# Students social network in undergraduate studies – does connecting to peers matter?

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*Abstract*—Social network analysis was used to examine student interactions at the University of Iceland's School of Social Sciences and School of Engineering and Natural Sciences. Comparing students who started in 2017 with those from 2020 during the COVID-19 pandemic, the study utilized a survey tool to track peer connections at study start and throughout the semester. Additional data on gender, relocation status and Grit were collected. The 2020 cohort showed fewer initial connections and less network growth than the 2017 cohort, highlighting the pandemic's impact on student relationships.

*Keywords*—Social networks, COVID, online learning, Grit

## I. INTRODUCTION

SOCIAL network analysis is increasingly recognized as an important factor in the success and retention of higher education students. Research indicates that students with more connections tend to perform better academically and that forming early connections, especially in the first year, is critical for preventing student attrition. During the COVID-19 pandemic, online education became the norm, and studies have shown that students experienced a decrease in social interactions and an increase in mental health issues during this period.

In summarizing the literature and findings on the impact of social networks on higher education students, it's critical to acknowledge the role these networks play in academic performance and retention. According to Felten and Lambert (2020) and McCabe (2016), a robust social network correlates with improved student performance. Baldwin, Bedell, and Johnson (1997) further supported this by demonstrating a link between more extensive social connections and better academic outcomes. This is particularly true for first-year students, where forming connections with peers is an important factor in retention, as discussed by Wilcox, Winn, and Fyvie-Gauld (2005).

The disruption caused by the COVID-19 pandemic, however, has led to a reduction in student interactions and possibly a loss of social networks, as found by Elmer, Mepham, & Stadtfeld (2020). Their research highlighted the mental health challenges and diminished social interactions among students during the lockdown. This raises concerns about the social capital of students who began their undergraduate education during the pandemic compared to those who started on-campus.

The benefits of social networks in higher education are not only about the number of connections. The quality of these connections and their evolution over time are equally important. For instance, students with larger networks at the beginning of their studies may retain and expand their network more readily, a finding supported by Cho, Gay, Davidson, & Ingraffea (2007) and Zander et al. (2018). Yet, students with fewer connections initially can also be more inclined to develop new ties, which introduces a nuanced view of network development in higher education settings.

During the pandemic, the shift to online learning brought unique challenges, as noted by Gelles et al. (2020), who found that students needed more self-discipline in an online environment. Alqahtani & Rajkhan (2020) pointed out that students' attitudes significantly impacted their adaptation to the sudden move to online courses. Gelles et al. (2020) also identified gendered differences in the experience of online learning, with female students often juggling increased domestic responsibilities.

Research on the academic stress of moving online indicates that perceived lack of control increased stress, but that high Grit scores moderated the effect of this stress on loneliness (Mosanya 2021). Further Grit and resilience may serve as a protective factors for students during the pandemic, as those undergraduate students that reported higher levels of Grit were less likely to worry about job opportunities and change their academic goals (Lytle and Shin 2023).

The study's purpose is to scrutinize the development of students' social networks during the pandemic in comparison to pre-pandemic conditions, informed by prior insights into emergency online teaching and social network theory. By understanding these differences, institutions can better anticipate and address the needs of their students in both online and traditional learning environments, ensuring that social network supports are in place to foster academic success, as suggested by the experimental studies of Boda, Elmer, Vörös, and Stadtfeld (2020) and Rientes and Nolan (2014).

## II. METHOD

The study took place at the University of Iceland, a state-funded institution with an enrolment of approximately 15,000 students. In contrast to many other regions globally, Iceland experienced less stringent restrictions during the COVID pandemic. Aside from a total shutdown in the initial COVID-19 outbreak in spring 2020, the university's facilities were

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generally accessible throughout most of the academic year spanning 2020 to 2021.

The participants were students in the School of Social Sciences (SoSS) and the School of Engineering and Natural Sciences (SENS). The students' initial participation in the study was at the beginning of their studies. We then followed the same participants as they progressed through their studies. The first cohort of participants began in the fall of 2017, well before the onset of the COVID-19 pandemic, while the latter cohort began their studies in the middle of the pandemic, in 2020. For both cohorts, four waves of data collection were made. The initial data collection was conducted during the first semester in September 2017 and 2020, the second in February the following years, the third in October the same year and the last in May, during the students´ sixth semester. Data on student social networks were collected using a survey tool that was integrated into the student management system. This tool allowed the students to start typing a name and then select a student from a drop-down menu. In each wave, students were prompted to name up to seven students. In the first wave, students were asked to name the students they knew best at the beginning of their studies. In the other waves, the students were asked to name the fellow students that they spent time with during their studies or in social activities. The procedure was identical for both cohorts.

In the following analyses, only data from the first two waves will be used. The total number of participants from the 2017 group are 621 (273 from SoSS and 348 from SENS) while the total number of participants from the 2020 group are 367 (164 from SoSS and 203 from SENS). In total 248 of those also answered the questionnaire in the first wave, (107 from SoSS and 141 from SENS).

### III. FINDINGS

Some summary statistics on the two cohorts, 2017 and 2020, can be seen in Table 1 and Table 2, respectively. As can be seen in Table 1, students at SENS in the 2017 cohort have on average significantly higher Grit score than the SoSS students, the difference is however not large. The difference in the two groups is not significant in the 2020 cohorts. When looking at the number of connections at the start of the academic years, the SENS students reported having significantly more connections on average to their peers than the SoSS students in the 2017 cohort, 1.62 vs. 2.03. In the 2020 cohort both groups reported around one connection to peers on average. In order to look more closely at the difference in number of connections in the two cohorts, the two groups, SoSS and SENS were combined and analysed together.

The number of connections at the start of the first semester by cohorts can be seen in Figure 1. As can be seen in the figure, a large proportion of the 2020 cohort did not report any connections when beginning their studies.

The number of connections reported in the students´ second semester can be seen in Figure 2. As can be seen in the figure, around 1/3 of the students from the 2020 cohort did not report any connections. To compare, all the students in the 2017 cohorts reported at least one connection.

| | SoSS (N=273) | SENS (N=348) | P-value |
|---|---|---|---|
| **Grit** | | | |
| Mean (SD) | 3.19 (0.379) | 3.26 (0.394) | 0.0115 |
| Median [Min, Max] | 3.25 [2.25, 4.00] | 3.25 [2.38, 4.50] | |
| Missing | 2 (0.7%) | 6 (1.7%) | |
| **Sex** | | | |
| Male | 81 (29.7%) | 184 (52.9%) | <0.001 |
| Female | 192 (70.3%) | 164 (47.1%) | |
| **How certain are you with your choice of studies?** | | | |
| Very uncertain | 0 (0%) | 2 (0.6%) | 0.0479 |
| Rather uncertain | 13 (4.8%) | 19 (5.5%) | |
| Neither | 26 (9.5%) | 58 (16.7%) | |
| Rather certain | 144 (52.7%) | 169 (48.6%) | |
| Very certain | 89 (32.6%) | 94 (27.0%) | |
| Missing | 1 (0.4%) | 6 (1.7%) | |
| **Numer of connections at the start of studies** | | | |
| Mean (SD) | 1.62 (1.93) | 2.03 (2.19) | 0.0138 |
| Median [Min, Max] | 1.00 [0, 8.00] | 1.00 [0, 9.00] | |

Table 1. Summary statistics for the 2017 cohort, School of Social Sciences (SoSS) and School of Engineering and Natural Sciences (SENS).

| | SoSS (N=164) | SENS (N=203) | P-value |
|---|---|---|---|
| **Grit** | | | |
| Mean (SD) | 3.17 (0.419) | 3.14 (0.379) | 0.518 |
| Median [Min, Max] | 3.25 [2.13, 4.13] | 3.13 [2.13, 4.13] | |
| Missing | 5 (3.0%) | 6 (3.0%) | |
| **Sex** | | | |
| Male | 40 (24.4%) | 107 (52.7%) | <0.001 |
| Female | 124 (75.6%) | 96 (47.3%) | |
| **How certain are you with your choice of studies?** | | | |
| Very uncertain | 2 (1.2%) | 2 (1.0%) | <0.001 |
| Rather uncertain | 4 (2.4%) | 18 (8.9%) | |
| Neither | 16 (9.8%) | 38 (18.7%) | |
| Rather certain | 67 (40.9%) | 93 (45.8%) | |
| Very certain | 73 (44.5%) | 52 (25.6%) | |
| Missing | 2 (1.2%) | 0 (0%) | |
| **Numer of connections at the start of studies** | | | |
| Mean (SD) | 1.01 (1.55) | 1.00 (1.65) | 0.965 |
| Median [Min, Max] | 0 [0, 7.00] | 0 [0, 7.00] | |

Table 2. Summary statistics for the 2020 cohort, School of Social Sciences (SoSS) and School of Engineering and Natural Sciences (SENS).
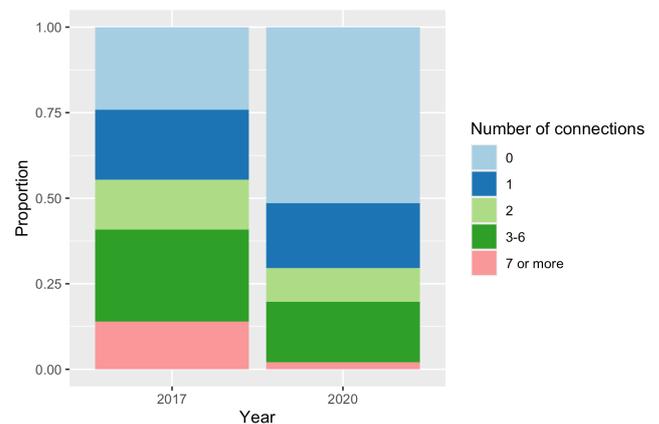


Figur 3. Number of connections at the start of the first semester by year.

The number of new connections can be seen in Figure 3. In 2017, less than one of every ten students reported forming no new connections between the first and second semesters. In contrast, in 2020, around half of the students reported no new connections. It is also informative to look at the findings for a student in the 25th percentile, as shown in Figure 3. In 2017, this somewhat socially active student would have been expected to report five new relationships. In 2020 however, the same student would have been expected to report only two.
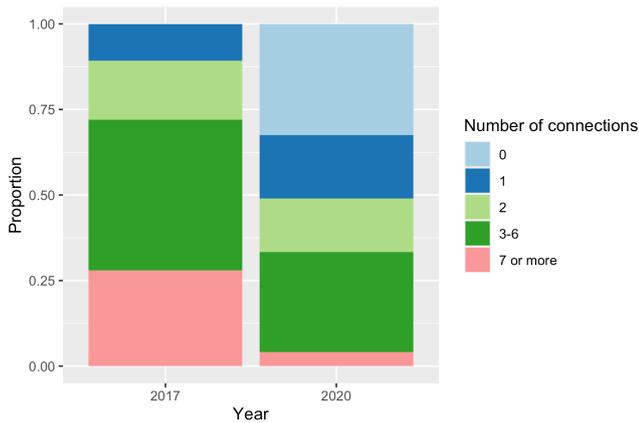
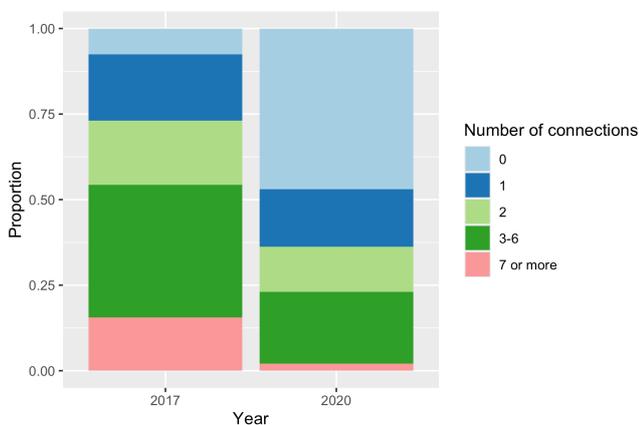Figur 4. Number of connections at the start of the second semester by year.



Figure 5. Number of new connections between the first and second semesters by year.

Additional information about the structure of the social networks is provided in graphs of the actual networks shown in Figure 4. To allow the visualization of tie formation during the first semester, the ties that were reported to have formed at the beginning of the first semester are shown in light blue, whereas new ties formed between the first and second semesters are shown in dark purple. It is clear by looking at the figure that the network of SENS students is more clustered in both cohorts than the SoSS network. It is also evident that students made fewer connections in the 2020 cohort compared to the 2017 cohort.

## IV. DISCUSSION

There is ongoing speculation about whether students who began their studies during the COVID-19 period will be able to catch up with previous cohorts as they progress in their studies. Faculty responsible for instructing these students should be mindful that they may lack the traditional peer support systems.

Furthermore, as the pandemic's effects on education persisted globally beyond 2020, subsequent student cohorts may face comparable challenges. It is our belief that universities must take a proactive stance in assisting students in forging new relationships and nurturing the development of their social networks, given the critical importance these networks hold for the students' future success.
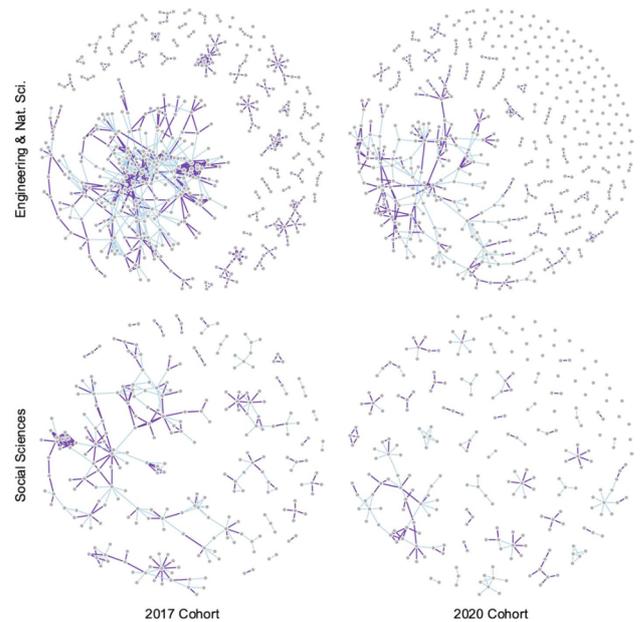


Figure 6. Social networks of the students in SENS and SoSS in the 2017 and the 2020 cohorts. Connections formed during the first semester are shown dark purple, and connections that existed at the start of the year are shown in light blue.

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