What Do You Want To Do With Your Life? Insights into how Engineering Students Think about their Future Career Plans

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Motivation

- Understanding engineering students’ career plans and pathways – how and why
- National Center for Engineering Pathways to Innovation (Epicenter)
- Fostering Innovative Generations Studies (FIGS)
Research Questions

RQ1: What are the different ways students think about their future plans?

RQ2: What are the motivations that drive students to choose a particular path?

RQ3: Are there significant differences between how men and women think about their futures?
2015 Engineering Majors Survey

- Engineering students at 27 schools
- 7,197 responses
- Targeted at juniors and seniors
- 1,848 responses to open-ended question
- 30% female
Open-Ended Question:

• “We have asked a number of questions about your future plans. If you would like to elaborate on what you are planning to do, in the next five years or beyond, please do so here.”
Methods

- Identify 10 main emergent themes
- More specific subcodes for some themes
- Iterate codes to better capture insights
RQ1: What are the different ways students think about their future plans?
Engineering

- No
- Yes
- Don’t know
- Probably (vague)
- No indication
- Engineering then leave
“Currently not sure, but hoping to use my engineering degree to work with people in a medical field setting” (junior, female)

“Work, employer pays for MS, go live and work abroad, attain PE, become senior engineer status, at this point make bank like a boss” (senior, male)
“After finishing my biomedical engineering degree, I plan on going to medical school. I loved the idea of having an engineering degree as a backup plan and also because I found the material very interesting.” (junior, female)

“I want to go to law school and while there obtain an MS in History” (sophomore, male)
“I am hoping to be hired into a company that has a position that draws in my imagination and attention. I do not necessarily know what this looks like, but I will know it when I see it.” (junior, male)
“Engineering, engineering management, or start directly in engineering management. Eventual goal is real estate and public office in Texas (or California if I were from the state)” (junior, male)
Ways to Think about Careers

- Specific Company
- Industry
- Job Trait
Ways Think about Careers

Specific Company

Industry

Job Trait

“I have accepted a job with GM, I will most likely work there for 3 years” (senior, female)

“I’d like to work for a private space company, such as SpaceX, Boeing, etc” (junior, female)
Ways to Think about Careers

**Specific Company**

“I really want to work in the automobile industry” (junior, male)

**Industry**

“I would like to work in the prosthetic limb industry. I would like to work with a company that improves the design and efficiency of this technology. It is something that I am very passionate about, and would like to expand my learning in that subject.” (junior, male)

**Job Trait**
“Most likely work for a larger company at first. Although I’d like to work for smaller companies since I don’t like large corporations and the atmosphere.” (junior, male)

“Find a job involved in design engineering (using Solidworks or other similar 3D modeling software) or manufacturing” (senior, female)
RQ2: What are the motivations that drive students to choose a particular path?
Motivations

- Giving Back/Helping People (34%)
- Life Goal (25%)
- Combine engineering with another field (7%)
- Inherent love of engineering (10%)
- Secure future (13%)
- Specific company (3%)
- Other (23%)
Giving Back/Helping People

• “I plan to use my engineering knowledge to better aid humanity. I am interested in a variety of subjects, but I want to change the world, not make tons of money. Sure, money is great, but as an engineer I feel it is my responsibility to aid humanity first. that is what I will do.”  (junior, male)
Life Goal

• “My dream is to develop defense software. This may involve working for a big tech company, starting my own company, or working for the army/DoD.” (junior, male)
Combine Eng with another field

• “I will work in the Singaporean civil service trying to apply design thinking to policy making” (junior, female)
Motivation - Specific Company

• “I am planning on working for The Walt Disney Company. I have 3+ years of experience with them as a Cast Member in their theme parks (in custodial, attractions, etc.). I plan to pursue a career with Disney long-term. I am interested in ultimately becoming an engineer responsible for daily operations of the theme parks or an Imagineer, which is part of the team responsible for developing new attractions and venues for the theme parks. However, due to the fact that these jobs are in high demand (and therefore very competitive), I am fully aware that I might not be able to get such a job immediately upon graduation. My "back up" plan is to work as a regular Cast Member in the theme parks (in other words, a job that pays an hourly wage, not requiring engineering experience), and working my way up to a salaried position, regardless of whether or not it is in engineering. Disney is a company that tends to promote their employees from within, and from the "lower ranks" of the company. I have no plans to return to school to pursue any further education, nor do I have plans to pursue an engineering-related job unless it is within The Walt Disney Company.” (senior, female)
RQ3: Are there significant differences between how men and women think about their futures?
Codes that Suggested a Difference

More Women

Engineering
then leave
Trait of the work
Life outside
career – Family
Teaching

Start business
Life outside
career – Travel
Motivations –
Inherent love of
gineering

 Fewer Women
Implications

• Inform Engineering Practice
  – Make content relevant and meaningful
  – Help students determine what is important to them in a job

• Potential Future Work
  – Better capture thoughts about what will influence career decisions
  – Students who plan to use engineering in other fields
Questions?
IGNORE slides past here, they are just for reference
### by year in school (n=1,848)

<table>
<thead>
<tr>
<th>Year in School</th>
<th>n</th>
<th>%</th>
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<tbody>
<tr>
<td>Freshman</td>
<td>30</td>
<td>1.6</td>
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<tr>
<td>Sophomore</td>
<td>164</td>
<td>8.9</td>
</tr>
<tr>
<td>Junior</td>
<td>668</td>
<td>36.1</td>
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<tr>
<td>Senior</td>
<td>767</td>
<td>41.5</td>
</tr>
<tr>
<td>5th-year Senior</td>
<td>216</td>
<td>11.7</td>
</tr>
</tbody>
</table>
Career Roles

- Start business
- Management
- Teaching

Life Outside Career

- Family
- Travel
Ways Think about Careers

Specific Company

General industry

Industry

Motivation

Job Trait

Influenced by specific experience
Ways Think about Careers

Specific Company

Industry

Job Trait

Size

Type of company (private, non-profit)

Involves travel

Trait of the work

Location

Trait of the company

Employer pays for further education
Table 3: Data for “Clarity of Plans” (n = 1790)

<table>
<thead>
<tr>
<th>Sub-code</th>
<th>%</th>
<th>Example Responses</th>
</tr>
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</table>
| No Idea       | 15 | “I have no clue what the future beholds after school.”  
                 |     | “I plan to be flexible and evaluate my opportunities as they present themselves”                                                              |
| Some Idea     | 34 | “I'd like to explore the field of green product development to lead the move towards more sustainable solutions to our daily lives”  
                 |     | “I would like to work in a firm that allows me to move/know different places and where I get to be part in projects with other engineers. I would also like to later on, own my own construction company.” |
| Know Exactly  | 51 | “I will be working wind farm project development for a developer, then transitioning into a career in policy or government affairs with a wind energy developer.”  
                 |     | “Go to grad school to be an oceanographer.”  
<pre><code>             |     | “I am joining a large engineering firm doing Structural Engineering in the Aviation and Global Facilities industry.” |
</code></pre>
<table>
<thead>
<tr>
<th>Sub-code</th>
<th>%</th>
<th>Example Responses</th>
</tr>
</thead>
</table>
| No                       | 6 | “After finishing my biomedical engineering degree, I plan on going to medical school. I loved the idea of having an engineering degree as a back up plan and also because I found the material very interesting.”  
“I want to go to law school and while there obtain an MS in History” |
| Yes                      | 70| “Currently not sure, but hoping to use my engineering degree to work with people in a medical field setting.”  
“work, employer pays for MS, Go live and work abroad, attain PE, become senior engineer status, at this point make bank like a boss” |
| Don’t know                | 12| “Travel and/or live abroad, and hopefully but not necessarily work in engineering”  
“Go to medical school, if not get my Masters and PhD in either electrical or biomedical engineering and work for the DOD” |
| Probably (vague answer)   | 9 | “Get a job, get financially stable, go on vacation.”  
“I am hoping to be hired into a company that has a position that draws in my imagination and attention. I do not necessarily know what this looks like but I will know it when I see it.” |
| No indication             | 3 | “Hope to travel/work for non profit in the first year or two after I graduate”  
“Currently undecided but will be looking to work abroad at some point.” |
| Engineering then leave    | 3 | “Engineering, engineering management, or start directly in engineering management. Eventual goal is real estate and public office in Texas (or California if I were from the state).”  
“I am just focused on getting a decent job right out of college. Engineering should open up a lot of possibilities for a job. If satisfied financially, I would like to go back to school and pursue a degree that suits me better.” |
Inherent Love of Engineering

• “I feel that choosing my major was more about loving what I was going to be doing rather than making a bunch of money doing it.”
Means to Secure Future

• “This degree is a means to achieve financial stability. If I find a workplace I'm happy to work for, I'll consider myself lucky.”
Ways students think about career plans

Motivations

Understanding gender differences