

## **WIP: Evaluating announcements of student services for first-year engineering students using content analysis**

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# **WIP: Evaluating announcements of student services for first-year engineering students**

## **Abstract**

This work-in-progress paper evaluates student communications. Many support services, such as out-of-class engagement events, academic advising, mental health support, and career services, target first-year engineering students to help improve their transition from high school to college. These support services have been linked to increases in student engagement and retention in first-year engineering programs. However, it is not clear how these services are disseminated, what the best methods are for sharing information with students, and how students learn about these services. The objective of this research is to better understand how students learn about available support services. This work-in-progress paper describes the preliminary results of a qualitative content analysis conducted on timing and frequency of communications, and engineering/professional topics provided in the communications to support first-year engineering students. Weekly newsletters distributed to first-semester engineering students during fall 2024 were analyzed for the timing and frequency of communications involving student support. The types of student support considered were academic advising support, academic peer support, faculty support, engineering faculty connections, out-of-class engagement, engineering peer connections, engineering career development, and general career development. Preliminary results indicated out-of-class engagement and engineering career development services were most frequent throughout the semester. Items related to academic peer support, engineering peer connections, and general career development were observed throughout the semester, but with less frequency. Items related to academic advising support and faculty support were not found within the newsletters. This information provides us with a better understanding of opportunities and communications, so we can better target messaging those items to help support engineering identity development. Furthermore, this study can help us identify some of the services that should be continued beyond first-year engineering.

## **Introduction**

Many student support services target first-year engineering students to help improve their transition from high school to college and to reach first-year retention goals. These programs may include items like bridge programs, required study labs, out-of-class engagement opportunities, and academic support (e.g., [1], [2], [3]). Many support services are available that may not be required as part of a student's curriculum. Other support services are required as part of the students' curriculum and include panels of industry experts, social events, speaker series, and hands-on workshops, among others. These opportunities are communicated to students through a variety of ways (e.g., email newsletters, bulletin boards, flyers, social media). The objective of this work-in-progress paper is to identify the most predominant academic support service opportunities offered to students during their first semester in an engineering program at a land-grant institution. We hypothesize that student services opportunities are disproportionately communicated; specifically, students may receive notices of some services by a variety of messages and may receive few notices of other services. With a better understanding of opportunities and communications, we can target messaging those items to help support engineering identity development.

## Methods

The dataset for evaluation in this work-in-progress included weekly newsletters distributed to all first-year engineering students at a land grant institution. The newsletters were delivered to official student email addresses and were intended to share events and opportunities. Beginning in week 2, newsletters were disseminated approximately each week over the 16-week fall 2024 semester, resulting in 13 newsletters. There were no newsletters during week 8 and week 15 of the semester, which corresponded to fall break and fall recess, respectively. Additional data, including bulletin boards located in the main engineering building and academic advising newsletters, will be evaluated in the future.

A codebook was created, including both primary and secondary codes. The primary codes related to student support services were academic peer support, engineering career development, engineering peer connections, faculty support, academic advising support, general career development, out-of-class engagement, and engineering faculty connections [4]. Definitions of these a priori primary codes were informed by Lee et al. [4] with adaptations to focus on engineering as described by Hopkinson et al. [5]. At least two secondary codes were identified for each primary code. Most of these codes were established in advance of the evaluation, and several codes emerged from the data set during analysis (Table 1).

Three newsletters (weeks 2, 3, and 4; 23% of the dataset) were coded independently by two researchers. The two researchers compared results, and the interrater reliability value was 83% and 78% for primary codes and all codes, respectively. Discrepancies were resolved through discussion. One researcher coded the remaining newsletters. Each individual item of the newsletters was coded once for each primary code and for secondary codes as necessary. While only one primary code was used for an individual item, multiple secondary codes may have been identified.

**Table 1. Primary codes (bold) as defined by Lee et al. [4] and Hopkinson et al. [5] and secondary codes (italicized) developed for this study.**

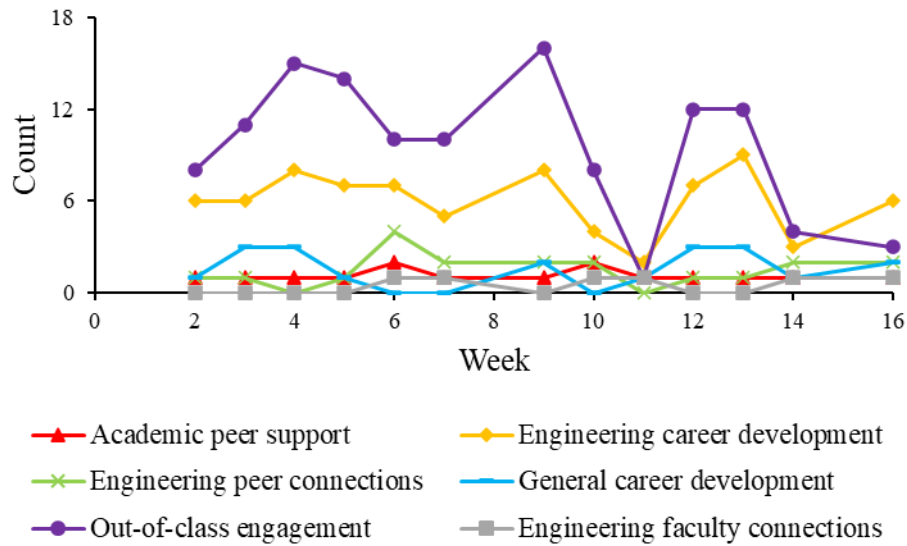
| <b>Code</b>                           | <b>Definition</b>                                                                                                                                                                                                                                                                                      |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Academic Peer Support</b>          | Institutional support geared toward improving or increasing interactions among students that contributed to their academic success                                                                                                                                                                     |
| <i>Advice</i>                         | Sharing tips and strategies from upper-level students; receiving advice from upper-level students                                                                                                                                                                                                      |
| <i>Group Projects</i>                 | Students working together on assigned academic work                                                                                                                                                                                                                                                    |
| <i>Studying</i>                       | Students working together on academic work outside of class that is not assigned; could include working on homework together that is not assigned as group work                                                                                                                                        |
| <i>Tutoring</i>                       | Peer-to-peer tutoring; individual tutoring or tutoring centers                                                                                                                                                                                                                                         |
| <b>Engineering Career Development</b> | Institutional support geared toward career opportunities via an undergraduate degree in engineering, providing access to experiences and role models to prepare students for a career in engineering, or developing industry-independent skills that contribute to successful professional performance |
| <i>Courses for Engineering Career</i> | Courses to support engineering career development that are not required from degree program                                                                                                                                                                                                            |
| <i>Engineering Programs</i>           | Programs that support engineering career development                                                                                                                                                                                                                                                   |
| <i>Internships</i>                    | Information on getting an internship; discussion of internship experiences                                                                                                                                                                                                                             |
| <i>Opportunities</i>                  | Opportunities to find employment outside of career fair                                                                                                                                                                                                                                                |
| <i>Professional Exams</i>             | Preparation for engineering-related professional exams                                                                                                                                                                                                                                                 |
| <i>Professional Mentoring</i>         | One-on-one relationship between student and professional mentor                                                                                                                                                                                                                                        |
| <i>Professional Networking</i>        | Opportunities for student and professional interactions outside of class                                                                                                                                                                                                                               |
| <i>STEM Career Fair</i>               | Anything related to career fair                                                                                                                                                                                                                                                                        |
| <i>Workshops</i>                      | Workshops for career related resources (resume writing, etc.)                                                                                                                                                                                                                                          |
| <b>Engineering Peer Connections</b>   | Institutional support geared toward interactions among students in engineering majors, increasing the number of interactions that students have with other students outside of the classroom, or grouping students based on some part of their academic circumstances                                  |
| <i>Socialize</i>                      | Opportunities to socialize with other engineering students; could be sponsored by Statler College                                                                                                                                                                                                      |
| <i>Support</i>                        | Creating shared experiences, making friends                                                                                                                                                                                                                                                            |
| <b>Faculty Support</b>                | Institutional support geared toward establishing, improving, or increasing interactions among students and faculty/staff as it relates to their academic performance                                                                                                                                   |
| <i>Faculty Advice</i>                 | Consulting faculty member for advice; does not rise to the level of mentoring                                                                                                                                                                                                                          |
| <i>Instructor Resources</i>           | Resources provided by faculty to support classroom learning                                                                                                                                                                                                                                            |
| <i>Office Hours</i>                   | Meeting with instructors during office hours to help with coursework                                                                                                                                                                                                                                   |
| <b>Academic Advising Support</b>      | Institutional support geared toward disseminating information related to improving academic performance or circumstances, providing access to resources that support academic performance, or monitoring academic performance or development                                                           |
| <i>Academic Advising Meeting</i>      | Interactions and meetings with academic advisor                                                                                                                                                                                                                                                        |
| <i>Advice/Guidance</i>                | Receiving advice and/or guidance on meeting career and curriculum goals                                                                                                                                                                                                                                |
| <i>Course Planning</i>                | Anything related to registering for classes or making sure courses count for degree completion                                                                                                                                                                                                         |

**Table 1. (continued)**

| <b>Code</b>                              | <b>Definition</b>                                                                                                                                                                                                                                                                                                     |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>General Career Development</b>        | Institutional support geared toward developing industry-independent skills that contribute to obtaining employment or providing access to resources that contribute to the professional development of students along different career trajectories                                                                   |
| <i>Courses for General Career</i>        | Courses to support career development not typically related to engineering that are not required from degree program                                                                                                                                                                                                  |
| <i>Graduate Degree</i>                   | Preparing for graduate programs                                                                                                                                                                                                                                                                                       |
| <i>Non-Engineering Careers</i>           | Related to careers not typically related to civil and environmental engineering                                                                                                                                                                                                                                       |
| <i>Non-Engineering Opportunities</i>     | Experiences not typically related to civil and environmental engineering                                                                                                                                                                                                                                              |
| <i>Professional Degree</i>               | Law school, medical school; other professional degrees                                                                                                                                                                                                                                                                |
| <i>Training</i>                          | Workshops for general career development                                                                                                                                                                                                                                                                              |
| <b>Out-of-Class Engagement</b>           | Institutional support geared toward improving or increasing extracurricular immersion in both social and professional activities hosted on campus and around the local community                                                                                                                                      |
| <i>Community Engagement</i>              | Activities not related to student organizations                                                                                                                                                                                                                                                                       |
| <i>Community Service</i>                 | Helping WVU and surrounding area                                                                                                                                                                                                                                                                                      |
| <i>Competition Teams</i>                 | Related to student organization competition teams (e.g. canoe, steel bridge)                                                                                                                                                                                                                                          |
| <i>Engineering Student Organizations</i> | Related to student lead organizations that are associated with Statler College; general information only                                                                                                                                                                                                              |
| <i>Events</i>                            | Out of class experiences not related to class                                                                                                                                                                                                                                                                         |
| <i>International Experience</i>          | International travel; study abroad of any length                                                                                                                                                                                                                                                                      |
| <i>Leadership</i>                        | Leadership opportunities outside of class; could be related to student orgs                                                                                                                                                                                                                                           |
| <i>Other Student Organizations</i>       | Student organization at WVU outside of Statler College                                                                                                                                                                                                                                                                |
| <i>Student Organization Projects</i>     | Opportunities within a student organization for more extensive project experience                                                                                                                                                                                                                                     |
| <i>Undergraduate Research</i>            | Participation in undergrad research; SURE, RAP, hourly, any undergraduate research experience                                                                                                                                                                                                                         |
| <b>Engineering Faculty Connections</b>   | Institutional support geared toward establishing, improving, or increasing interactions among students and engineering faculty/staff, increasing the quality of interactions students have with faculty/staff, and helping students establish relationships with faculty or staff related to professional development |
| <i>Faculty Mentoring</i>                 | One-on-one relationship between student and faculty mentor; assistance and advice outside of classroom; any interaction that is not part of coursework                                                                                                                                                                |
| <i>Faculty Networking</i>                | Opportunities for student, faculty and staff interactions outside of class                                                                                                                                                                                                                                            |

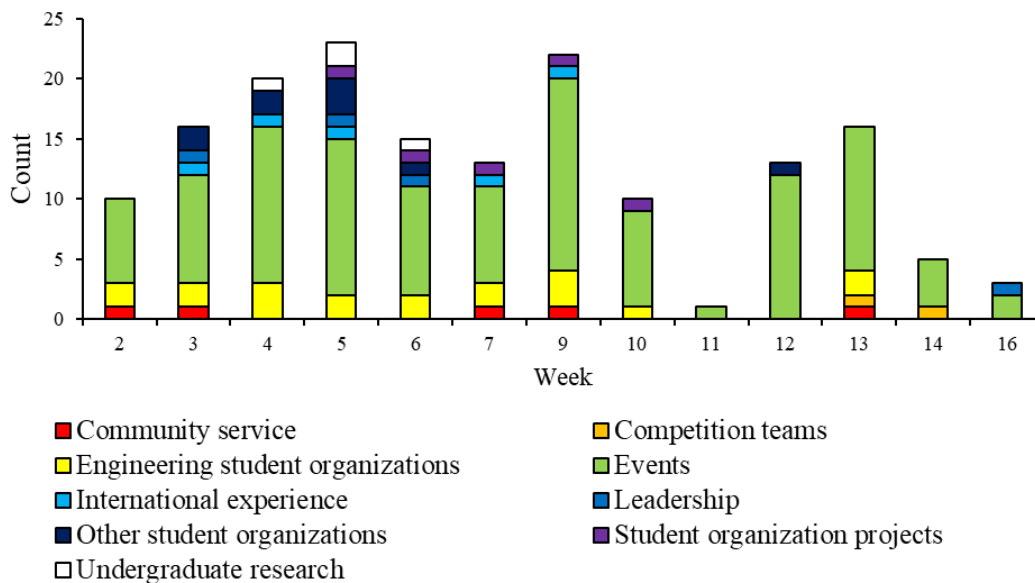
## Results

Overall occurrence of primary coded items ranged from 6 in week 11 to 29 in week 9 (average = 20; standard deviation = 6.6). There were a substantial number of items related to out-of-class engagement and engineering career development throughout the semester. There were fewer items related to general career development, engineering peer connections, and engineering faculty connections. There were no items related to faculty support and academic advising. The fewest items were recorded during week 11; this week corresponded to class registration dates for freshmen and sophomores (Figure 1).



**Figure 1. Frequency of primary student services codes per newsletter.**

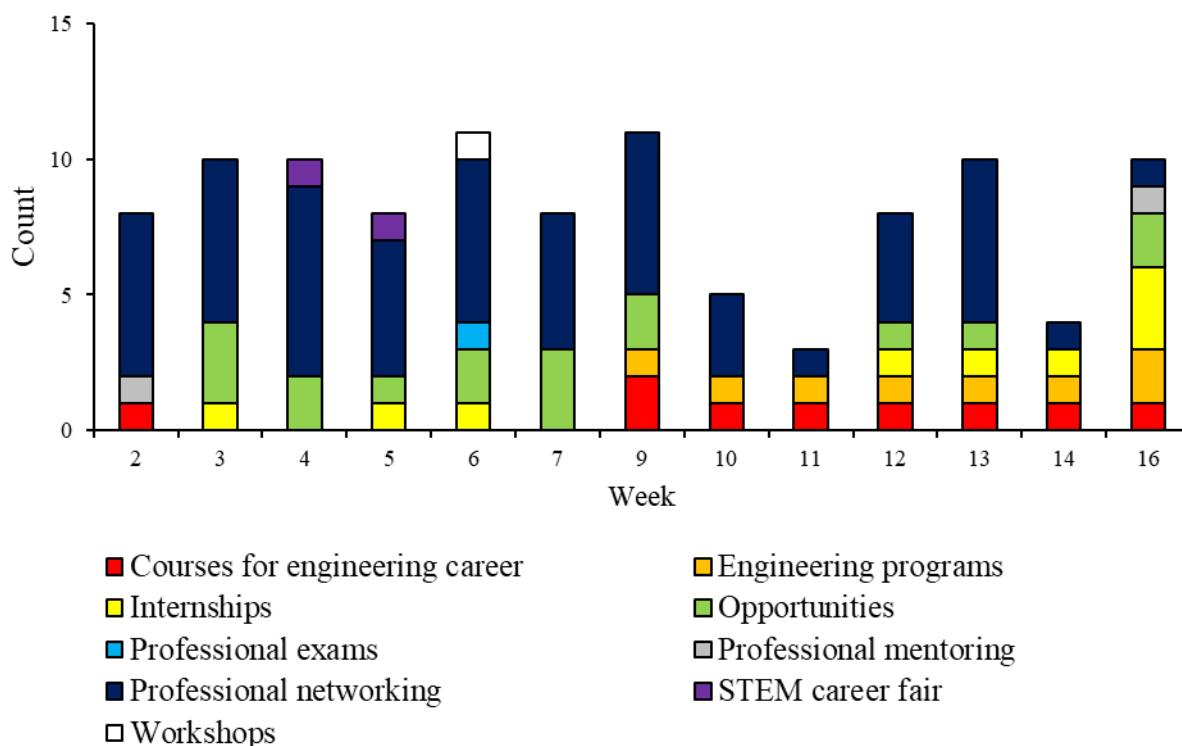
Out-of-class engagement had the highest count of primary coded items for all weeks but two (week 11 and week 16, Figure 1). Events provided the greatest contribution to out-of-class engagement (Figure 2) and were defined as out-of-class experiences not related to class. On average, students could attend more than eight events per week. Types of events included presentations by engineering professionals, presentations to help students get an internship or job, the career fair, and presentations by West Virginia University Libraries. There were also opportunities related to engineering student organizations during most weeks of the semester. No observations of community engagement were recorded.



**Figure 2. Secondary codes contributing to out-of-class engagement by week; no observations of community engagement were recorded.**

Engineering career development items had the second highest count of primary codes for most weeks (Figure 1). The high count was primarily due to the items related to professional networking (Figure 3). Professional networking was defined as opportunities for student and professional interactions outside of class. Types of professional networking opportunities that were communicated through the newsletters included alumni and other engineering professionals who participated in discussion panels and gave presentations.

The STEM career fair, which targets engineering majors, occurred during week 5 of the semester, and items related to the career fair were observed in weeks 4 and 5. Opportunities for employment outside of the career fair were defined with the secondary code “opportunities.” These opportunities were available throughout the semester. Courses for engineering careers, defined as courses to support engineering career development that are not required from the degree program, were highlighted before and after the course registration period for the following semester.



**Figure 3. Secondary codes contributing to engineering career development by week.**

No academic advising services items were observed in the newsletters. These services and opportunities were communicated by a separate newsletter distributed by the academic advising center. The academic advising center newsletters as well as bulletin boards in the engineering building will be evaluated as part of this ongoing research to better understand how student services are communicated to students.

## **Discussion**

The results reported in this work-in-progress paper were limited to evaluating the timing and frequency of communication of student support services in a newsletter distributed to first-year engineering students. The analysis will be extended to other forms of communication like bulletin boards and additional newsletters. Data analysis is in progress, but preliminary analysis suggests that out-of-class engagement and engineering career development were also highlighted in bulletin boards in the common area of the engineering building. Students received information about out-of-class engagement and engineering career development activities from multiple sources.

The overall impact of disseminating this information to students cannot be understood by this analysis alone. However, this information is essential for identifying experiences that could be examined to determine whether they contribute to the development of an engineering identity. The reported results will be understood in context of student survey results, student interviews, and faculty/staff interviews in a broader project that is evaluating relationships between student services and engineering identity (see [6]). There will be follow-up student interviews in spring 2026 to help understand whether and/or how students' use of student services changes over time. In addition, one question will address how students receive information: "Can you provide examples of how you learn about student services provided by Statler College?".

## **Conclusions**

In an evaluation of first-year engineering student newsletters to communicate items about student support services, there were a substantial number of items related to out-of-class engagement and engineering career development throughout the semester. Fewer opportunities related to general career development, engineering peer connections, and engineering faculty connections were reported in the newsletters. Other means of communication such as bulletin boards and additional email newsletters are under evaluation to better understand how and how often this information is communicated with students. This work provides a description of events, activities, and services that could potentially affect the identity of first-year engineering students. The data gives evidence of how the university is supporting first year students to begin to build their engineering identity by communicating information about different professional opportunities. With a better understanding of opportunities and communications, we can target messaging those items to help support engineering identity development.

## **Acknowledgment**

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