned previously, we have settled on four sessions each quarter as the “right” number. Meeting every other week allows the groups to stay in contact, but also allows the PAs flexibility in scheduling. For example, the PA may move a session to an earlier or later week to avoid conflicts with a midterm exam. We also avoid having scheduled sessions during the last week of the quarter as we found that student attendance and engagement was low - they were prioritizing other courses.

When examining students’ responses to being asked “Please identify all class meetings which proved beneficial to your ongoing transition to the University (mark all that apply),” we see that they seem to prioritize learning actionable skills. For example, Academic Culture and Study Skills for Higher Education, Academic Strategies, Major Reflection, and Navigation & Time Management are all rated highly (>50%). Additionally, students have enjoyed less structured meetings like Destressor/Check-in and PA Buddy Group (students have reiterated this last point in their responses to open-ended questions as well). Students did not find that some meetings were as beneficial. For example, Academic Culture, Fixed vs. Growth Mindset, and Healthy Relationships & Consent were chosen by less than 50% of students.

The biggest challenge in success of this program results from communication between engineering and student affairs. Student affairs, which determines their content year by year in a manner that is more responsive to the overall student population, often produces content later in

the quarter, leaving little time for review by engineering academic advisers. This means that content is inadvertently duplicated, which can make it difficult for Peer Advisers to get students to engage with the content. Student affairs' training model for Peer Advisers has varied significantly over the years and is often scheduled on an as-needed basis when content is prepared. In contrast, engineering content is developed well in advance and Peer Advisers receive training at the beginning of each quarter in person. Better coordination of expectations, content, and delivery to Peer Advisers remains an ongoing area of improvement.

Conclusions

We have created a first-year engineering seminar course that helps students in their first two quarters at the University to form social bonds and to learn valuable skills to aid their learning. The New Student and Family Programs office of Student Affairs has used their expertise in student development theory to select and train Peer Advisers to lead small groups. The engineering academic advising office and new students office have worked together to create content for four meetings of these small groups each quarter. By focusing on keeping the content relevant and timely, we have been able to raise student satisfaction with the course and with engineering. Additionally, we have added support for the Peer Advisers to ensure their satisfaction and the course's continued success. Challenges in communication and planning between the two offices remain, particularly in training the Peer Advisers.

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