

Social Engagement of First-time Freshmen and Transfer Students One and Two Years Post-COVID

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Abstract

In this research paper, we present results from a survey focused on student engagement with college, university, and local events, use of student resources, students' general feelings of connection to the engineering college and the university, and their social engagement with peers and faculty. Retention, particularly of first- and second-year students, remains a challenge despite efforts to improve first-year programming and it is widely recognized that a sense of social belonging contributes to persistence in undergraduate engineering programs. Thus, it is important to evaluate student engagement with programming and their sense of social belonging. The Engineering and Architecture College distributed a survey addressing these items to students in five introductory-level engineering, computer science, and architecture courses in fall 2021 (N=409) and fall 2022 (N=226). In this paper, we focus on results that highlight key differences between first-time freshmen and transfer students as well as engagement trends for the fall 2021 cohort of first-time freshmen, the first semester with in-person instruction after COVID-19, versus the fall 2022 cohort. Our aim is to better understand how engineering colleges can best serve their first-year student populations. Few significant differences were found between the 2021 and 2022 cohorts apart from higher resource utilization and slightly more frequent event attendance for the 2021 cohort, indicating that although many 2021 students transitioned directly from an online learning environment, they were approximately equally engaged. The comparison between first-time freshmen and transfer students revealed that transfer students were significantly less likely to engage with peers and felt less connected to the university but were more likely to utilize college resources and felt equally connected to the engineering college. Overall, first-year students felt significantly less connected to the engineering college than the university at large despite the majority reporting attending engineering events and engaging with resources, peers, and faculty, indicating that further strategies are necessary to help first-year students feel well-connected to engineering.

Introduction

Undergraduate student retention has been a significant and persistent issue within most engineering colleges for decades. The percentage of students who begin an engineering program and go on to complete their degree has remained at only about 50% [1]. Among those who leave STEM majors, first- and second-year students typically have the largest dropout rates [2]. From 2012-2019, 37% of first-time freshmen students who took our multidisciplinary first-year engineering course had left our college or university by their third year of study, indicating a need to improve retention efforts. Due to these trends, many have investigated why students leave STEM disciplines. Social belonging and connection have been identified as critical factors for retention, as detailed below. Across disciplines, undergraduate students who reported having poor quality relationships and poor support from peers, staff, and student services were significantly more likely to indicate they were seriously considering leaving their university compared to students who reported high quality relationships [3]. A lack of belonging in engineering, along with academic factors, was highly influential in students' decision to leave engineering majors in one study [4]. Further, 44% of students who left engineering identified a

lack of interaction with students and staff as a factor influencing their decision to leave [5]. Social belonging and engagement impact more than just retention. A recent study found they also strongly impact emotional readiness as students transition to the workplace. Respondents who agreed that their university helped prepare them for the emotional impact of the transition identified relationships with peers and involvement in extracurricular activities as the most influential experiences [6]. Further, we have observed that students who engage with clubs and resources such as our career services office, especially early in their undergraduate careers, are typically more likely to secure internships and full-time positions prior to graduation. Thus, understanding how engineering students are connected to their college and peers and how engagement differs based on student demographics are key steps for refining efforts and programs intended to retain students in engineering.

Multiple demographic factors, including race [7] and first-generation status [8], have been shown to influence the success and retention and success of STEM students. In this paper, we chose to focus specifically on another minority demographic in the STEM, transfer students, who play a critical role in increasing the total number of STEM graduates. Studies have identified several social factors contributing to the success of transfer students as they transition to four-year universities, including the level of interaction with faculty [9] and social integration with peers [10]. However, key differences have been observed in the social engagement patterns of transfer students compared to first-time freshmen. Engineering and computer science transfer students were found to engage in extra-curricular and co-curricular activities less often and report having fewer close personal friendships at their university [10] and a 2009 NSSE report showed that transfer students typically engage less with faculty-led research, study abroad programs, and internship programs than students who began as first-time freshmen [11]. Thus, we chose to focus on comparing social engagement for our first-time freshmen and transfer students to identify significant differences in the manner that these two groups engage.

An additional factor that we postulated impacted engagement and social behaviors of first-year students over the last two years was the widespread lack of access to in-person learning during the COVID-19 pandemic. Our incoming fall 2021 cohort of in-state, first-time freshmen, who made up the majority of our research subjects, only participated in fully in-person learning approximately 5% of the time during their final year of high school [12]. Covid-era lockdowns and remote learning have impacted both the achievement of key learning outcomes and the social well-being of students. A recent preliminary review on the transition to online learning during the pandemic revealed that learning losses were common among both K-12 and university students in subjects such as math, reading, and economics [13]. Further, a study of a cohort of university students in Switzerland revealed that students reported an increase in stress, loneliness, anxiety, and depression symptoms during pandemic lockdowns compared to levels in 2019 [14]. The Center for Collegiate Mental Health also found that university students in 2021-2022 reported higher levels of social anxiety, academic distress, and slightly higher levels of depression compared to pre-pandemic levels, all of which may have influenced these students' desire to engage socially [15]. By comparing data from the fall 2021 and 2022 cohorts of first-time freshmen, we sought to understand whether the high degree of social isolation that many first-time freshmen experienced during the 2020-2021 school year impacted their likelihood to engage with events, resources, and their peers during their first semester of university compared to students entering university after a more traditional high school experience.

In this paper, we provide results from a first-year engagement survey of 675 students in introductory level courses pursuing degrees in the College of Engineering and Architecture in fall 2021 and fall 2022. We focus on two primary research questions: first, were there significant differences in engagement with engineering events and resources or social behaviors and connection in fall 2021, our first semester of in-person learning after covid, compared to fall 2022 among first-time freshmen; and second, were there significant differences in those areas for transfer students compared to first-time freshmen?

Experimental Methods

Participants

Undergraduate students enrolled in five introductory level engineering, computer science, and design/architecture courses completed the survey. Survey results were matched with student demographic information including new/continuing status, gender, ethnicity, degree program, first-generation status, and Pell-eligibility using student-provided identification numbers. Continuing students (sophomore–level and above) and students not pursuing a degree offered by our college were excluded from the data set. After exclusion of these students, a total of 675 responses remained. Overall, first-time freshmen represented 86% of the sample and transfer students represented 14%. A summary of respondent demographics is included in Table 1.

Table 1. Summary of respondent demographics

Variable	Identifier	Overall [N (%)]	First-time Freshmen		Transfer	
			Fall '21	Fall '22	Fall '21	Fall '22
Sample Size	N/A	675	341 (51%)	240 (36%)	68 (10%)	26 (4%)
Area of study	Civil/ Environ. Eng.	66 (10%)	34 (10%)	31 (13%)	0	1 (4%)
	Chemical/ Bio-eng.	105 (16%)	50 (15%)	32 (13%)	16 (24%)	7 (27%)
	Design/ Construction ^a	131 (19%)	63 (19%)	48 (20%)	16 (24%)	4 (15%)
	Electrical Eng./ Computer Science	162 (24%)	106 (31%)	29 (12%)	21 (31%)	6 (23%)
	General Eng./ Pre-eng.	60 (9%)	27 (8%)	26 (11%)	5 (7%)	2 (8%)
	Mechanical Eng./ Materials Science	151 (22%)	61 (19%)	74 (31%)	10 (15%)	6 (23%)
Gender	Male	481 (71%)	250 (73%)	166 (69%)	47 (69%)	18 (69%)
	Female	194 (29%)	91 (27%)	74 (31%)	21 (31%)	8 (31%)
Ethnicity	White	387 (57%)	194 (57%)	137 (57%)	41 (60%)	15 (58%)
	Minority/International	268 (40%)	135 (39%)	99 (41%)	25 (37%)	9 (34%)
	Unknown/ not reported	20 (3%)	12 (4%)	4 (2%)	2 (3%)	2 (8%)
First-generation	Yes	176 (26%)	82 (24%)	56 (23%)	28 (41%)	10 (39%)
	No	484 (72%)	253 (74%)	179 (75%)	37 (54%)	15 (58%)
	Unknown/ not reported	15 (2%)	6 (2%)	5 (2%)	3 (4%)	1 (4%)
Pell-eligible	Yes	125 (19%)	61 (18%)	43 (18%)	15 (22%)	6 (23%)
	No	550 (82%)	280 (82%)	197 (82%)	53 (78%)	20 (77%)

^aIncludes degrees in architecture, design, and construction

Demographics of 2021 and 2022 survey respondents were comparable for all except students' area of study; a lower percentage of responses were obtained from electrical engineering and computer science students in 2022 (13.2% of overall sample compared to 31.1% in 2021) due to a logistical issue with the implementation of the survey in one computer science course.

Survey Implementation and Measures

Our Qualtrics-based online survey was administered to the students described above during the final two weeks of the fall semester in 2021 and 2022. A college staff member distributed the survey during an in-person classroom session for the majority of the implementations. The survey contained a combination of multiple choice and free response questions that fell into four major question categories:

1. Attendance at various college and university-wide events (multiple choice, with response options to indicate whether students attended and did/did not enjoy event)
2. Utilization of various college and university-wide resources and, for 2022, resource accessibility (multiple choice, with response options to indicate frequency of use)
3. Engagement in social behaviors including making friends in their major, studying with friends, reaching out to faculty members, and having friends at their residence (yes/no).
4. Level of connection to their department (2022 only)/ college/ university/ the city and, for 2022, whether they felt they belonged/ felt welcomed in the college (7-point Likert items, where 1= "strongly disagree" and 7 = "strongly agree")

A list of multiple-choice survey questions and response options analyzed during this study is provided in Appendix A. Multiple choice questions pertaining to university-wide events and resources were also included in the survey but not analyzed or included in the results. In addition to the question foci provided above, several free-response questions were included related to how students heard about events, their plans to continue pursuing a degree in the college, and an open-ended question for additional feedback. The free-response questions were not included in our analysis.

Data Analysis

To evaluate the two research questions outlined previously, responses obtained from first-time freshmen in 2021 (N=341) and 2022 (N=240) were compared as well as responses obtained from transfer students (N=94) and first-time freshmen (N=581) across both cohort years. We chose to combine students from both the 2021 and 2022 cohorts for the second comparison due to the limited number of transfer students who completed the survey in 2022 (N=26). For statistical analysis, Chi-squared tests were used to identify differences in groups based on transfer status or response year for questions with dichotomous response variables and paired or independent samples t-tests were used for within or between-group analyses of Likert-scale results, respectively. Results were considered significant at the $p=0.05$ level. All analyses were performed using IBM® SPSS Statistics.

Results

Event Attendance and Resource Utilization

Responses to the first two sets of survey questions allowed us to determine attendance at six college-level events (two social welcome events, a resource open house, club events, professional development workshops/employer visits, and the career fair) as well as utilization of five college resources (tutoring center, two maker spaces, instructor office hours, and our peer mentoring program). The percentage of students who attended at least one event, the average number of events attended, the percentage of students who utilized at least one resource, and the average number of resources utilized were calculated from survey responses and results are shown in Table 2.

Table 2. Event attendance and resource utilization

Group	Attended at least one event (%)	Number events attended	Utilized at least one resource (%)	Number resources utilized
Overall (N=675)	71%	1.7	68%	1.0
All First-time Freshmen (N=581)	72%	1.5	66%	1.0
All Transfer Students (N=94)	63%	1.7	78%	1.2
2021 First time Freshmen (N=341)	76%	1.8	70%	1.0
2022 First time Freshmen (N=240)	66%	1.5	61%	0.9

Overall, 71% of all students reported attending at least one event over the course of the semester, but attended an average of only 1.7 out of 6 events included in the survey. Similarly, 68% percent of all students reported utilizing at least one of the five resources included in the survey with an average of only 1 resource utilized. As shown in Figures 1 and 2, most students only attended or utilized only 1-2 events or resources, with very few students attending all events or utilizing all resources. Overall, the majority of students engaged in some manner with events and resources, but most did not engage with a large variety of activities or resources. In 2022, students were asked whether resources were accessible to them. Approximately 78% of students agreed or strongly agreed that college resources were accessible, indicating that for most students, the low number of resources utilized, may represent a lack of communication or student interest, rather than an issue with accessibility. We intend to include further items on future iterations of the survey to understand why students did not choose or were unable to utilize more of the resources available to them.

First-time Freshmen: 2021 vs. 2022 Cohorts

Based on chi-squared analyses, first-time freshmen in 2021 were significantly more likely to utilize at least one resource ($p=0.03$) and attend at least one event ($p=0.01$) than first-time freshmen in 2022. As shown in Figure 1, the generally higher engagement of the 2021 cohort is evidenced by the fact that 32% of first-time freshmen in 2021 attended at least 50% of our events compared to only 25% in 2022 and 4.5% more first-time freshmen utilized at least three of five resources in 2021.

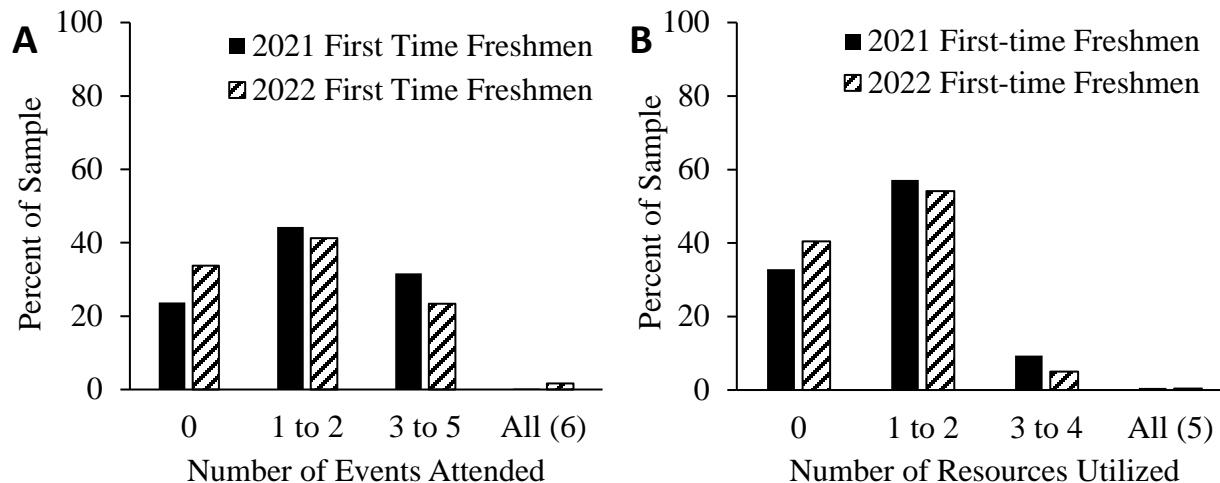


Figure 1. Distribution of number of events attended (A) and resources utilized (B) by 2021 vs. 2022 first-time freshmen

Taken together, this indicates that the 2021 cohort of incoming freshmen were more engaged with college events and utilized more of the available resources, even though many of them transitioned directly from a high-school experience that allowed very little in-person learning and social engagement during their senior year compared to students in the 2022 cohort.

First-time Freshmen vs. Transfer Students

When comparing first-time freshmen and transfer students, the primary difference was that transfer students were significantly more likely to utilize at least one resource than first-time freshmen, as indicated by a chi-squared analysis ($p=0.03$), with 12% more of the transfer student population utilizing a resource. Conversely, 9% more of the first-time freshmen population attended at least one event, but this difference was not significant ($p=0.06$). As shown in Figure 2, 37% of transfer students did not attend any events and only 22% did not utilize any resources, compared to 28% and 33% of first-time freshmen, respectively. Further, transfer students were more likely to utilize a variety of resources; 15% utilized three or more compared to only 8.1% of first-time freshmen. Overall, this comparison indicates that although freshmen were slightly more likely to attend events, transfer students were significantly more likely to utilize resources, indicating distinct forms of engagement in these two groups.

Resources with the largest discrepancy in the reported fraction of the population who utilized them were our tutoring center (19% of transfer students used compared to 14% of first-time freshmen), instructor office hours (63% of transfer vs. 45% of first-time freshmen) and our career services offices (12% of transfer vs. 6% of first-time freshmen). The only resource that was utilized by a higher fraction of first-time freshmen was our peer mentoring program, which pairs an underclassman with an upperclassman student. These trends suggest that a greater fraction of transfer students engaged with resources, particularly academically or career focused resources, compared to first-time freshmen during their first semester at the university. It is critical to note that although a greater fraction of transfer students utilized resources, the majority

of students enrolled in first-year who were served in our college were first-time freshmen due to the low number of transfer students (94 compared to 581 first-time freshmen in our sample).

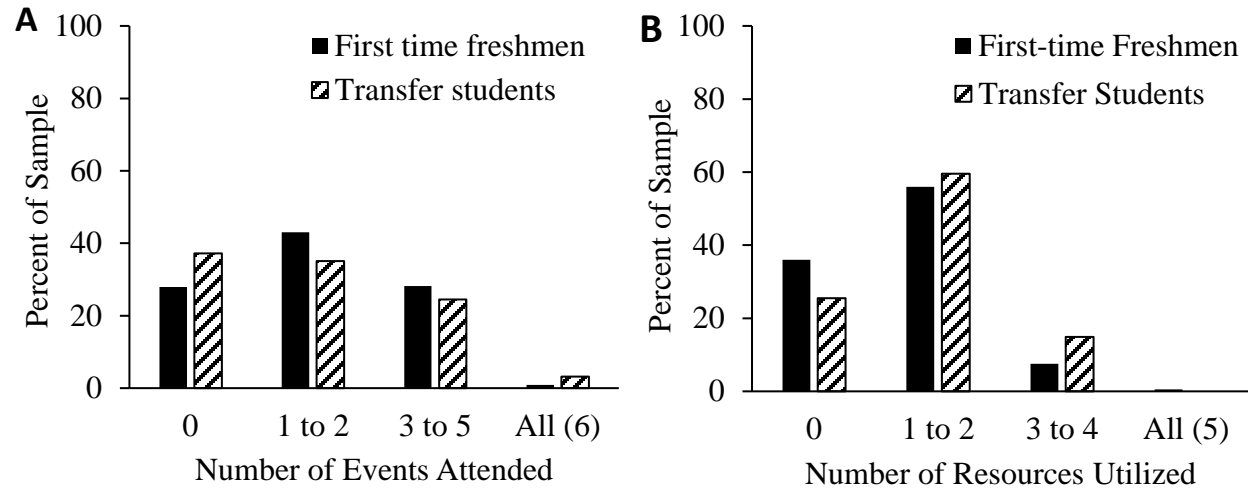


Figure 2. Distribution of number of events attended (A) and resources utilized (B) by first-time freshmen vs. transfer students

Overall, 84% of students who reported using one of our college resources were first-time freshmen, and only 16% were transfer students. Thus, due to the relatively small number of transfer students and the fact that they already utilize a higher number of resources, the greatest opportunity for promoting growth in overall resource utilization during students' first semester at university may come through targeting the first-time freshmen population.

Attendance at Socially-focused vs. Academically Focused Events

Finally, to further characterize event attendance, we separated events into two categories: primarily social (two beginning-of-semester social welcome events) and primarily academic/career-focused (resource open house, professional development workshops/employer visits, and the mid-semester career fair). We then compared the percentage of students who attended at least one event in each category, shown in Figure 3.

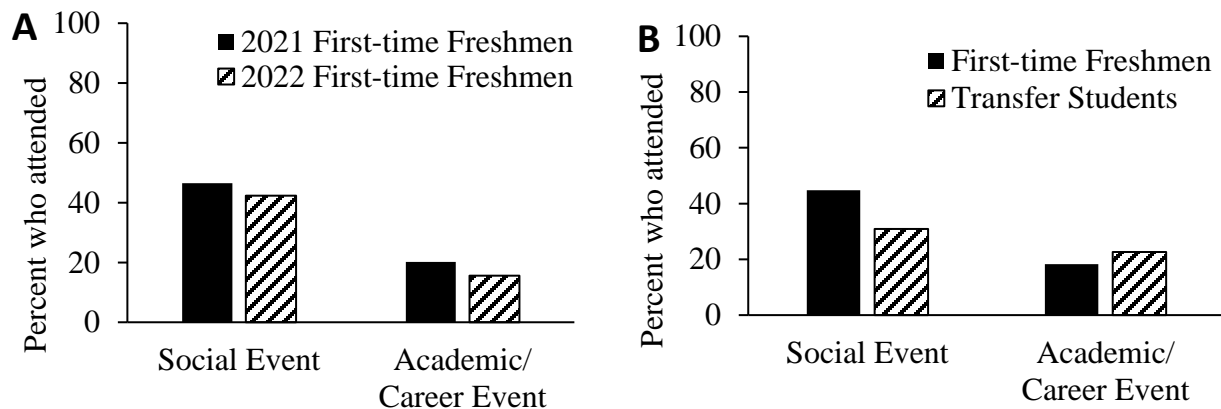


Figure 3. Percentage of 2021 and 2022 first-time freshmen (A) and first-time freshmen and transfer students (B) who attended at least one socially- or academically-focused event

The 2021 and 2022 cohort of first-time freshmen displayed similar trends; more than double the percentage of students in both cohorts attended a socially-focused event compared to an academic- or career-focused event. A slightly lower percentage of students in the 2022 cohort attended both types of events than students in the 2021 cohort, which is consistent with the results for overall event attendance showing lower attendance in 2022. Although numerous covid-era restrictions existed in fall of 2021 at our university, including indoor masking requirements and social distancing, this did not appear to impact attendance at social events as we only observed a 4.1% difference in the percent of students who attended social events between cohorts. A comparison between transfer students and first-time freshmen revealed large differences in the type of event attended. Approximately 45% of the first-time freshmen population attended a social event compared to only 31% of the transfer student population. The opposite trend was true for academic or career-focused events where 23% of transfer students attended versus 18% of first-time freshmen. Again, it should be emphasized that the majority of students served at both types of events were first-time freshmen due to the lower number of transfer students. Taken together, this data reveals that hosting socially focused events may be significantly more effective for engaging large numbers of first-time freshmen, but that transfer students typically attend socially-focused and academically-focused events at more even rates.

Social Behaviors and Level of Connection to the College, University, and Community

The second two sets of survey questions focused on social behaviors, including whether students studied with friends, made friends with a college classmate, reached out to and instructor/faculty member outside of class, and had friends at their residence, as well as the level of connection to the college, university, and surrounding community. In 2022, students were additionally asked whether they felt welcomed in the college and felt they belonged. Figure 4 shows the overall percentage of “yes” responses for the four social behavior questions for the 2021 and 2022 cohorts of first-time freshmen (A) and the first-time freshmen and transfer students (B).

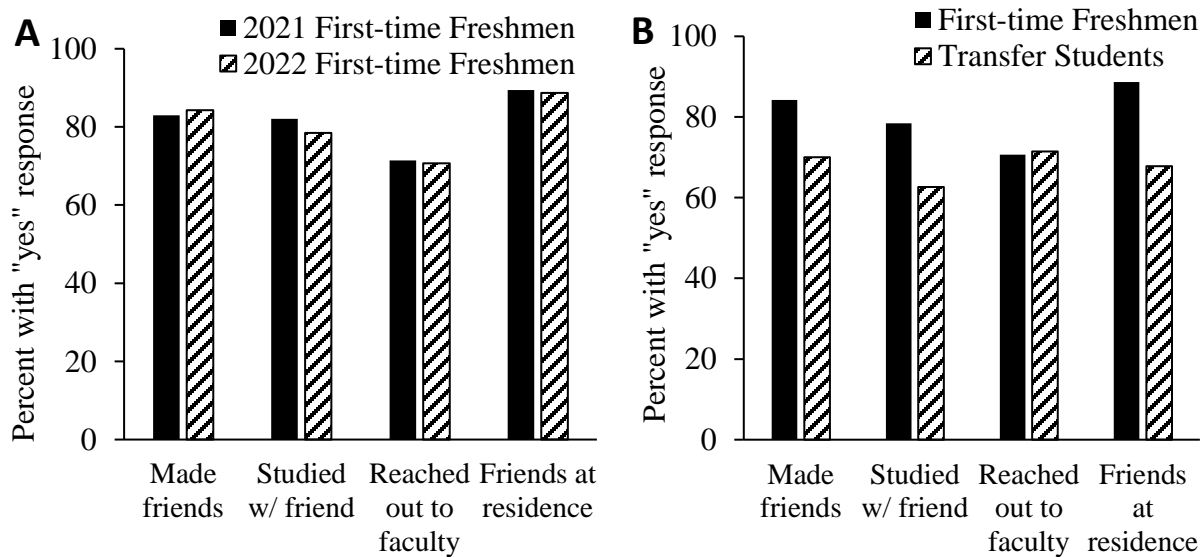


Figure 4. Percent of respondents answering “yes” to questions related to social behaviors for the 2021 and 2022 cohort of first-time freshmen (A) and first-time freshmen and transfer students (B)

Social Behaviors

The 2021 and 2022 cohorts of first-time freshmen showed few differences in their engagement in social behaviors. Students in the 2022 cohort were less likely to report studying with a friend ($p=0.01$) but all other differences between groups were insignificant, indicating high and approximately equal engagement in the four social behaviors assessed for both groups. Conversely, the comparison of first-time freshmen and transfer students revealed several significant differences. 14% fewer transfer students reported making friends in their courses ($p<0.01$), 16% fewer reported studying with friends ($p<0.01$) and 21% fewer reported having friends at their place of residence ($p<0.001$). This indicates that transfer students were significantly less engaged with their peers, both in and out of the classroom environment. However, transfer students and first-time freshmen were nearly equally likely to report reaching out to faculty, indicating that this discrepancy did not extend to student-faculty relationships.

Sense of Connection

Finally, students' level of connection was assessed with three 7-point Likert items in 2021 and five 7-point Likert items in 2022. Table 3 shows the average result for each question for the overall sample and for the four main student groups. For all items, a response of 1 corresponds to "strongly disagree", a response of 4 corresponds to "neither agree nor disagree" and a response of 7 corresponds to "strongly agree."

Table 3. Average Likert responses to connection and belonging questions

Item	Overall	2021 First-time Freshmen	2022 First-time Freshmen	First-time Freshmen	Transfer Students
Connection to college	4.6	4.6	4.5	4.6	4.5
Connection to university	5.3	5.4	5.4	5.4	4.8
Connection to city	4.9	5.0	4.8	5.0	4.5
Connection to major/ department	4.9	Not asked	4.9	4.9	5.0
I feel like I belong in the college	5.0	Not asked	5.0	5.0	4.8
I feel welcome in the college	5.4	Not asked	5.4	5.4	5.3

As shown in Table 3, there are significant differences in the degree of connection between students and their department, college, university, and the surrounding city overall. Students felt most connected to the university at large, followed by their major/department and the surrounding city at approximately equal levels. Students felt significantly less connected to the engineering college than to any other entity ($p<0.001$ for all pairs based on paired samples t-tests). Overall, only 57.4% of students agreed that they felt at least somewhat connected to the college, compared to 79.1%, 67.1%, and 72% that agreed they felt at least somewhat connected to the university, city, and their department, respectively. Despite the fact that a high percentage of students attended a college event or utilized a college resource (71% and 68%, respectively), a lower percentage actually felt connected. This suggests that hosting college-sponsored events or promoting college resources may not be enough to foster a sense of connection to the engineering college among first-year students.

A comparison between the connection of first-time freshmen in 2021 and 2022 reveals no significant differences in the mean level of connection to the college, university, or surrounding community between cohorts. This suggests that the different learning and social experience of these students prior to entering university as a result of the COVID-19 pandemic did not have a large impact on their overall sense of connection during their first semester. On the other hand, a comparison between connection and belonging for first-time freshmen and transfer students does reveal significant differences. Transfer students report feeling significantly less connected to both the university at large ($p < 0.001$) and the surrounding city ($p < 0.01$). However, there were no significant differences in the level of connection to the engineering college. We did not run statistical tests for the last three items in 2022 due to the small sample size of transfer students ($N=26$), but available data suggests that there were not large differences in the level of connection to individual departments, or the degree to which transfer students feel they belong and feel welcome compared to first-time freshmen. Taken together, this suggests that although transfer students feel significantly less connected to the broad university and local communities during their first-semester, they feel equally connected and welcome in the engineering college.

Discussion and Future Work

Research Question 1: Overall Engagement Trends for 2021 and 2022 First-time Freshmen

Based on our results, first-time freshmen in 2021 were more engaged with some aspects of the engineering college than students in the 2022 cohort. These students were more likely to attend an event, more likely to utilize a resource, and more likely to study with their friends. However, there were no other significant differences in the engagement in other social behaviors or the overall level of connection to the engineering college and university reported in these two cohorts. Taken together, these results provide two key insights. First, results suggest that the level of overall connection that first-time freshmen feel towards engineering colleges may not be heavily dependent on attendance at college-sponsored events or utilization of college resources, but rather dependent on relationships with peers and faculty. Second, results also suggest that the large amount of virtual or hybrid learning during the final year of high school for students in our 2021 cohort did not negatively affect their overall likelihood to engage in social events, utilize resources, or connect with their peers and faculty upon entering the university; conversely, students who entered university immediately after a primarily virtual or hybrid year of high school were more likely to attend events and utilize resources.

In the future, we intend to focus analysis on two main topics. First, because equal levels of overall connection to the college were reported for both cohorts despite higher engagement by the 2021 cohort in several areas, we intend to investigate which social behaviors and engagement methods significantly impacted the level of connection students felt. Second, we intend to conduct a more detailed analysis based on area of study, gender, race, first-generation status, and socioeconomic status as several recent studies have indicated that there were discrepancies in students' experience during the pandemic based on these factors. For example, students with low socioeconomic status experienced more COVID-19 related psychological distress and a lower sense of belonging during the pandemic [16], and varying trends in pre- and post-covid sense of belonging based on gender and minority-status were observed in a study of computing students [17]. Detailed engagement analysis based on these factors will allow us to determine student

groups whose engagement was heavily impacted by the pandemic and potentially develop targeted interventions and support programs to re-engage these students.

Research Question 2: Engagement Trends for First-time Freshmen and Transfer Students

Results from our survey consistently revealed that transfer students were less likely than first-time freshmen to engage in socially-focused events or with their peers, but equally or more likely to engage with academically or career development focused events, college resources, and faculty. Results related to transfer students' engagement with social events and with their peers were not surprising, as previous studies have also indicated that transfer students tend to be less socially engaged than first-time freshmen [10]. Although transfer students appeared to be less socially connected to peers in their courses, they were equally connected with faculty, utilized resources at a higher rate, and felt equally connected to the college compared to first-time freshmen, suggesting that discrepancies in the way these two groups engaged in activities and developed friendship with their peers did not heavily impact their overall sense of connection. These preliminary results on transfer students' overall sense of connection to the engineering college are encouraging, though suggest that further effort should be placed on ensuring these students connect with their peers as the development of close relationships and peer support has been previously shown to influence both GPA [10] and graduation rates [18].

We recognize that our study is limited in several aspects. We analyzed only the social engagement, resource utilization, and connection during students' first semester at university. We recognize that as students continue in their degrees, further discrepancies may emerge between first-time freshmen and transfer students that influence their success. Thus, a longitudinal study following first-time freshmen and transfer students over several years as their engagement patterns and academic success vary would provide a more complete picture of which types of engagement within the engineering college are influential for promoting belonging and success. Additionally, we evaluated only the overall sense of connection to the engineering college rather than performing a detailed analysis which fully captures students' sense of belonging, which, according to Goodenow, is the extent to which students "feel personally accepted, respected, included and supported by others in the school social environment" [19]. In the future, we intend to include additional survey items to further examine the sense of belonging between these two groups as we recognize that the survey items used to evaluate connection to the engineering college and relationships with peers were basic and likely did not fully capture students' sense of belonging.

Conclusion

We developed and implemented a student engagement survey focused on resource utilization, event attendance, social behaviors, and students' sense of belonging and collected responses from 675 first-time freshmen and transfer students in 2021 and 2022. Differences between the 2021 and 2022 cohorts of first-time freshmen and between first-time freshmen and transfer students were investigated. In summary, our results reveal two major trends. First, we did not observe a large number of significant differences in engagement between our 2021 and 2022 cohorts of incoming first-time freshmen, suggesting that entering university directly after a low level of in-person engagement during their final year of high school did not significantly impact

students' tendency to engage during their first semester. Second, distinct differences in the ways first-time freshmen and transfer students engaged with events, resources, and peers in the engineering college were observed, particularly in the areas of resource utilization and social engagement. However, no difference in their overall level of connection to the engineering college was identified. We intend to use these results to better understand engagement trends within our student population and continue to develop resources and support systems that best meet the needs of individual student populations. More broadly, we hope that our results are also useful for other four-year engineering programs as they develop strategies to foster engagement and connection amongst their own first-year students after the pandemic.

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Appendix A. List of Survey Questions and Response Options Analyzed during this Study

Question Group 1: College-level Event Attendance (Multiple Choice)

Year	Question	Events Included	Response Options
2021	What VCEA (Voiland College of Engineering and Architecture) events did you attend this year and did you enjoy them?	<ul style="list-style-type: none"> ▪ Academic Kick-off ▪ Ice Cream Social ▪ Any VCEA club meeting/event ▪ Student Success Open House ▪ Technical Career Fair ▪ Any Career Development Workshop/Employer Session 	<ul style="list-style-type: none"> ▪ I did not attend ▪ I attended and did not enjoy it ▪ I attended and it was okay ▪ I attended and enjoyed it
2022	What VCEA (Voiland College of Engineering and Architecture) events were you aware and did you attend this semester? And if you attended, did you enjoy your experience?	<ul style="list-style-type: none"> ▪ Academic Kick-off ▪ Ice Cream Social ▪ Any VCEA club meeting/event ▪ Student Success Open House ▪ Technical Career Fair ▪ Any Career Development Workshop/Employer Session 	<ul style="list-style-type: none"> ▪ I was not aware of this event ▪ I was aware of this event but did not attend ▪ I attended this event but did not enjoy it ▪ I attended this event and enjoyed it

Question Group 2: College Resource Utilization and Accessibility (Multiple Choice)

Year	Question	Events Included	Response Options
2021	Which VCEA (Voiland College of Engineering and Architecture) resources did you utilize this semester and how often?	<ul style="list-style-type: none"> ▪ VCEA Tutoring ▪ FIZ Maker Space ▪ School of Design and Construction Maker Space ▪ Career Services ▪ Academic Advising ▪ Student Club Hub ▪ Office Hours with an Instructor ▪ Peer Mentoring Network 	<ul style="list-style-type: none"> ▪ Never ▪ 1-4 times ▪ 5-10 times ▪ More than 10 times
2022	Which VCEA (Voiland College of Engineering and Architecture) resources are you aware of and have you used this semester? If you used the resource, how often did you do so?	<ul style="list-style-type: none"> ▪ VCEA Tutoring ▪ FIZ Maker Space ▪ School of Design and Construction Maker Space ▪ Career Services ▪ Academic Advising ▪ Office Hours with an Instructor ▪ Peer Mentoring Network 	<ul style="list-style-type: none"> ▪ I am not aware of this resource ▪ I am aware of this resource but have not used it ▪ I used this resource only 1 time this semester ▪ I used this resource 2-5 times this semester ▪ I used this resource more than 5 times this semester

Year	Question	Response Options
2022	Please select the degree to which you agree or disagree with the following statement: VCEA resources are accessible to me.	<ul style="list-style-type: none"> ▪ Disagree ▪ Neither agree nor disagree ▪ Agree ▪ Strongly agree

Question Group 3: Social Behaviors (Yes/No)

Year	Question	Social Behaviors	Response Options
2021/ 2022	Please answer the following statements with a "yes" or "no"	<ul style="list-style-type: none"> ▪ Made friends with a VCEA classmate ▪ Studied with a friend ▪ Have friends in my place of residence ▪ Reached out to a faculty member, instructor, or TA outside of class 	<ul style="list-style-type: none"> ▪ Yes ▪ No

Question Group 4: Connection and Belonging (Multiple Choice/ Likert)

Year	Question	Statements	Response Options
2021	Please rate the extent to which you agree or disagree with each of the following statements.	<ul style="list-style-type: none"> ▪ I feel connected to VCEA (Voiland College of Engineering and Architecture) ▪ I feel connected to WSU ▪ I feel connected to the Pullman Community 	<ul style="list-style-type: none"> ▪ Strongly disagree ▪ Disagree ▪ Somewhat disagree ▪ Neither agree nor disagree ▪ Somewhat agree ▪ Agree ▪ Strongly agree
2022	Please rate the extent to which you agree or disagree with each of the following statements.	<ul style="list-style-type: none"> ▪ I feel connected to VCEA (Voiland College of Engineering and Architecture) ▪ I feel connected to WSU ▪ I feel connected to the Pullman Community ▪ I feel connected to my major/department ▪ I feel like I belong in VCEA ▪ I feel welcome in VCEA 	<ul style="list-style-type: none"> ▪ Strongly disagree ▪ Disagree ▪ Somewhat disagree ▪ Neither agree nor disagree ▪ Somewhat agree ▪ Agree ▪ Strongly agree