Examine the Migratory Patterns of Engineering Students using Social Psychological Theories

This project examines the enrollment and persistence choices of engineering students. A large number of engineering students change their engineering discipline over the course of their undergraduate career. This project aims to identify and understand the choices engineering students are making with regard to persistence and enrollment in various engineering disciplines. This study uses a mixed methods, nested analysis design. The study is designed in two parts, the first is a large scale longitudinal study of general migratory patterns across several colleges. The second is a case analysis at one university using surveys and interviews and applying social psychological theories to understand the reasons for this migration.

**Approach**

- Social Cognitive Career Theory (SCCT) - career choice based on self-efficacy, outcome expectations, goals, barriers and supports
- Kelman’s model of social influence (SI) - social influence results through three processes: compliance, identification, and internalization
- Chilly climate - students feel unwelcome, intimidated, out of place, devalued

**Outcomes**

The major findings from this project to date are:

- ~20% of engineering students change their major
- Migration costs the students at least an extra semester
- Engineering students who graduate are slightly less likely to have changed their major
- There are clear trends in migratory patterns within engineering e.g. industrial engineering is the most popular destination and electrical engineering and computer engineering trade a lot of students
- Migration is negatively correlated with academic performance
- Self-efficacy, interest, and departmental climate have emerged as the most significant factors related to performance and migration

**Benefits**

The findings from this project are expected to help engineering educators and administrators guide students to make appropriate choices within engineering. If students make the right choice of discipline at the outset of the undergraduate career, i.e. the choice most in line with their interests, goals, values, and abilities, they are more likely to persist and to succeed in their discipline.

**Deliverables**

The products of this research so far have included two articles published in conference proceedings as well as a number of presentations. The first of a series of articles describing our findings is currently under preparation and will be submitted to a peer reviewed journal within the next month.

**Table 1: Correlations between major satisfaction and social psychological variables**

<table>
<thead>
<tr>
<th></th>
<th>Major Satisfaction</th>
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<tbody>
<tr>
<td>Self-efficacy</td>
<td>.619**</td>
</tr>
<tr>
<td>Technical interest</td>
<td>.478**</td>
</tr>
<tr>
<td>Barriers</td>
<td>-.471**</td>
</tr>
<tr>
<td>Climate</td>
<td>.423**</td>
</tr>
<tr>
<td>Support</td>
<td>.03</td>
</tr>
<tr>
<td>Compliance motivation</td>
<td>-.502**</td>
</tr>
<tr>
<td>Identification motivation</td>
<td>.685**</td>
</tr>
<tr>
<td>Internalization motivation</td>
<td>.521**</td>
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</tbody>
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**Figure 1: Summary of migratory paths**

**Figure 2: Summary of major migratory trends**

**Figure 3: Time to completion against number of major changes**

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