WIP: How Professional Networking Impacts Outcome Expectations and Choice Goals in a First-year Engineering Course

Dr. Evelyn Walters, Temple University

Eve Walters is an Associate Professor of Instruction in Temple University's Department of Civil and Environmental Engineering.

Cory Budischak, Temple University

Cory is a teacher and researcher who strives to reduce the harmful effects of energy production and use. Teaching has always been his central passion. He started as a group tutor in college, which led him to his full time career as an Associate Professor of Instruction at Temple University in the Department of Electrical and Computer Engineering. He has also taught a course "Electric Vehicles and the Grid" at the University of Delaware. He employs innovative instructional methods such as problem based learning, flipping the classroom, and teaching through interactive games. He finds it rewarding to reach students with these methods who may not have been reached by traditional lectures. His research focuses on the transition to 100% renewable energy and effective engineering instruction/support using problem based learning, flipped classroom approaches, design thinking, and co-curricular supports such as mentoring.

His main research focuses on two research questions:

1) What would our energy system look like if we make the shift towards 100% renewable energy and how much would the system cost? The research focuses not on a single energy system (electricity, transportation, agriculture), but the interaction among systems and taking a systems thinking approach.

2) How can learning and educational outcomes be improved with innovative instruction and co-curricular supports?

His research has appeared in Discovery News, The Huffington Post, Scientific American, and Rolling Stone Magazine. His outreach to the community has been featured in many local publications. He has presented his work all over the country including on the TEDx stage. He has done consulting work, including for the Chief Investment Officer of JPMorgan Chase, Michael Cembalest.

Cory received his Doctorate in Electrical Engineering from the University of Delaware. He spent 8 years at Delaware Technical and Community College in the Energy Management Department as an Instructor and Department chair before transitioning to his current role at Temple University.

When Cory is not educating or researching, he enjoys backpacking, yoga, volleyball, and hiking with his family.

Dr. Shawn Fagan, Temple University

Dr. Shawn Fagan is the Assistant Dean for Undergraduate Affairs in the College of Engineering at Temple University.

Work in Progress: How Professional Networking Impacts Outcome Expectations and Choice Goals in a First-year Engineering Course

Introduction

A plethora of studies exist which link the development of a professional identity to retention and persistence within undergraduate engineering. Factors such as student experiences and perceptions of their knowledge and skills as well as the culture of the university have all been linked to identity development. A study by Pierrakos et. al. [1] compared first-year engineering persisters with those who transferred out and additionally found that persistence occurs when students have more knowledge and exposure to the field as well as contact with actual engineers. Generally, first-year engineering students have very limited interactions with the field and practitioners.

Social cognitive career theory (SCCT) is a theoretical framework which may be used to understand the processes which influence how people form interests, make choices, and achieve various career outcomes [2]. In SCCT, the interaction between social cognitive variables and other variables such as personal characteristics and social environment work together to explain career pathways [2]. Outcome expectations are personal beliefs about what will happen if given actions are undertaken and may be acquired through learning experiences such as personal attainment or social persuasion [2]. Outcome expectations are also linked to an individual's choice goals, performance goals, and choice actions. Choice goals have been defined as "the type of activity or career one wishes to pursue and performance goals as the level or quality of performance one plans to achieve within a given task or domain" [3]. Furthermore, as students establish a set of beliefs about the consequences related to an engineering degree, they begin to develop goals directed towards these outcomes and formulate a plan to achieve their goals [4].

Using the SCCT model as a guiding theoretical framework, this study seeks to understand how a professional networking intervention in a first-year Introduction to Engineering course affects a student's engineering outcome expectations and their engineering choice goals.

Methodology

As part of a first-year general engineering course (approximately 350 students/year and 70 students/section), we are developing a module which introduces students to required transferable skills, including professional networking. The module is presented to students in stages as shown in Figure 1.

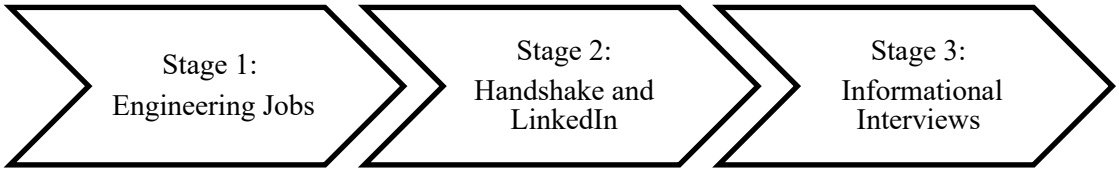

Figure 1. Stages of the Professional Networking Module implemented in a First-Year Introduction to Engineering course.

Stage 1: Engineering Jobs

The learning outcomes for Stage 1 is for students to: (i) recognize core technical and professional skills they will need to acquire throughout their academic journey; (ii) identify the differences between the engineering fields.

In class, students are provided with current entry-level job postings for a variety of engineering fields. In small groups, students review at least four postings and identify technical expertise, software experience, and transferable skills required for each position. Finally, teams analyze the skills required in different engineering fields, making sure to note common themes.

Stage 2: Handshake and LinkedIn

The learning goals of Stage 2 are for students to (i) engage with a student-centric, online career managmenet system, Handshake; and (ii) create a LinkedIn profile which they use to connect with peers and eventually practitioners in their future field.

This stage begins with providing students with an in-class introduction to Handshake. Students are tasked with finding at least three engineering internships of interest to them and which match their current skillset. As part of their submission, students are required to identify professional skills common to all three postings.

To provide a more formal overview of networking, students engage with a LinkedIn homework assignment within the online social annotation platform, Perusall. Here they begin to create content (e.g. Headline, Summary, Experiences, Skills) that they will subsequently use in their own profiles. The following in-class assignment requires students to create their LinkedIn profiles and connect with at least 10 peers.

Stage 3: Informational Interviews

The learning outcomes of Stage 3 are for students to: (i) initiate contact with a potential interviewee in a professional manner; (ii) gain a greater appreciation for what day-to-day life looks like for an engineering professional; (iii) begin to develop their professional presence.

In Stage 3, students first conduct an informational interview with an upper-level classmate to learn more about their involvement in cocurricular activities, required professional skills, and any internships or research experiences they have had. Finally, students reach out to a practicing engineer via LinkedIn and conduct a similar informational interview, with questions focused on their engineering field and advice on how to be successful in their early careers.

Results

In the first iteration of this intervention, as part of Stage 3, students were only asked to complete an informational interview with a working professional. Following their interviews, an in-class discussion was facilitated with PollEverywhere. Students were prompted to share advice that

their interviewee provided. One major message students received was the power of having a well-developed professional network:

- *"make connections and always try to keep learning something new"*
- *"go to as many career fairs as possible so you can build your network"*
- *"Networking and communication is SUPER important, start building your tree of contacts early"*
- *"build strong network"*
- *"Build strong connections"*
- *"Make connections"*
- *"network, get internships, join societies"*
- *"Build a solid network"*

Additionally, students noted that many interviewees had recommendations about the role of experiential learning opportunities:

- *"do many internships and explore different fields on engineering"*
- *"Apply for a lot of internships and don't overthink interviews"*
- *"find work in different fields"*
- *"Keeping options open. Even if you are interested in a specialty in a field, it is a good idea to look into other specialities due to demand."*
- *"make sure to get real-life experiences and learn from those"*
- *"Continue to learn outside of schooling, get as much work experience as possible"*
- *"Be comfortable with failing and applying for a lot of internships"*

At the end of the semester, students provided instructors with anonymous feedback about the course. In addition to answering basic questions, they had the option of providing comments. Many students had a positive impression of the professional networking module:

- *"I would have liked to do more assignments with networking and learning how to figure out what major of engineering is best for us. I enjoyed when we had a guest speaker who taught us about certain things to know."*
- *"Linkedin hand shake was a great touch to the course I am still amazed at the networking that is being done. The overview of majors has help me to see all the possiblities of Engineering. The guess speakers have inspired me to work harder and focus more."*
- *"I found the LinkedIn and Overview of Majors part helpful. I liked the guest speakers and seeing the things we could do with our majors."*

Future Work

In the next iteration of the module, we intend to conduct pre-and post-surveys to learn more about short-term student gains in recognizing the need for professional networking skills as well as outcome expectations and choice goals associated with building a professional network. We also plan to conduct an Interpretative Phenomenological Analysis exploring the student's lived experiences to gain an in-depth understanding of how engineering outcome expectations and engineering choice goals are influenced by the professional networking intervention.

References

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