Freshmen Seminar: Gateway to choosing the right STEM Major through Connections

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Abstract - I want to be an engineer – is that not good enough? Do I have to pick a major too? Oh Boy! Most engineering students have to go through this phase. Some are able to make a decision quickly and some need more help. Like many colleges, New Jersey Institute of Technology (NJIT) allows students to be admitted into engineering as ‘undeclared.’ Not declaring for too long is as dangerous as making a hasty decision and being stuck in the wrong major. It is very important that these students get all the help they need to make an informed decision. This paper describes how a general university requirement (GUR) course such as, freshman seminar class, can be used as a launching platform to organize and implement various strategies and initiatives to help students pick the right major during their first year. Using peer mentors to coordinate all these efforts helped maximize the effectiveness of this initiative.

Index Terms – choosing the right STEM major, freshman seminar, peer mentors.

More and more students are struggling with their transition from high school to college. According to Deborah Hirsch, high school students understand what to do to get into college, “but they have an undeveloped and even unrealistic understanding of what it takes to successfully transition, persist and graduate from college.” [1]. New Jersey Institute of Technology (NJIT), like many other colleges, has recognized this issue and has been working on various strategies and initiatives targeted towards helping students with a smooth transition. This paper focus on undecided (undeclared) engineering students and the extra help they need to smoothly transition to college, while facing the difficult choice of picking the right major.

Although NJIT admits students to the Newark College of Engineering without a declared major, the number of undeclared students has always been much smaller than those who have made up their minds and picked an engineering major when applying (30-35 undeclared against >550 with declared major). One of the authors of this paper, Ms. Grazia Lopez, served as academic adviser for these undeclared engineering students with an objective to coordinate efforts to help get students all the information they need to make the right choice. Prior to Fall 2012, undeclared engineering students were not grouped together. They were mostly taking all the same courses, but were not necessarily put into same section. Most of the efforts to guide them through the difficult choice of picking the right major were made through one-on-one advising sessions. This method worked very well for some students, but the need for a coordinated effort on a larger scale was clear. Around the same time, learning community initiative was expanding rapidly at NJIT and used freshman seminar as one of the linked courses. It was recognized that there were several advantages in making undeclared students part of learning community experience.

Freshman seminar is zero credit course, but a graduation requirement at NJIT. This course is primarily designed to serve as college 101 course, but with sufficient room for improvisation and flexibility to accommodate different needs and expectations of students in various colleges and departments. Freshman seminar was picked as a launching platform to coordinate several activities and resources to help students make their decision with confidence. Undeclared students need assistance not only in information gathering on the diverse engineering majors, but also decision-making skills. Therefore, freshman seminar course was modified to put more emphasis on decision-making process as well as introduction to various engineering disciplines. The course was also tweaked to assist students in making connections and smooth transitions into their college careers.

Pilot study:

In the fall of 2012, the university grouped one section of about 18 undeclared engineering major students together in a freshmen seminar course. The academic advisor for undeclared students was also the instructor of this course. Since this was a pilot program at the time, the academic advisor tried many strategies and action plans that emerged as being the most effective after extensive research of similar efforts across STEM focused schools. Among the various strategies implemented by the advisor, following stood out and were quite useful particularly for NJIT students.

- Coordinate lessons on the decision making process into the freshmen seminar curriculum, which surpassed the college life adjustment information.
• Schedule presenters from each of the engineering major disciplines to visit the class and share vital information on their major area. These presentations covered vital information within each discipline, such as: curriculum, challenges, and career and research opportunities. Students were asked to take notes, gather information and ask questions to enhance their understanding of each of the engineering majors offered at NJIT.

• Provide frequent one-on-one sessions with the students (at least twice a month) to give more information and assistance on the specific needs of individual students that were not fully covered in the classroom group setting.

• Make the cohort part of learning community initiative so that students receive help from 2 upperclassmen mentors who guided students through their transition to college life.

• Expose students in undeclared cohort to many useful resources as part of learning community initiative, including a chance to present their humanities projects at freshman research showcase towards the end of spring semester.

• Ask students to carefully consider all the information that was presented to them and narrow down on a major that interested them the most. They were further asked to give a 5-10 minute presentation on the engineering major that interested them thus far followed by question and answers to get constructive feedback from the class.

• Ask students to interview an upper-classmen (peer) who is studying the engineering major they may be thinking about pursuing. They were then asked to record their questions and answers on paper and submit it.

Through this model, students were able to begin thinking of their own career interests and values and in turn started focusing on narrowing down their choices for the right major.

Lessons Learned:
• This pilot study was very successful and students reported that they felt that they were well informed about all the highlights various engineering majors had to offer.

• This pilot study demonstrated that freshman seminar can be used very effectively to streamline efforts, strategies, and initiatives to help students make informed decision about their major.

• All engineering departments recognized the importance of attracting these undeclared students and conveyed their enthusiasm to be part of expansion of this pilot study to include all undeclared students.

Below is a chart depicting how many undeclared engineering students chose a major by the end of their first year. Some chose but are not yet able to declare due to not meeting requirements as of yet:

![Undeclared Engineering Students 2012/2013](image)

**FIGURE 1**

**PROGRESS OF UNDECLARED STUDENTS AT THE END OF FIRST YEAR 2012-13**

Expansion of the study:

In fall of 2013, the university grouped about 35 undeclared engineering students together in two learning community cohorts supported by faculty, staff, and peer mentors. Freshman seminar again served as one of the learning community courses. More resources were allocated to the effort and many new strategies were

• NJIT established Advising Success Center (ASC) to oversee all undeclared and transfer students. ASC academic advisors at NJIT, made further changes to the freshmen seminar curriculum in order to best serve their undeclared students.

• The additions to the curriculum would allow undeclared students to be able to explore engineering majors, learn the decision making process, speak to students currently in majors they are considering, and receive information and tours from the academic departments themselves. The students also completed a journal entry on the top two choices they were considering for engineering majors and why.

• Students were invited to major-minor fair that was coordinated by ASC with help from all departments at NJIT.

• Along, with the additions to the curriculum, the undeclared students were able to build close connections with both the academic advisor, who instructed the freshmen seminar course, and the peer mentors and peer advisor liaisons in the classroom.

• Barbara Christie stated, “Strong scholarly evidence supports an approach to retention that encourages professors to connect to their students, offering a supportive and warm, learning environment” [2]. Therefore, our
advisor-instructors made sure to make the classroom experience filled with opportunities for making connections and building bonds between students, mentors and with the advisor.

- On top of meeting with the academic advisor weekly in the freshmen seminar course, the students would meet with the academic advisor one on one outside the classroom in order to further discuss specific and unique concerns when considering majors. They would also attend study sessions and social events with the peer mentors and peer advisor liaisons. These connections began to help foster bonds between the students, advisors, mentors, which in turn gives them an overall enhanced college experience. Connections assist in keeping students satisfied and motivated to graduate from NJIT.

- With connections being made, and the decision making process being reviewed, there is also the preparation on the rigor of an engineering major. At NJIT, the connections made with staff and faculty across campus could be documented through an online retention tool, known as MAP-Works. Student were able to complete a 15 minute survey within MAP-Works, that had them distinguish and report the way their college transition was going academically, socially, and financially.

- The advisors and other staff members across campus were able to review the survey and assist students efficiently with appropriate interventions. The undeclared students struggled with self-efficacy, time management and positive study habits. The academic advisors and peer advisor liaisons who knew this worked hard to try and express the intensity of engineering major and the diverse struggles with each individual major, so students would begin to think about and change their high school habits.

**Lessons Learned:**

- This effort continued to provide very good results.
- ASC and the Office of the Dean of Students (overseeing learning community initiative) worked very closely to maximize effectiveness of all the efforts.
- Very good indication that such efforts can be extended to non-engineering students at NJIT.
- Students felt very assured in choosing a major and formed close bonds with one another to help them through their time at the university.
- A lot more students were able to make a decision very quickly enabling them to work harder to maintain a high GPA and satisfy requirements for the major they wish to move into.

Below is a chart depicting number of undeclared engineering students that chose a major by the end of their first year. Some made a decision, but were not able to declare due to not meeting requirements for major of their choice.

![Pie chart showing progress of undeclared students at the end of first year 2013-14.](image)

**REFERENCES**


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