

# **Social Capital During COVID-19: Research Case Studies from U.S. and U.K. Contexts**

## **Abstract**

During the Spring 2020 semester, universities shifted into emergency remote teaching due to the COVID-19 pandemic. Globally, the pandemic disrupted students learning, their support structures, and interactions with other individuals both socially and academically. In addition, it created lasting impacts on professionals in determining strategies and altering objectives to help undergraduate engineering students achieve their learning objectives. Previous research on social support during the pandemic has focused primarily on singular cultural context, this study was conducted to understand the impact of the pandemic on students support in different cultural contexts. The purpose of this research was to explore how students experienced social capital structures at two institutions: one in the United Kingdom (U.K.) and one in the United States (U.S.) during the period of emergency remote teaching. The survey was designed around social capital theory, it provided demographic information, students agreement with their educational and social interactions, and names of individuals as well as resources they utilized during the pandemic.

Results revealed similarities and differences between the two groups. Both case studies had the same top three alters: friends/roommate, professor, and family members, and reported almost the same frequency in communication with their alters. Participants in both case studies also had high rates of support in both expressive and instrumental categories from their top two alters. Examining the differences, the UK case had a lower mean response for both sense of belonging and satisfaction at the university. Finally, there was a difference in the types of alters identified in each case due to different cultural contexts.

## **Keywords**

emergency remote teaching (ERT), social capital, case study, undergraduates, United States, United Kingdom

## **Introduction and Literature Review**

College student's social interactions fundamentally changed when the COVID-19 pandemic forced universities worldwide to shift to emergency remote teaching (ERT) in March of 2020. Student's relationships were no longer based on frequent, in-person interacts with members of the campus community. Face-to-face classes and co-curricular activities on campuses halted and students faced changes in living situations as they sheltered-in-place with family or friends [1], [2].

The changes in social interactions caused by the pandemic are concerning because these interactions are important for learning. Learning is a social activity and social interactions are necessary to develop deep understandings of new and complex ideas [3]–[6]. Engineering students frequently rely on classroom-based social interactions such as asking classmates and instructor questions and working on team projects to develop technical and non-technical professional skills [7]. Social interactions that occur in co-curricular activities are another source

of learning for engineering students, particularly for important non-technical professional skills [8].

Additionally, changes in social interactions caused by the pandemic are concerning because they provide emotional support and access to academic resources. Interactions with faculty, staff, peers, family, and others have been shown to provide emotional supports through interactions such as encouragement and normalizing struggles and tangible resources such as suggesting courses to take and providing insight into academic and connecting students to job opportunities [9]. While the pandemic negatively affected students' mental health and wellbeing overall [1], [10]–[13], students reported that social relationships positively contributed to their wellbeing during the pandemic [11], [14].

The purpose of this paper is to examine how undergraduate engineering students from two different global contexts utilized social capital during some of the most uncertain time points in the pandemic. Insights gained from a deep dive into these cases can serve to better prepare engineering educators for future unknown educational disruptions. Our study expands on existing literature which studies students' social supports during the pandemic (e.g., Author et al., 2022) by investigating the social capital of engineering students during the period of ERT during the spring of 2020 in two cultural contexts: students attending an institution in the United Kingdom (UK) and one in the United States (US). The overarching research question addressed is: *How were students at two institutions supported by their social capital networks during emergency remote teaching (ERT)?*

### **Theoretical Framework**

Social Capital theory explains the importance of using social connections and social relations in achieving goals [15]. Social capital theory has been used in engineering education to study undergraduate students' initial decisions to major in engineering, their persistence, and perceptions of fit in the field [16]. The Network Theory of Social Capital [15] describes two main types of interactions or support—instrumental and expressive—which help individuals to achieve their goals. For engineering students, instrumental support comes in the form of specific help with academic goals, such as help on a homework problem or referral to an internship opportunity. Expressive support relates to “physical health, mental health and life satisfaction” [11, p. 244], such as emotional encouragement to persist. In social capital theory, the people in an individual's social networks are called “alters”—these are the people who provide instrumental and expressive supports through social interactions. Previous research examining engineering students' social supports during the pandemic has focused primarily on singular cultural context [11], this study was conducted to understand the impact of the pandemic on students support in different cultural contexts. We examined two of these institutions one in the United Kingdom (UK) and one in the United States (US). While each group of students were

educated during the COVID-19 pandemic, the cultural differences and institutional choices varied.

## **Methods**

We employed a multiple case study approach to examine two cases during the period of emergency remote teaching [17]. Case studies are a particularly advantageous when the researchers seek to study a phenomenon in which the researcher has little to no control. Case studies allow the researchers to answer how and why questions answered through triangulation of several sources of data. One case was in the United States and one was in the United Kingdom. Both cases were at large research universities and focused on engineering students across multiple grade levels. The cases were chosen based on access to data in a timely manner, as suggested by [17].

### *Case 1: United States Context*

Case 1 consisted of engineering students at a large public research institution in the midwestern United States. The total number of undergraduate students was 10,226 across the engineering college. Approximately 51% of engineering enrollment identifies domestic White, 12% as domestic Asian, 24% as international, 5% as Hispanic/Latinx, 4% two or more races, with less than 1% of students identifying as African American. Approximately 74% of the engineering students identify as male. The institution does not collect non-binary genders. The university offers a wide range of engineering majors. Prior to the period of ERT, the university had some infrastructure to transition courses online, but most instructors had no experience teaching virtually. In March 2020, instructors were given one week by the university to transition to ERT. In Fall of 2020, the university held classes both residentially and online, with the administration emphasizing the importance of residential education. Students were allowed to live in campus housing. Individual departments and instructors made decisions based on considerations of safety and with the intention to get students back on campus. For example, the large classes were primarily taught online, whereas smaller classes were held in large classrooms to enable social distancing. The first-year engineering program established many online social events to facilitate students building connections with each other. Additionally, first year engineering courses were taught online, but students were still placed in teams for design projects. Instructors utilized technology such as break out room features and social platforms to encourage discourse. The university has formal programming to connect engineering students with their advisors. Advisors held a mixture of online and in-person office hours. University staff reached out to online enrolled students and online faculty on a weekly basis to provide resources and encouragement. In addition, student clubs and professional societies were allowed to meet in-person with proper social distancing measures.

### *Case 2: United Kingdom Context*

Case 2 consisted of engineering students at one of the largest research-intensive universities in the UK, and one of the most international, with staff and students from over 120 countries. The Engineering Faculty is organized in academic departments covering a wide range of disciplines: Biochemical, Biomedical. In the academic year 2020/21, 1613 undergraduate students were enrolled full-time in Y1, 962 in Y2 and 377 in Y3, across the different departments of the Engineering Faculty.

Over the past years, the Engineering Faculty has undertaken a critical review and reform of the curriculum for the majority of its undergraduate engineering programs, aiming to create more opportunities for students to apply technical and theoretical engineering knowledge through practical application [18], mostly through interdisciplinary project- and problem-based learning.

In response to the COVID-19 pandemic, the university took a 'safety first' approach, suspended all in-person teaching from March 13 and announced a fully online curriculum throughout the remaining of the 2019/20 academic year. The change to ERT in mid-March came about two weeks into the end of the second term of the academic year (ending March 26). The third term, running from late April to mid-June, is almost exclusively dedicated to exams and final-year assessment. Hence, one of the priorities of the ERT was on assessment, and how to deliver the end-of-year exams remotely.

The university has dedicated structures and resources to support student wellbeing (mental, social and physical) including: information and advice on wellbeing and mental health (including Student Psychological and Counselling Services), dedicated support for students with disability, dedicated support for international students, finance and housing, and career guidance. Under Student Support and Wellbeing, a team of Student Advisers based in academic department act as key contacts for first-year undergraduates for any wellbeing, support and student experience matters.

### **Data Collection**

We obtained ethics board approval from each university before any data collection was conducted at that institution. We collected data at both institutions during the period of emergency remote teaching from the COVID-19 pandemic using the Understanding Student Supports survey [11], which consists of three parts. Part 1 includes questions that are designed to elicit information about students' sense of belonging and satisfaction at the university using a Likert scale response of 1 to 5 [19]. The students were asked to select their level of agreement with the following questions:

- I feel connected to the University community.
- I think the University has done a good job of continuing quality instruction during the time of the COVID-19 pandemic.
- I'm satisfied with my educational experiences this semester.
- I'm satisfied with the amount of social opportunities I've had this semester.
- I am glad I chose to attend the University this semester.
- I feel I am member of the campus community
- I feel a sense of belonging with the campus community.

Part two consists of a name generator [16] in which students were asked to list the names of up to five people whom they considered to be influential to their success and persistence in engineering. After naming each person, respondents were then prompted to answer several questions about each person they named, including: (1) the nature of their relationship (2) how long they had known the person, and (3) how that person had supported them that semester. The third part consisted of a resource generator [16] in which lists several types of support, asking

respondents to identify the types of alters (such as family members or peers) that provided that support both before and during the periods of ERT.

We administered surveys at both institutions within the same time frame relative to the start of the semester. Because the US institution was substantially larger, we recruited a random sample of engineering students from that institution and recruited from the population at the UK institution. After data cleaning, the resulting sample was 336 engineering student participants from the US institution and 138 participants from the UK institution. Due to constraints placed by the UK institutional ethics board, demographic information of race, ethnicity, and gender were not able to be collected.

### Data Analysis

To clean the data, we first eliminated any responses with an unreasonably short response time. After removing some of these responses, we examined the data starting with the first set Likert scale questions. If respondents did not complete these questions, we removed their entire set of responses. Next, in the name generator section, the survey asked respondents to list up to five people they felt supported them during the COVID-19 pandemic; we cleaned this section by first identifying participants who did not list at least one alter. We removed any set of responses that indicated five “N/A” for the name generator. Additionally, we removed a participant’s entire response if they did not indicate a legitimate alter type within the name generator response section. For example, a few participants listed a celebrity as an alter which does not meet the definition of an alter from social capital theory because they do not have a personal relationship with that person.

After the initial data cleaning, we categorized the data from the name generator based on the alter type. We refined these categories through an iterative process involving discussions with all authors. We created 12 categories from initial participant responses. In **Table 1. Categorized Alter Types** Table 1, we document how we created our final categories.

**Table 1. Categorized Alter Types**

Final alter type	Sample responses included in alter type
Advisor	Academic, department specific, and co-curricular advisors
Extracurricular personnel	Band advisor, robotics club advisor, athletic coach, those that facilitated co-curricular or program specific activities
Family	Parents/stepparent, uncle, aunt, grandparent, sibling
Friend/roommate	Roommate, best friend, friend, fraternity brother
Mentor	Success coach, peer mentor, assigned department-specific mentor, co-curricular activity mentor
Professor	Professor in named course, professor (course not named), lecturer, instructor, teacher
Significant other	Boyfriend, girlfriend, fiancé, spouse
Spiritual/Medical guide	Religious personnel (such as pastor,) medical doctor (such as therapist)
Supervisor/employer	Future employer, manager, academic supervisor
Teaching assistant	TA, lab assistant, module lead, research graduate student, graduate student
University staff/personnel	Administrator, program-specific staff, general university department representative

University student staff/personnel	Student counselor, residential assistant, tutor
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Respondents primarily indicated advisors as academic advisors and department specific counselors.

After the data was cleaned and categorized, we used descriptive statistics and graphical representations to visualize the results for each case. For the Likert scale data, we separated the questions designed to elicit information about sense of belonging and questions designed to elicit information about satisfaction. We used descriptive statistics to analyze students' responses to each of the questions.

We worked to ensure high quality data analysis in several ways. First, we worked on the data analysis in an iterative process. For example, two authors lead the categorization of the name generator, but, if there were any responses that did not fall neatly into a category, they consulted with the rest of the team to ensure correct understanding of the student's response. Additionally, our author team consists of researchers working in each of the different cultural contexts, ensuring that we are accurately understanding the student responses from their cultural background.

## Results

In this section, we present the results for each case, followed by a comparative investigation across cases to look for similarities and differences in student responses across cases. Case Study 1 is the U.S. institution and Case Study 2 is the U.K. institution. There were total of 336 responses for the US case and 138 responses for the UK case.

### *Sense of Belonging and Satisfaction*

We separately analyzed Likert scale responses for sense of belonging questions and for satisfaction questions. For the US case, out of five the mean response for sense of belonging was 3.38 (SD=1.08) and the mean response for the satisfaction at the university was 3.33 (SD=1.05). For the UK case, the mean response for sense of belonging was 2.92 (SD=1.00) and the mean response for the satisfaction at the university was 2.94 (SD=0.96).

### *Name Generator*

Figure 1 shows a summary of the results from the name generator section of the survey. There were twelve categories defined in the U.S. case study. After we cleaned the data, there were a total of 336 responses that could be categorized. The top three resource types from the U.S. case were friend/roommate, professor, and family member.

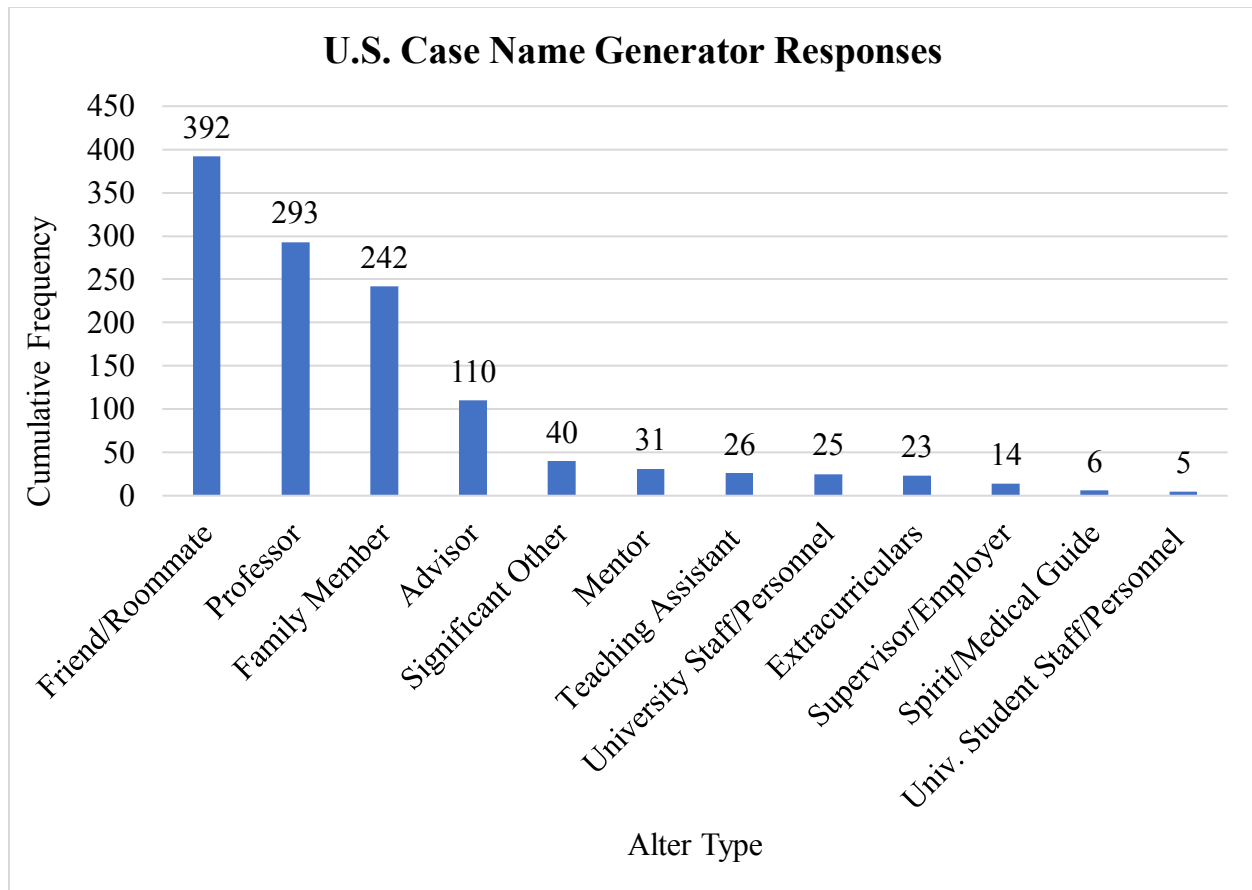


Figure 1: Respondent results alter types identified from the U.S. Case Study.

Like the U.S. case as shown in Figure 2, the participants in the U.K. case study indicated the same top three alter types: friend/roommate, professor, and family member as those who offered the most support to students during the pandemic.

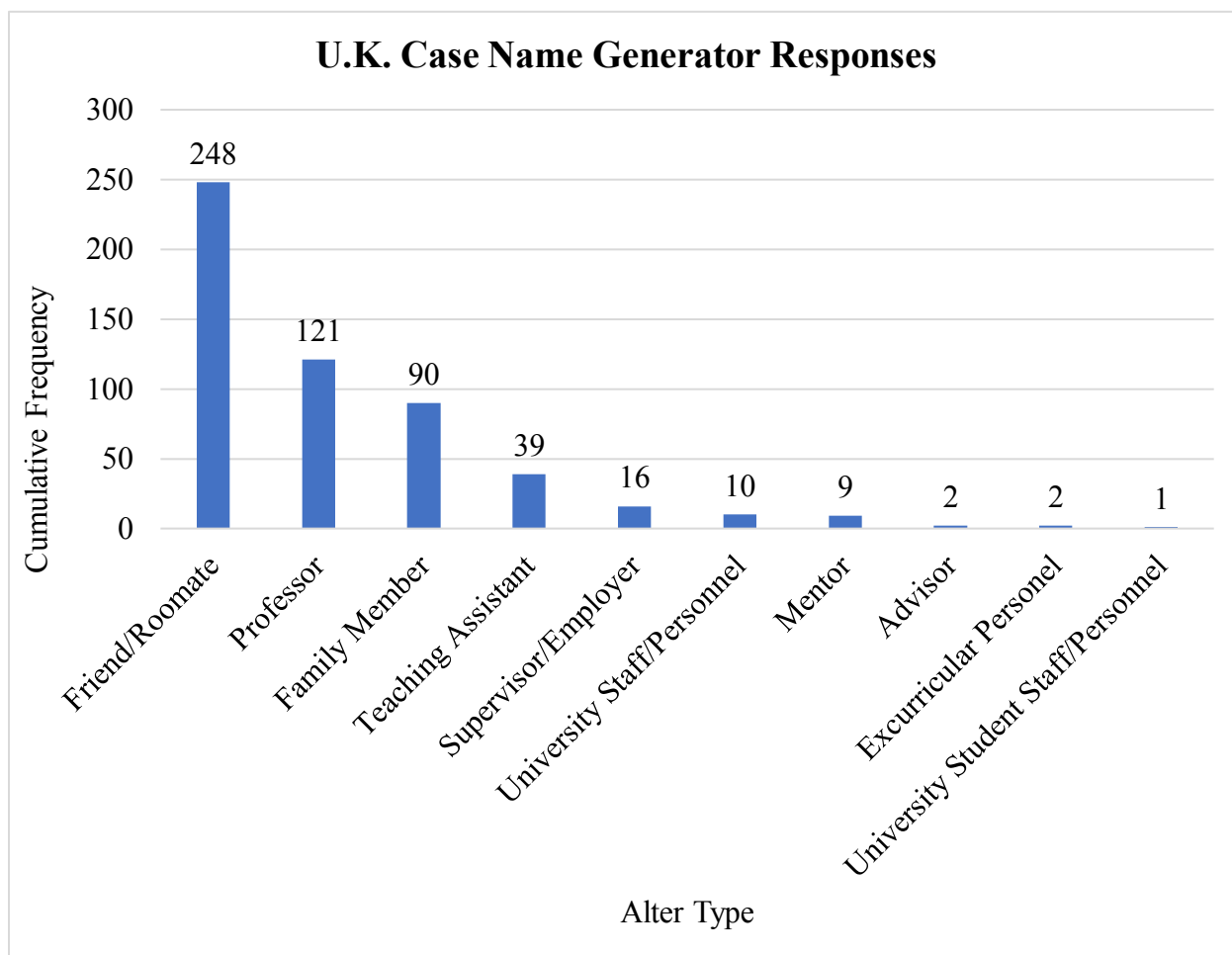


Figure 2: U.K. student respondent results of the type of resources identified.

The survey asked participants several questions about each alter they listed. For example, students were asked if the person was affiliated with the university. For the US case, 73.4% of the alters identified in the name generator were affiliated with the university and in the UK case 73.1% were affiliated with the university. Students were also asked about their frequency of communication with the alters they identified. The results are displayed in

Table 2. Table 2 displays the percentage of students who identified an alter with each level of communication frequency. For example, 4% of students in the US case identified that they communicated with an alter in their top five almost never. The results indicate that students rely more heavily on alters with whom they communicate more frequently and that the rates are similar across the two cases.

**Table 2. Students Report of Communication with Alters. Table displays the percentage of students who identified an alter with each level of communication frequency.**

Frequency of communication with alters	US case responses	UK case responses
Almost never	4%	6%



Once a year or less	2%	2%
A couple times per year	10%	12%
Monthly	7%	7%
A couple times a month	9%	9%
Weekly	12%	14%
A couple times per week	22%	15%
Daily	16%	18%
More than once per day	18%	17%

The survey also asked students to identify the types of support that each alter in the name generator provided. In the survey, students were asked, for each of the alters they identified, whether or not they had provided each of the supports during the previous semester (during the period of ERT). Table 3 displays the results of the supports by alter for the top two alter types, professors and friends/peers. Percentages are the percentage of alters identified in the name generator that students identified as providing each type of support

**Table 3. Supports Provided by Top Two Alter Types. For the US case, a total of 293 alters were identified across all student responses and for the UK case, a total of 121 alters were identified.**

Support	Professors		Friends	
	Case 1: US	Case 2: UK	Case 1: US	Case 2: UK
		Expressive: Wellbeing		
Your mental or emotional health	20%	10%	72%	54%
Your physical health	9%	6%	60%	38%
Disappointments you've had	19%	11%	67%	52%
Difficulties you've faced	35%	12%	75%	58%
Encouraged you to keep going when you struggled	0%	12%	72%	58%
Asked about your levels of stress	0%	12%	47%	52%
		Expressive: Mentorship and Advice		
Challenge me to be my personal best	65%	39%	67%	65%
Checks on my progress	47%	28%	59%	50%
Discusses school, academic and career topics	60%	38%	76%	65%
Encourages me about my studies	63%	36%	67%	55%
Is a mentor	41%	24%	15%	11%
Supports me with other resources.	43%	22%	65%	40%

		Instrumental		
Helps me with course selection	18%	13%	30%	31%
Suggests networking opportunities	32%	12%	23%	22%
Tries to involve me in extracurricular activities	15%	7%	49%	36%
Gives me advice on academic and/or career options	56%	18%	50%	34%
Suggests job or graduate school opportunities	33%	13%	21%	25%
Introduces me to people in their professional network	19%	9%	17%	17%

As seen in Table 3, students at both universities identified high rates of support in both expressive and instrumental supports from both their professors and their friends. For the professors, these rates were highest in the expressive (mentorship and advice category). Although the rates were lower for the other categories identified, they still suggest that professors were providing a wide range of expressive and instrumental supports during the pandemic to their students. The rates of support from friends were distributed across all types of supports, suggesting that students received a wide range of supports from their friends. This was especially true for expressive supports.

### *Cross Case Comparison and Discussion*

*Belonging and Satisfaction:* The student responses to the questions about sense of belonging and satisfaction differed between the two cases. In the Likert scale questions, students in the UK case indicated lower mean responses for both sense of belonging and satisfaction at the university. This could indicate that the supports in place at the US case helped students feel a stronger sense of belonging.

*Alter Types:* We found several key similarities in the types of alters students identified between the two cases. In the name generator portion of the survey, the three groups of alters who students identified the most during the period of Emergency Remote Teaching were family, friends, and professors. For both cases, the friend/roommate group was most listed alter type, indicating that students in both the UK case and the US case considered their friends to be most important for their success and persistence. This is not surprising, as college age students often rely heavily on their peers and their peers play an important role in their development from students to professionals [11], [14]. However, it is an encouraging result that students still had a support system of their peers, even when they were more isolated from peers than they previously had been. The next most identified group was their professors and then family members. In both cases, the percentage of close alters that were affiliated with the university was

almost exactly the same. This indicates that students in both cases are relying similarly on these close alter types.

There were also some key differences between the alter types between the two contexts. In the US context, university-based advisors were indicated by many students (110 total responses) as providing support. However, there were only two responses indicating advisor alters in the UK context. This could indicate that advisors at the US based institution did more to support students during ERT, that students had stronger relationships with their advisor in the US context, or that advisors had a more central role in students' educations in the US context. This indicates a difference in how advisors are viewed and utilized in the different cultural contexts. Additionally, there were several groups of alters that were indicated by the US students that were not used by the UK students, including spiritual guides and therapists, university staff, and significant others. This could indicate cultural differences in how students approach support or it could point to institutional differences in how students were expected to interact with their advisors.

*Interactions with Alters:* We noted similarities in the frequency with which participants in each case interacted with the alters (

Table 2). Students in both cases relied most heavily on alters with whom they had frequent interactions. This supports the importance of close ties with alters to develop relationships and have consistent support [15]. It also provides evidence that students were able to maintain these relationships during the period of ERT, even when they were physically separated from their alters.

We also found that students at both institutions relied on each of the alter types of a wide variety of supports. For example, professors in both contexts provided both expressive and instrumental support. In fact, they most heavily supported students in expressive support in mentorship and advice. This shows that even though professors were more isolated from students and had less one-on-one interactions with them, professors still provided a wide range of these essential supports. Additionally, friends in both cases provided high levels of supports in each of the three categories, expressive supports (well-being and mentorship/advice) and instrumental. This supports the importance of peer-peer relationships and demonstrates that students continued these supports even when they were more isolated. This provides insights into the resiliency of students' social networks and demonstrates that students continued to nurture these relationships, even when it was made more challenging by physical distance. We saw slightly lower values for all types of support in the UK context. This could indicate that students did not maintain as close of relationships with their close alters during the period of ERT.

## Summary

In this study, we examined the social capital and supports of students at two different institutions, one in the US and one in the UK, during the period of emergency remote teaching due to the COVID-19 pandemic. We surveyed students across the engineering schools at both institutions about their sense of belonging and satisfaction and used a name generator to ask them to identify the top five people in their social networks and the types of supports these people provided. We found many similarities and several key differences across the two cases. Similarities included: students identified the same top three groups of alters, friends, professors, and family members; students identified that individuals in each of these groups provided them with a range of instrumental and expressive

supports—even though they were physically isolated from these alters. Students relied on university alters vs non-university alters are almost exactly the same rates at the two institutions. We also found some differences. These differences included: students in the US case identified other groups of alters, such as advisors and extracurricular personnel, more frequently than the UK case; and students in the US case identified on average a higher sense of belonging at the university.

## **Conclusion and Implications**

From these findings, we conclude that despite the many challenges caused by the global pandemic, engineering students at the two universities studied found ample support. We expected that the close ties associated with family would provide students with many supports, and our data supported this assumption.

What is somewhat more surprising—and promising—is that professors have an important role to play in supporting students during times of crisis. Their support is not limited to purely academic-related issues; they also provide salient emotional support that help students succeed. This finding has implications for helping students during crises and during “business as normal”. If faculty recognize their potential to positively influence a students’ academic journey through expressive actions such as inquiring about their stress levels, sharing their own disappointments and difficulties while earning an engineering degree, or encouraging students who are facing obstacles, individual faculty could support student success and collectively faculty could even begin to change the stress culture for which that engineering programs are widely known.

Our findings also point to the essential relationships that students have with peers—relationships that provide a variety of instrumental and expressive supports those students report as being influential to their success and persistence. While university personnel may certainly agree that aspects of these peer relationships are out of their control, this finding implies that to extent possible, engineering faculty, staff, and students should promote peer relationships in engineering programs. This could take the form of instructors embedding ample opportunities for teamwork in courses or advisors and co-curricular leaders promoting the benefits of out-of-class opportunities to get to know other students. Undergraduate students who recognize their significant role in the lives of their peers might take an extra minute to talk with a classmate after class or invite a friend to join them at a meeting of a student organization.

Overall, our work affirms the importance of social relationships in experiences of engineering students. These relationships have perhaps never been more important than during the global crisis caused by the COVID-19 virus.

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