
An Engineering Major Does Not (Necessarily) an Engineer Make: Career Decision Making Among Undergraduate Engineering Majors

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I. INTRODUCTION

In the late 1950's, Sputnik spiked policy makers' concerns about the United States' ability to produce professionals to maintain its preeminent status in technology and innovation. Undergraduate education has been a significant focus of efforts to recruit talented scientists, mathematicians, physicists, and engineers into science and technology fields. This is a natural focus, since higher education prepares students for a range of fields in science, technology, engineering, and math. However, relatively little is known about the decision making processes that lead undergraduates toward or away from such fields.

This paper explores the career-related decision making of seniors enrolled in undergraduate engineering programs at two, nationally recognized institutions. Eighty students were recruited as freshmen from these institutions as part of a four-year study that focused on issues of academic and career persistence among engineering undergraduates. This strand of our research emerged as surveys and interviews revealed that many engineering students were undecided about their career plans, even late into the senior year. As we probed this phenomenon, we began to question the link between students' undergraduate major and their career choice.

ABSTRACT

This study uses a mixed-methods design to investigate students' career decision making at two U.S. undergraduate institutions. The research question was, "To what extent do students who complete undergraduate programs in engineering intend to pursue engineering careers?" We surveyed senior engineering majors about their post-graduate intentions, and later interviewed a subset of the seniors about their career intentions. Only 42 percent of students surveyed reported that they definitely intended to pursue a career in engineering, 44 percent were unsure, and 14 percent were definitely not pursuing engineering. We observed significant institutional differences. Interview data reveal the quixotic nature of many students' decisions about their careers; strikingly, students were vacillating between multiple post-graduate options late into the senior year, even into summer. Implications are discussed for further research and ways engineering departments can influence students' career decisions.

Keywords: career decision making, mixed methods research, professional persistence

II. LITERATURE REVIEW

For nearly sixty years, extensive resources have been devoted to researching ways to steer our most talented students into science, technology, engineering, and math (STEM) careers (Lowell and Salzman, 2007; Lucena, 2005). Much of this research has focused on the undergraduate experience and ways to identify, attract, and retain students into STEM majors. (National Science and Technology Council, 2000).

An important strand of this research examines differences between those who remain in STEM and those who switch into non-STEM majors. Such research has identified few important cognitive differences in terms of students' capacity to complete the major. Factors that influence students' decisions whether to persist have more to do with demographics, attitudes, program structure, quality of advising, and curriculum and instruction than they do grades or ability (Eris et al., 2005, 2007; Seymour and Hewett, 1997).

Underlying programs, practices, and research related to STEM undergraduates is the assumption that students who complete STEM-related majors will pursue STEM careers (Adelman, 1998;

Fister, 1990; Fox, 2003; Tsapogas, Cahalan, and Stowe, 1994). However, significant shifts in the workforce raise questions about the tenability of this assumption.

The U.S. Department of Labor estimates that employees in today's labor force will have three to six careers in their working lifetime (Bureau of Labor Statistics, 2006). New graduates no longer seek a company in which to climb the job ladder from entry to retirement. Instead, they think in terms of expanded skill sets and "first careers." Throughout the undergraduate years, students continue to struggle with *career* decisions—not merely job decisions—often contemplating professional options with no direct relationship to their undergraduate major. For example, a student with a pre-med degree might choose a graduate program in law, while a student with an engineering degree might choose a job in investment banking. Students can wrestle with job and career decisions late into their senior year—and beyond (Adelman, 1998; Arthur, Khapova, Wilderom, 2005; Atkin, Green, and McLaughlin, 2002; Foskett and Hemsley-Brown, 2001; Inkson, 2007; Koettters, 2007).

Perry (1970) developed a stage-model of college students' intellectual and emotional development that has been extensively applied to student learning and decision making. Perry suggests that young adults progress from oversimplified, dualistic approaches to problem solving to approaches that are increasingly refined, complex, and accommodating of diverse perspectives. Perry's model provides a rational model for student career decision making, yet research suggests that, in practice, students' decision making process is not altogether rational.

Career decision making is influenced by myriad factors, including chance events (Bright, 2005; Bubany et al., 2008). Students' perception of a profession can strongly influence their career choices. Yet many students who have had only limited exposure to a profession may base their decisions on limited or distorted perspectives. For example, a single internship experience—whether positive or negative—can become the basis for over-generalizations pertaining to working conditions, job responsibilities, and career options (Roska, 2005; Danziger, 2006; Shauman, 2006). Students can have persistent angst about committing to a career, even when it would appear from their undergraduate major that they are prepared for a career in a particular field (Frederic et al., 2008). Some have argued that undergraduates might have undeveloped (or under-developed) professional identities related to the careers associated with their college major. Consequently, students might not believe that their undergraduate degree binds them to a related career (Dannels, 2000). Whatever the underlying reasons, research into students' decision making strongly suggests that the link between undergraduate major and career choice is not assured.

Yet data are limited pertaining to students' career decision making processes. Most existing data are quantitative, survey data, which summarize students' decisions, or capture the decision at a moment in time, making it appear that students are more decided than they in fact might be. Most participants in these studies are freshmen and sophomores, and when seniors are surveyed their results are typically mixed in with students of other classes. Survey data do not typically examine the struggles students experience in making career decisions, nor the tenuousness or even the capriciousness of some students' decision making. Finally, few studies examine career decision making of engineering majors (George et al., 2001; Kelly et al., 2004).

This study used a mixed-methods design to investigate career decision making among undergraduate engineering majors (Cresswell et al., 2003). Our research question was, "To what extent do students who complete undergraduate programs in engineering intend to pursue engineering careers?" Using surveys, we summarized the assuredness of undergraduate seniors at two different universities regarding their intentions to persist in engineering careers and then we explored those decisions qualitatively through extensive interviews. This study provides unique insights into career decision making among senior undergraduate engineering majors. The data—both quantitative and qualitative—have significant implications for undergraduate engineering program policy and practice.

III. METHODS

Data in this paper come from undergraduates enrolled at two universities. One is Suburban Private University (SPRI), a private, comprehensive university offering undergraduate majors in the humanities, social sciences, mathematics, engineering, and science. The second site is the Technical Public Institution (TPUB), a state-funded, technical institution offering undergraduate degrees in engineering, chemistry, mathematics and computer science, and economics and business (names of institutions and participants are pseudonyms). There are important programmatic differences between these two institutions: SPRI offers a broad range of alternatives to engineering, while the TPUB does not.

A. Participants

Students were recruited for the study who indicated engineering as their intended major when entering each institution as freshmen. A total of 80 students were recruited (40 each from SPRI and TPUB). Students completed surveys and interviews each year for four years, until spring 2007. Some students left the study because they had chosen a major other than engineering. In the senior year (2007), 74 students participated from the two institutions (TPUB = 35, SPRI = 39).

B. Data

Data presented in this paper are from two sources. The first is quantitative, gathered from the Persistence in Engineering (PIE) Survey. The second source is qualitative, based on extensive student interviews. In both sets of data, the definition of "professional persistence" in engineering is based on students' articulated intention whether to persist in engineering. We did not predetermine criteria for what constituted an engineering or engineering-related career. Our purpose was to study the intentions of engineering majors, and so we let students define what constituted for them an engineering or non-engineering career. As a side note, when students were contemplating not persisting in engineering, their alternatives fell clearly out of both engineering and STEM fields (with the exception of one student who considered teaching science education at the university level and two students who considered medicine). In all other cases, students were considering alternatives in business, law, culinary arts, linguistics, K-12 teaching, and other non-STEM fields.

1) Survey Data: The PIE survey seeks correlates of academic persistence and professional intention to persist among undergraduate

IV. FINDINGS

engineering majors. The survey was created by project researchers and refined over several administrations. Questions focused on students' undergraduate experiences, how their interest in engineering evolved, and their post-baccalaureate intentions (Eris et al., 2005, 2007).

The PIE Survey data were gathered during the spring of 2007 from 74 senior engineering majors. Response rate was 100 percent. The survey item relevant to this paper asks students whether they intend to pursue a career or graduate study in engineering for at least three years after completing their undergraduate degree. Response options were *definitely not*, *probably not*, *unsure*, *probably yes*, and *definitely yes*.

2) *Interview Data*: Our second source of data is ethnographic interviews. A subset of 28 students across the two institutions participated in lengthy (one- to three-hour), semi-structured interviews each year, beginning their first year. Students were not chosen randomly for interviewing. Rather, we over-sampled women and students of color in order to ensure that we captured perspectives from students who reflected a broad range of experience.

Student interviews were typically conducted in the spring. Senior year interviews were held between March and April (after students had completed the PIE Surveys), with some follow-up interviews in May and June. In the senior year we interviewed 12 of 35 (34 percent) of the participants from TPUB and 16 of 39 (41 percent) from SPRI. Interviews were audio taped and transcribed.

Based on interviews, students' career intentions were categorized as either *Definitely Persist*, *Unsure*, or *Definitely Not Persist*. To categorize students, researchers calibrated the rubric using several initial cases. When agreement reached 100 percent, researchers divided and completed categorizing the remaining cases.

To be characterized as *Definitely Persist*, a student had to articulate an intention to pursue an engineering job or career for at least three years after graduation—the same criterion for persistence used on the survey. "Pursuing engineering" could include attending graduate school and/or working in an engineering-related job. Students pursuing advanced degrees were placed in categories based on their stated intentions regarding what they were going to do after obtaining the degree. For example, one mechanical engineering student who was going to medical school for the express purpose of building a career in bio-engineering was categorized as *Definitely Persist*, even though her graduate course of study was not expressly engineering. We categorized another student as *Unsure*, who was earning a master's degree in business, but who was undecided about whether to apply the degree towards engineering or another field. Students who said they were taking an engineering job but intended to remain in the job for less than three years before shifting to a non-engineering career were listed as *Unsure*.

Obviously we could have used student responses on the survey to categorize students' career intentions. Instead, we used the rubric we have just described for two reasons. First, students' decision making was quite fluid, even in the spring of the senior year. Because of this, it was possible that a student who was *Unsure* on the survey might have shifted to a *Probably* or *Definite* (yes or no) response when she or he was interviewed one or two months later, or vice versa. Second, given the detail revealed in interviews, we hypothesized that students' responses on surveys might not reflect the complexity of their decision making. Consequently, students might select a definitive response on a survey item that might not reflect their actual ambivalence.

A. Survey Findings

Seniors were asked on the PIE survey (taken in March of their senior year) about their intention to pursue an engineering career. Responses are shown in Figure 1.

Distinct patterns emerge across the two schools. At TPUB, 80 percent of students report that they are *Definitely* or *Probably* going to pursue engineering for at least three years after graduation, compared to 54 percent at SPRI. At TPUB, 14 percent of respondents are *Definitely Not* or *Probably Not* going to pursue engineering, while the figure is over twice that, or 36 percent, at SPRI. These differences are statistically significant (chi-square = 5.21, df = 1, $p < 0.05$).

Looking at combined data, 42 percent of all students were *Definitely* going to pursue a job in engineering. Adding *Probably Yes* to the count, the number of seniors considering engineering as a career rises to 66 percent. On the other hand, 26 percent report they will *Definitely Not* or *Probably Not* choose engineering, and 8 percent are *Unsure*.

We believe that the survey data over-report engineering persistence. Among those interviewed, over one-third (9 of 28) reported different intentions than they had on surveys two months earlier. In all but two of these cases, students reported on surveys a stronger intention to persist in engineering than was conveyed in their interviews.

B. Interview Findings

Of the 28 students interviewed at the two institutions, 25 percent reported they would *Definitely Not Persist*, 54 percent reported *Unsure*, and 21 percent reported *Definitely Persist*. In the sections below, we illustrate examples from each of the three categories. We chose these samples based on students' clarity about their decision making and the extent to which their deliberation was similar to that of others in the same category. In some cases, text has been lightly edited to eliminate redundant phrases, "um's," and other distracting features.

1) *Definitely Persist—Max (TPUB)*: At TPUB, Max is the clearest case of unwavering commitment to engineering. His father was an engineer and his mother had a science and technology background and worked with engineers. He also spent time with his father's engineering colleagues and sought their advice about which

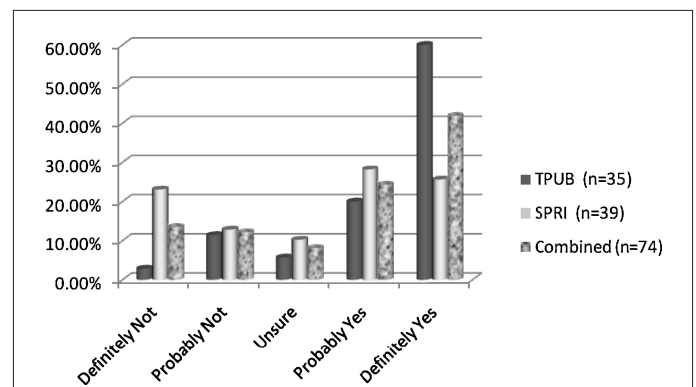


Figure 1. TPUB and SPRI responses on the survey item: "Do you intend to practice, conduct research in, or teach engineering for at least 3 years after graduation?"

college to choose, based on his interest in engineering. Max had early and ongoing support for a career in engineering, which he describes in his first interview:

I also have a lot of hook ups just with the geologists in the oil and gas industry because of my dad. A guy who graduated from TPUB here actually kinda took me and another kid who lives in my hall—my dad hooked us up with him—he kinda like took us in and helped us out and talked to us about what petroleum engineering was about and then gave us a contact to this job and now we got it.

Max's interest in engineering did not waver during his undergraduate years. He graduated ready to move across the country to begin an engineering job in the petrochemical industry. A large salary and the associated lifestyle were important features of Max's interest in engineering as a profession:

There is a saying, 'The rich do as they please and the poor do as they must.' That's a pretty big motivator for me... I want to be able to do whatever I want when I get old. When I get experience, I want to be my own boss. And, I want to do things the way I want to do them. And, I want to retire. Live happy. And I know people say money can't buy happiness—give me a million dollars and watch the grin on my face. Money can buy happiness.

Max was unusual compared to most of the undergraduates we interviewed, in that his long-term goals were clear and they encompassed more than professional attainment. Max's vision of his future included a clear picture of his home life. To that end, the job fits perfectly within that picture:

It's exactly what I need. So, I'm so stoked. And, all my rigs will be—it's a big program, they have seven rigs running right now. And, they're all within an hour of the office so I'll be home at night. I won't have to fly to North Dakota for weeks at a time or something. And, we could like double the house down there that we were looking at here. It's just, it's awesome.

With his engineering degree, Max stepped into an engineering career that suited his talents and will enable him to pursue his financial goals and desire for professional independence.

2) *Unsure—Leslie (TPUB):* Leslie entered TPUB loving mathematics. Intending to become a missionary after graduation, she hoped to use a degree in Civil Engineering to benefit the residents in the mission she would serve:

[When I began TPUB] I really wanted to get involved in missions, so I found out about a place [that recruits engineers to work in orphanages]. I went into the office and talked to them and saw all of what they do as engineers. And you know they showed me plans for working on an orphanage in Guatemala. I was like, 'Wow, I want to do that!' So that's pretty much how I got into engineering.

Leslie's goal of becoming an engineer was intertwined with her religious faith. During her undergraduate years she questioned her

faith and her engineering path:

I think the worst times for me [in undergraduate school] have been the times that I was really struggling with my faith, because that's what I use to shape my whole life and my purpose—like my daily purpose and my overall purpose. And so when that's kind of shaky, then it's hard to figure out where everything else fits in. And that includes all my engineering stuff.

Beginning her sophomore year, Leslie struggled with her interest in engineering studies. Leslie's experiences with internships did not help to cement her desire to pursue engineering as a career. After her first internship, in a governmental entity, she asserted, "If that's what engineering work is all about, I'm not interested." During her senior-year interview in early April, Leslie stated that she had no intention of practicing as an engineer, although "she wouldn't change a thing" about her undergraduate experience. She had decided to teach mathematics in public school, although she wanted to wait before re-entering college to earn her teaching credentials.

Leslie and her mother planned to travel overseas after Leslie graduated. In mid-June, Leslie picked up her annual check for participating in the study—just six weeks after her previous interview—and announced that upon returning from the trip she would seek an engineering job after all! She explained her decision with the comment: "Engineering pays better than Starbucks." She reiterated her interest in teaching mathematics, but said she was not ready to begin right away and needed a way to support herself until she started her studies.

Leslie's future plans were still shifting. Although she decided to seek an engineering job, she was not intending a career in engineering. Of course, there is no telling what will happen if and when Leslie begins an engineering job. Given the dramatic nature of her changed career intention over a six-week period, she might find another career to be even more appealing than mathematics education and choose to pursue it—or find that engineering works for her and remain in the profession. Meanwhile, although Leslie was disinclined towards engineering as a career, she recognized the power of the degree for getting a high-paying job.

3) *Unsure—Nate (SPRI):* When Nate first came to SPRI, he planned to major in engineering, even though he was considering other careers as well. When asked in his first year about his future plans, he mentioned an interest in teaching, saying, "I thought it looked interesting."

However, by his sophomore year Nate soundly rejected engineering as a possible career, and he had also veered away from teaching. In his first year, Nate started a non-profit company designed to improve medical education in third-world countries, and created a student group to provide a summer camp for low-income high school students. When asked as a sophomore about a possible career after graduation, he said:

I'll be in med school. I'll probably be a part of the program that our non-profit's starting, but yeah I'll probably be in med school, maybe still working with the company and expanding it.

Later in that interview, Nate was asked to describe his view of the skills practicing engineers need. The interviewer asked him to

imagine himself as an engineer and Nate interrupted:

- Nate: Professional engineer? I've never even thought about it. The thought of becoming a professional engineer is like, it's just like never...
- Interviewer: So you said you wouldn't do it and you were shaking your head.
- Nate: Yeah. Wouldn't do it.

In his junior year, however, Nate was more equivocal. He remained committed to social action but saw ways to apply his engineering knowledge to third-world development. Even so, his interests remained broad and unfocused. Mostly, he planned to delay career decisions until returning from a year abroad in Brazil. Nate imagined the range of possibilities would narrow upon his return from Brazil. Engineering-related work remained as one of the options, along with business consulting or educational consulting.

Nate graduated with a dual degree in Chemical Engineering and Brazilian Studies. His year-long trip to Brazil did not happen. Instead, Nate accepted a position working full-time as an engineer for a corporation—something that in previous interviews he insisted he would not do because he felt such work would be “boring” and lead nowhere. As passionate as Nate had been in earlier interviews, especially regarding his commitment to social change, he was surprisingly nonchalant about his upcoming work situation. When asked what he would be doing with the corporation, he said:

That's the bad thing, I really don't know. [Laughing.] I really don't. I don't know what happened. I got through two runs of interviews, and I still don't know exactly what I'm going to be doing.

While working for the corporation, Nate will be completing a co-terminal (master's) degree in education and technology, offered through SPRI's School of Education. He originally applied directly to the Ph.D. program, but the department faculty asked him to start with the master's degree. Looking into the future, Nate sees a career in engineering as a fallback, something to do if his education plans do not work out:

Ten years from now, I still plan on being in business for myself, doing consulting [sounds questioning], either in education, or, possibly, in engineering. But the focus will be on education, science education stuff. I might have to do the engineering to, you know, actually make some money, but the focus is hopefully going to be in science education.

We categorized Nate as *Unsure* about a career in engineering because he was admitted into a non-engineering master's program with the intention of leaving engineering behind. If Nate continues in his plan to complete the Ph.D. in education, he will not have persisted in engineering. He feels conviction about the education path, but there is still uncertainty. In fact, each of Nate's interviews is characterized by assuredness regarding his immediate plans—which in all cases shifted—and an abiding ambivalence about engineering compared to other possible paths.

4) *Definitely Not Persist—Kevin (SPRI)*: As a first year student, Kevin seemed bent on an engineering career. He began at SPRI in

electrical engineering. Kevin had some vision of what a future job would look like, describing a “decent job” as “interesting, where you get to work with prototypes and design rather than being a quality assurance manager or something and just kind of looking over stuff and making sure that you have like 1.2 failures per 10,000 instead of 1.3.”

As a sophomore, Kevin still planned a career in electrical engineering. He had considered and dismissed other engineering fields, such as mechanical, and rejected the idea of a minor in economics. As a junior Kevin still sought an engineering degree, but was considering other careers and interviewed for a finance internship. He had already participated in an engineering internship but was clearly leaning away from the engineering profession, which had become his fall back, in case something better did not work out.

I thought doing this finance [internship] would give me some more flexibility when I'm looking for full-time stuff because I could try it on, see if I like it, and if I, if for some reason it's not what I want to do, I think I can still go back and find an engineering job relatively easily... I think this [taking a summer job in finance] leaves more options open for next year.

Kevin got the finance internship, where he used his technical skills to do some programming, and had experiences that involved more human interaction than he had had during his engineering internship.

In his senior year, Kevin did interview for engineering jobs, but he also interviewed for jobs in banking and finance. Kevin received several offers in both engineering and banking and finance. His final choice was between banking or finance:

And then I got a few offers, and I went with a banking one, just by talking to a lot of different people that said that—most people said that that skills you learn from a banking analyst job are more widely applicable than what you might learn doing something like trading, which were the other two offers I had gotten.

In considering his options, Kevin seemed to value flexible career options and a broad skill set:

- Interviewer: So, what other factors did you consider in looking at the offers?
- Kevin: Well, just the trajectory it would send you on afterwards. Like, a trading analyst is definitely going to be a trader; a banking analyst will either go on to be a banker or do the financial analysis, in another aspect of the financial business world. Um, what else did I consider? Just, trying to—just what I would learn on the job, basically.

Engineering, banking, and finance all satisfied Kevin's desires for intellectual challenge and a certain level of income and lifestyle. However, he perceived that banking and finance provided opportunities to learn more than he would in an engineering job. In our interviews, Kevin did not appear to agonize over his career decision. He recognized that he had many options. While he valued the

engineering background he had acquired, he finally decided, based mostly on his internship experiences and job interviews, that banking that banking would provide the greatest opportunity to expand his skill set and broaden his career options.

V. CONCLUSION

Our research question was, “To what extent do students who complete undergraduate programs in engineering intend to pursue engineering careers?” Surveys revealed that 42 percent of all 74 students in the study were *Definitely* intending a career in engineering at the time they were surveyed in March of their senior year. Another 24 percent reported they were *Probably* going to enter a career in engineering, 8 percent were *Unsure*, 12 percent were *Probably Not* intending careers in engineering. The rest (14 percent) reported that they were *Definitely Not* considering engineering-related careers. There were significant differences by institution, with TPUB students reporting a greater likelihood than SPRI students of pursuing careers in engineering and SPRI students reporting greater likelihood of not pursuing engineering careers.

Interviews highlighted the fluid and even quixotic nature of students’ decision making. Of the 28 seniors we interviewed, 15 (54 percent) fell into the *Unsure* category. These students were still vacillating between different post-graduate options late into the senior year, even into summer. To be clear, these students were not vacillating between different *job* options within engineering; they were wrestling with a range of career choices.

We conclude with four insights derived from these data. First and most importantly, these data clearly indicate that students who complete a major in engineering are not necessarily committed to careers in engineering or even STEM. Furthermore, many students had not made decisions about what to do next, even by June of the senior year.

Second, during the span of students’ tenure as undergraduates, their thoughts about career options were strongly swayed—we could even say disproportionately swayed—by a single experience, such as an internship, interaction with faculty or even staff, or advice from a mentor. The movement could be in either direction. In the senior year itself, students could shift categories quickly. A student who was *Unsure* about engineering might become a *Definite* engineering candidate if an enticing job offer came through. Alternatively, someone who seemed sure about becoming an engineer might, at the last moment, switch to another career option if an unexpected opportunity looked more promising. It could be that the students’ perceptions of engineering as a job or career, whether accurate or not, is what causes or contributes to their exploring alternatives. Other findings related to this project suggest that students’ perceptions of the engineering profession are extremely limited at the time they must make career decisions (Stevens et al., 2008).

Of course, students are also swayed by family and other outside forces. However, only rarely did we hear students describe specific, deliberate assistance in their decision making by the engineering department. Institutional support for decision making came almost exclusively from career centers or campus Web sites. Thus, students were not expressly guided towards jobs and careers by those with STEM backgrounds and expertise.

Third, institutional differences are most likely contributing to the varying levels of commitment to engineering careers among stu-

dents at TPUB and SPRI. TPUB is a technical institution with a mission to produce engineers and other science and technology majors. As such, TPUB offers few alternatives to engineering and few options for non-technical coursework. SPRI, on the other hand, is a large university with a comprehensive range of majors in the sciences, humanities, and arts. Students meet a breadth of requirements and have more latitude than students at TPUB for course-taking outside of the major. Admission into any major at SPRI is open to any student who wishes to enroll in that major. Consequently, it is not surprising that SPRI students would explore and shift majors, often migrating out of engineering and technical fields altogether.

Institutional factors beyond the structure of the curriculum and requirements for a major could also be a factor in students’ career decisions. Student life, accessibility to faculty, diversity of gender and ethnicity, proximity to industry or urban life, and other factors all contribute to students’ exposure to various social and career alternatives. We believe that valuable research could be conducted on the many ways that institutional characteristics influence students’ career decision making.

Fourth, “career” may be an obsolete term. At least, it does not mean now what it did in decades past. Today’s youth entering the workforce do not consider the choosing of a career as a lifetime commitment. Instead, they think about their “first job” or maybe their “first career.” Many students expect to have diverse professional experiences. Participants we interviewed saw their engineering education as a good start, and they valued the problem solving skills they acquired in their major. They believed that their skills would also be valued by future employers, regardless of the profession in which those skills might be applied. Engineering graduates see themselves as qualified to enter a broad range of fields and often they struggle trying to figure out which one to pick first.

These data leave us with good news and bad news. The bad news, from the perspective of infusing the engineering profession with a talented, qualified applicant pool, is that an engineering major does *not* necessarily an engineer make. The progression from undergraduate engineering degree into an engineering career is not assured. The technical and problem-solving skills students acquire in their engineering majors equip them for success in a broad range of professions.

The good news is that students’ decision making is malleable. Precisely because students are open to a range of alternatives, engineering as a career can be marketed to engineering students. In fact, research in career decision making suggests that some students can be persuaded into careers based on how the career is described (Tansley et al., 2007). More substantively, providing students with exposure to a range of engineering responsibilities and jobs could attract them to engineering careers. Encouraging students to pursue careers in engineering would require deliberate planning and programming on the part of engineering departments, possibly working in collaboration with campus career centers. At the same time, knowing the powerful influence of internship experiences on students’ decision making, engineering departments might become more deliberate in structuring opportunities to meet a range of student interests. Many students who spend their internship experiences just sitting in front of computers might over-generalize their experience, believing that such limited activity constitutes the sum total of an engineer’s work life.

We believe that students’ decision making about their post-graduate plans often takes place without the knowledge or influence

of engineering faculty, who could conceivably provide valuable insights and guidance. Structuring such guidance into existing programs could ensure that qualified, talented graduates of engineering programs will use their skills and abilities in the service of engineering-related careers.

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