



An Investigation Into How Students Spend Their Time During Study Breaks

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This complete research paper will describe an investigation into how first-year engineering students spend their time during mid-semester breaks. Fall breaks have become a reality at the majority of Canadian universities, though somewhat remarkably, there has been very little investigation into the impact of these breaks on students. At the University of Waterloo, a two-day fall break, following the holiday Monday of Canadian thanksgiving (the second Monday in October) was added on a three-year trial starting in 2016, with the stated goal of helping student mental health by allowing a time to catch up on classwork before the stressful midterm period. Fall break was extended to be a full week at UWaterloo beginning in fall 2019 on a three-year trial, based on the resounding positive response captured in institution-wide student surveys.

In 2017, the authors noticed a reduction in midterm grades for specific populations of first-year engineering students following the fall break and began investigating the effects. To mitigate the perceived harmful effects of the fall reading break on these students, an academic and social intervention was instituted during the two-day study break in fall 2018, and a four-day intervention in fall 2019. An evaluation study of the fall 2018 intervention was completed in winter 2019, which showed a positive response from students.

In this paper, the authors continue their investigation into the impacts of the fall break on students, with an emphasis on international and out of province students as this group is unlikely to return home during the break. This investigation was conducted as a concurrent mixed-methods study consisting of surveys, with semi-structured interviews with students. Purposive sampling of students who remained on campus was used for the interviews to ensure their perspective was captured by the researchers.

Results show a significant number of students, regardless of where they spent the break, studied inefficiently during the break from school, which is reflected in their academic performance; and students who remained on campus while most of their peers left, found the time lonely and largely unproductive.

Introduction

Although a fall break has become the norm for many universities in Canada, little research has been conducted to determine the impact of fall breaks on students, whether it is an evaluation as to whether the stated goals of the break – which typically focus on stress and mental health [1] – are being met, or whether there are any other unintended impacts of the introduction of the fall break (see [2] [3] [4]).

Agnew, Poole and Khan [4] found that contrary to the intended effect of the fall break, the stress-reducing benefits of the break, are often lost to poor time management and the struggle to transition back into academic mode after being away from the structured environment for a full week. “Students reported that this caused feelings of being overwhelmed, anxious, and stressed, and perceived consequent impacts on their overall well-being and academic performance.” This feeling of being overwhelmed is described as a feeling of guilt or regret. The scheduling of the break to coincide with the Canadian thanksgiving in early October was also described as a concern, being too early in the term to offer much of the desired benefits.

While there is little research on the impacts of academic breaks on students, first-year engineering students and their behaviors are well-documented and echo some of the concerns raised by Agnew, Poole and Khan. Brozina, Johri and Naderi [5] described the importance of setting first-year students up for success and that time management is a crucial skill for success. Poor time management was correlated with student-reported feelings of stress. Bradley and Bradley [6] described the challenges that first-year students face with inadequate time management as they enter the program, and the detrimental effect that this lack of skill produces a significant drop in GPA. To further complicate the matter, "...few incoming freshmen have a felt need to improve their time management and study skills, even though most are seriously deficient in these areas". While teaching time management skills right at the start of degree studies would seem most logical, the student participants indicated that a willingness to learn these skills is "enhanced by one (often academically painful) semester in college."

Fleming, Moore, Williams, Bliss and Smith [7] stressed the importance of social supports, especially when working with minority populations. These social supports were found to be predictive of academic success for under-represented college students and were found to be more influential than common variables like SAT scores.

Fall Break at the University of Waterloo

At the University of Waterloo, engineering students in each program proceed through their studies as a cohort, with core courses bulk scheduled so that all students in a particular cohort will have nearly identical schedules, except for elective courses. In the fall term, first-year students have very little flexibility in their schedules, and so timetables are nearly identical for all students in a particular cohort. One benefit of the approach is that it facilitates scheduling a midterm week, where regular classes, labs, and tutorials are cancelled, and then students will write one midterm a day for five days. This approach to midterm scheduling was in place before the introduction of the fall break, and was implemented as a result of the work of a first-year task force meant to improve student success in first-year engineering.

At UWaterloo, a two-day fall break was added on a three-year trial starting in 2016, with the stated goal of helping student mental health by allowing a time to catch up on classwork before the stressful midterm period. The break was scheduled to follow the existing holiday long weekend for Canadian thanksgiving (the second Monday of October). The university website describes the fall break as "an initiative to support students in ensuring a successful fall term by providing a break in the schedule for on-campus undergraduate and graduate students. Students are encouraged to use the time to prepare for the rest of term, which may include studying for upcoming midterms, catching up on reading and assignments, or taking some time for rest and personal wellness." [8] For the years 2016 to 2018, this meant that students would have the three-day holiday weekend plus two days of fall break, then two days of their regular class schedule. The two days of their regular class schedule were often filled with assignment and lab deliverables as instructors tried to encourage students to prepare for their upcoming midterms. The following week was then the five-day midterm week.

The fall break was extended to be a full week beginning in fall 2019 on a three-year trial, based on the resounding positive response in an institution-wide survey given to students, and due to

the scheduling difficulties introduced by the three-day break format [9]. To accommodate the mid-semester break, the semester started earlier in September, shortening the orientation week to a couple days. This meant the number of days for new student orientation were significantly reduced, as students still moved in during the September Labour Day weekend (which falls on the first Monday in September), but regular classes began almost immediately. Orientation week, as it was known, was often a time for students new to campus and the university environment to become familiar with student services, and to build a social network of supportive peers. As seen in a previous study, orientation week was an important event in the formation of student course project groups during their first term on campus [10].

Motivation

After the introduction of the fall break in 2016, one of the authors noted that midterm grades for their first-year programming course were low. In an earlier investigation into what could be causing this drop, the authors identified that students who regretted how they spent their break performed worse than their peers who showed no regret, and that inexperienced, struggling students had the highest odds of showing regret [11].

Thus, the following year, to mitigate the perceived harmful effects of the fall reading break on these students, the authors planned an academic and social intervention during the two-day study break in fall 2018. During the intervention, instructors and TAs held a collection of one-hour course-specific sessions, advertised as midterm preparation help sessions. These sessions had two goals: review the relevant course content and problem-solving techniques, and model successful study strategies without explicitly discussing them [12]. Alternating with the academic sessions were social/networking events co-offered with support from the engineering student society. These social sessions were meant to aid students in building a support network of peers in engineering and become more familiar with the services available, two key objectives towards improving student success in their current and subsequent terms [13]. The social aspects of the intervention were meant to provide a way to both improve student wellness and replace some of the benefits that were lost when the length of the orientation was reduced. An evaluation study of the fall 2018 intervention was completed in winter 2019, which showed a positive response from students [14]. Based on this success, when the break was expanded to a week in 2019, the intervention was expanded to the four working days during the fall reading week (i.e. not those days scheduled as weekend or holiday). The format was similar, with study sessions intermixed with social/networking sessions.

Also in 2019, adjustments were made to the scheduling of first-year engineering midterms to try to give the students a taste of university-level midterms before the break so that they would be more motivated to study. Students wrote two midterms on the Thursday and Friday before the break, then had nine total days with no scheduled classes, labs, or regular tutorials. The break was immediately followed by three midterm exam days, with one exam on each of Monday, Tuesday, and Wednesday.

For students in first-year engineering at UWaterloo the fall break is scheduled approximately five weeks after students arrive on campus, so there is little time to become accustomed to the routine, and there is little time to explore the city off-campus. Indeed, many students are still very unfamiliar with campus itself. Even with the fall break intervention in place, the authors

were concerned with how the longer break would impact student well-being, and academic success. In particular, the authors were concerned about additional harm to students who were not able to return home for the break, such as out-of-province and international students.

Methods

As a first step to characterize and identify the impact of the fall break on students, one needs to know how many students are spending the break on or near campus, and how they are spending their time. In this paper, the authors present an investigation into the impacts of the fall break, with a focus on international and out of province students. This paper seeks to answer the following research questions:

1. How do students spend their time during the fall break?
2. What is the impact of the break on students' academic success?
3. How do the experiences of students who remained on campus differ from their peers?
4. What is the impact of the break on students' sense of community with campus?

This investigation was conducted as a concurrent mixed-methods study consisting of a survey administered to all first-year engineering students after the fall break, and again at end of term; combined with in-person semi-structured interviews with students¹. Purposive sampling of students who remained on campus was used for the interviews to ensure their perspective was captured by the researchers. Eleven students fit the selection criteria and indicated that they consented to be interviewed, all were invited, and ultimately three responded and participated in the interviews.

To capture first year engineering students' perceptions and experiences of the fall break, online surveys were administered in the week after midterm grades were released to students in both 2018 and 2019 (approximately 2-3 weeks after the fall break), with a follow-up survey at the end of the semester (before final exams). Of the 1474 eligible students in 2018, the post-break (PB) survey received 217 valid responses, and the end of term (EOT) survey received 76. Of the 1572 eligible students in 2019, the PB survey received 284 valid responses, with 195 at EOT. The demographic breakdown of valid responses was 33% female in 2018, and 31% female in 2019 (the Faculty of Engineering had 31% female enrollment in first-year in 2018), with representation from all engineering programs in both years. Descriptive statistics of the survey data was used to address research question 1, while a regression model was calculated to predict term grades, addressing question 2.

For the qualitative portion of the study, conducted in 2019 only, students were asked in the PB survey to consent to a follow-up interview. Students who spent more than seven days of the fall break on campus were invited to participate in a 30-minute interview. This portion of the study was conducted as a phenomenology [15], seeking to understand the shared experience of the reading break for students who did not return home. These data were used to address research questions 3 and 4.

¹ University of Waterloo Office of Research Ethics #40032

Results

The surveys relied on student perception and self-reporting of how they spent their time, and were conducted after the students had resumed their regular class schedule. As they had received most or all of their midterm grades when the surveys were conducted, it was expected that a student's midterm performance could have an impact on their perceptions of the fall break. The results below discuss in detail their responses of time spent during the break. From the interviews, it is possible to gain a richer picture of how students who remained on campus perceived the break, and what impact it had on their connectivity with their peers and the wider campus community. The term "on campus", was used rather than "in Waterloo" in an attempt to distinguish between students who remained engaged with the university from those whose home was in Waterloo. Unfortunately, as discussed below, there was some confusion for students from outside the Waterloo area who remained in their off-campus housing and did not go on campus during the fall-break.

RQ1: How do students spend their time during the fall break?

With the length of the break, it is not a surprise that many students would choose to leave campus for most or all of the time period. Student count statistics show that approximately 73% of the first-year Engineering students came directly to university from an in-province secondary school [16]. International students make up approximately 12% of the first-year student enrolment [17]. While these statistics provide only a rough measure, as cities in an adjacent province and in some of the American states are closer to Waterloo than some cities located in the home province, and the home locations of mature students are not captured, it does give a rough measure of the number of students likely to go home based on distance.

As part of the PB survey in 2019, students were asked how many days they spent "on campus", "at home", or in other places (see Figure 1). Of the 271 students who completed the survey, 48% indicated that they spent the majority of the time (seven or more days) at home, while 17% indicated that they spent that majority of the time on campus. Some students chose to split the break time between locations, with 26.2% spending about half of the break at home and half elsewhere on campus or in other locations. The decision to return home during the break is likely the result of many factors including distance, cost, family pressure, and how supportive a student sees their home environment. Comparing the percentage of students who returned home for most or part of the break with the enrolment statistics, it appears that all who could return home, did.

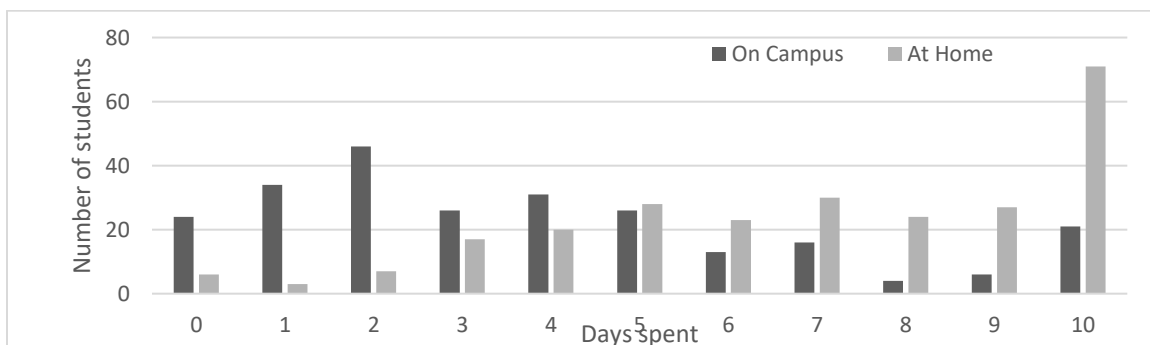


Figure 1. Number of days spent at home and at campus, PB survey (2019 only)

A small number of students reported spending time in locations other than home or on campus, as shown in Table 1. Consistent with the above finding that students sought the support of family and friends, two of the other locations involved meeting them in locations other than home. A small number of students indicated that they visited locations in Waterloo and nearby cities.

Table 1. "Other" locations (2019 only)

Tourism	12
With extended family	8
Visiting friends	8
Hobbies/Sports	1
Library	1

In both 2018 and 2019, students were asked to indicate the three main activities they undertook during the fall break. Open text boxes were used to ensure the full range of activities would be captured. Table 2 below summarizes these data.

Table 2. Three main student-reported activities during fall break

Category (Keywords)	2018			2019		
	#1 Activity	#2 Activity	#3 Activity	#1 Activity	#2 Activity	#3 Activity
Studying/Homework (study, library, assignment, help session, homework, hw, review, notes, school, lecture, education, project, WEEF, class, coding, design, team, work, question, class)	77	56	52	104	62	42
Family/Friends (family, friend, socializing, significant other, visit)	76	75	38	98	106	73
TV/Internet/Video Games (internet, movie, watch, Reddit, YouTube, anime, Netflix, media, tv, game, gaming, web)	21	34	54	26	39	68
Sleep (sleep, slept)	14	22	15	11	26	25
Physical activity (physical, sport, working out, exercise, soccer, recreation, volleyball, basketball, walking, gym, swim, rock climbing)	0	3	13	1	8	8
Hobbies (read, dance, hobby, instrument, violin, guitar, volunteer, club, shop, create, pass time)	3	4	13	3	4	5
Resting (relax, chill, breathe, health, alone, ate, pray, temple, music, eat, break, other, personal, myself, party, leisure, procrastinate, rest)	4	15	23	17	25	27
Chores (cook, chore, routine, grocer, errand, clean, appointment, laundry)	0	0	3	1	6	7
Travel (outside, driving, travel, bus, car, going, transport, tour, transit)	0	4	8	1	5	7
Coop (coop, co-op)	0	1	1	0	0	0

As suspected, studying/homework and visiting with family/friends are the most common activities, with different self-care or relaxation activities filling out the rest of the table. Some time was spent on leisure consuming types of media, although fewer than half of the students

identified this as being in the top three activities. While students likely spent a significant amount of time online, they may have classified this time as studying or spending time with family and friends rather than on entertainment. Students also reported spending significant time sleeping, likely an indication that they had found the fall term to be very busy/stressful. Little time was spent on physical activities or hobbies. Most students who are admitted to engineering at UWaterloo participated in a wide variety of extracurricular activities in high school, however, it seems students did not see the break as an opportunity to resume or continue participation in these types of activities.

To examine their study habits in more detail, students were asked to indicate how much time (on average) they spent studying each of their courses each day. These questions appeared in a large table, where students selected from: “no time”, “<1 hour”, “1-2 hours”, “2-3 hours”, or “3+ hours”. These responses were summed for each student to obtain a rough estimate of the total number of hours they spent studying each day (see Figure 2). Most students indicated that they spent some time studying, while still leaving time for other activities. Typically, they worked for the time that would be considered a reasonable workday (which is markedly less than the workload for a typical “school day” involving lectures, tutorials, labs, and then working on assignments outside of scheduled class time).

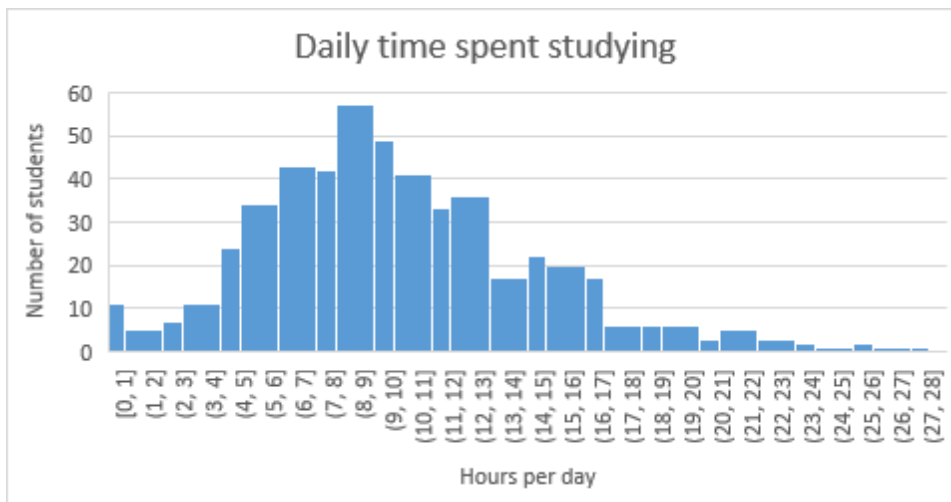


Figure 2. Sum of daily study hours across all courses, 2018/19

While there are some problems with this data (5 students indicated that they studied 24+ hours each day), a median of 8-9 hours is believable. What is somewhat concerning in these data are the 36 students out of 504 valid responses reporting more than 16 hours of studying per day. Even considering an error in reporting by an hour or two would indicate 5-10% of students are spending far too much time studying each day for it to be effective. Generally, the Faculty of Engineering at UWaterloo sets the expectation for students that they should be “working” 60 hours per week on their studies, which averages out to between 8 and 12 hours per day (depending on whether weekends are included or not).

To investigate students’ feelings about how they planned/spent their fall breaks, they were asked whether they regretted how they spent their fall break; Table 3 summarizes these data. A

significant number of students indicated that they regretted how they spent their time during the fall break.

Table 3. Responses to "Did you regret how you spent your time over the fall break"

Regret	Regret, Post-break			Regret, EOT		
	2018	2019	Total	2018	2019	Total
Yes	87 (40%)	126 (44%)	213 (43%)	20 (26%)	78 (40%)	98 (36%)
No	130 (60%)	158 (56%)	288 (57%)	56 (74%)	117 (60%)	173 (64%)

In 2018, the calculus midterm was the Monday after the fall break; in 2019, the calculus midterm was the Thursday before the fall reading week. Similarly, algebra was scheduled for Thursday in 2018, and the Tuesday following the break in 2019. All other subjects varied in the schedule by program. Given the schedule, one would expect there to be similar patterns of studying algebra between the two years and very different patterns for calculus. The expectation was that in 2019 students would not have been studying calculus at all over the break, or very minimally to maintain their skills, instead focusing on courses like algebra and for many students, chemistry, which had midterms immediately following the break in 2019. Table 4 and 5 summarize the amount of time students spent studying both courses over the break in 2018 and 2019.

Table 4. Summary of self-report time spent studying Algebra by year, PB survey

Algebra, hours per day	2018	2019
No time spent	7%	5%
<1 hr per day	23%	18%
1-2 hrs per day	34%	37%
2-3 hrs per day	22%	20%
3+ hrs per day	14%	20%

Table 5. Summary of self-report time spent studying Calculus by year, PB survey

Calculus, hours per day	2018	2019
No time spent	9%	40%
<1 hr per day	30%	23%
1-2 hrs per day	28%	23%
2-3 hrs per day	21%	8%
3+ hrs per day	11%	7%

Contrary to expectations, a significant number of students reported studying for calculus during the fall break in 2019, even though they had already written that midterm. When cross-checking these students with students who regretted how they spent the break, most reported studying as their number 1 activity during the break. In addition, when stating in an open text box what they would do differently, the vast majority say they would study more (as opposed to studying differently, like spending more time on algebra, and less on calculus). This could indicate that a

significant proportion of students have not developed good study skills in the five weeks they have been on campus, however more investigation is needed here. As the incoming students can be characterized as having been high achievers in their secondary education, there is the possibility that students who had found the calculus midterm challenging chose to focus on trying to correct that problem, assuming that they would find the remaining midterms more typical of their previous exam experiences.

RQ2: What is the impact of the break on students' academic success?

The survey questions included information about the students' demographics including program, gender, and whether they were 4-stream (the student would be going out to work on paid co-op placements after only 4 months on campus, with the work term starting January) or 8-stream (the student would spend 8 months in two school terms, with their first work term starting in May). The demographic data and the data described in the previous section were then cross-referenced with each students' term average for all courses taken during their first term in engineering. A linear regression model was calculated to predict the student's term average, controlling for their demographics, and days spent on campus and at home. This model seeks to predict the impact of "regret" and time spent studying algebra and calculus (as an indicator of time management and study skills) on the students' term averages.

Table 6 below summarizes the regression coefficients for students in fall 2019 ($F(15,133)=4.20$, $p<0.001$). The sample included in the regression model is somewhat small compared to the entire first year student body (149 students out of nearly 1600 in 2019), however the sample had respondents from all 12 programs under study, was 27% female, and half were 4-Stream students, matching the student demographics of the Faculty of Engineering well.

Table 6. Linear Regression Coefficients, Term GPA post-break survey ($R^2=0.32$, $n=149$)

	Coefficient	Std. Err.	t	P>t
Female	-2.72	1.87	-1.46	0.148
Non-Binary	7.31	5.92	1.24	0.219
4 Stream	-0.16	1.69	-0.10	0.924
Program	-0.32	0.24	-1.34	0.181
Do not regret how spent time	7.12	1.66	4.29	0.000
Days Spent on Campus	-0.42	0.68	-0.61	0.540
Days Spent at Home	-0.90	0.58	-1.54	0.125
<1 hr studying Algebra	4.78	5.07	0.94	0.347
1-2 hrs	0.44	4.75	0.09	0.926
2-3 hrs	-2.00	4.99	-0.40	0.689
3+ hrs	-3.78	5.07	-0.75	0.457
<1 hr studying Calc	-3.22	2.24	-1.44	0.153
1-2 hrs	-4.26	2.23	-1.91	0.058
2-3 hrs	-17.79	3.61	-4.93	0.000
3+ hrs	-2.94	4.20	-0.70	0.486
y-intercept	87.08	7.58	11.49	0.000

The demographic data, and factors such as the days spent on campus were not statistically significant. Two factors do stand out: students who did not regret their time over the break were predicted by the model to earn 7% higher on their term average compared to those that reported regret ($p < 0.000$); and students who reported studying calculus over the break were predicted to have a lower term average than their peers who did not study calculus. Students who spent 1-2 hours on calculus during the break were predicted to earn 4% lower compared to students who did not study calculus (bordering on significance, $p = 0.058$); and students who spent 2-3 hours studying calculus were predicted to earn nearly 18% lower ($p < 0.000$). This drop was not seen for students in the 3+ hours category, although some caution is needed in interpreting these results due to the small number of students in these categories ($n = 19$ in the 2-3 hours category, and $n = 17$ in the 3+ hours category).

Both of these factors, regret and studying calculus, can be considered poor choices in terms of how students spent their time during the break. The students completed the survey after receiving their midterm grades, so it is natural that some would regret their choices because they did not perform as well as they had wanted or hoped. Yet, text responses also indicate that students regretted studying as much as they did, with some indicating that they should have taken time for rest, leisure activities, and travel. Some students regretted spending time on a particular subject or not spending enough time on a particular subject. While it is not possible to eliminate the feelings of regret for all students, the large percentage that regret, coupled with the indication that students who do not regret their time have noticeably better term averages, indicates that providing better guidance to students should be an area of priority when it comes to advising first-year students.

In conclusion, for the more than 1 in 3 students who regretted how they spent their break, or the 1 in 3 students who studied inefficiently, there are large and statistically significant negative impacts on their term average in their first academic term in engineering.

RQ3: How do the experiences of students who remained on campus differ from their peers?

Interview invitations were sent out to consenting students² who spent seven or more days on campus during the fall break. Of the 11 students contacted, interviews took place with three of them. Of these three students, the first interviewed was a male out of province, Canadian national (referred to as “MME” below) from Mechanical and Mechatronics Engineering, second was a female international student (referred to as “CIV” below) from Civil and Environmental Engineering, and the last to be interviewed was a male international student (“MGT”, below) from Management Engineering.

There were several common themes that emerged from the three interviews that were conducted, but the most prevalent and intense was around loneliness:

MGT: For the people like me that are here and there is no one else around, it can be a little bit, I want to say, desperate? But definitely lonely.

² Consent was asked on the post-break survey in 2019

MME: Yeah, it feels weird, it's just like you go in [to the cafeteria] now [at end of term], it is so full of people, you have to wait in line for so long. You went in reading week, you were the only person in there. Is it open? Am I supposed to be here?

CIV: Uh it was a little lonely because like my roommates left. Everyone on the floor left too almost because like most of the people live close by and like can go back. Like I live in [Asia], so like the flight back home is almost 19 hours, so I'm like, seven days is not really worth going back. So, yeah, it was really empty.

All three students commented on how campus had become a “ghost town”, in particular calling out previously busy locations like cafeterias and the campus library as being completely empty.

MME: I would be the only person going in to get food and I felt kind of weird because all of the staff would just be talking to each other in the corner, like if I wanted a burger, do I go: “hey can one of you come behind the burger booth over here?” [laughs] Yeah, it was kind of scary how empty it was

There was also an element of surprise as their roommates sometimes left without saying goodbye, MME commented:

MME: I have two roommates and both of them just left. Neither of them told me they were leaving, so I came back one day and was like [student name] “where are you?” He just left.

All three were asked to comment on where they spent their time while on campus, with all three stating the majority of their time was spent in their residence room. Their activities there varied, typically with a mix of relaxation and studying, but their forays into the wider community were limited (e.g. one ventured to a local shopping mall, one spent time studying alone in the library and visited a sibling in Toronto for a day). The full exchange with MGT, below describes more or less what all three experienced:

Interviewer: so would you say over those 10 days, was your time mostly studying, was it mostly relaxing?

MGT: I would love to say it was mostly studying but it was definitely mostly relaxing [laughing].

I: so mostly in your residence room by yourself?

MGT: Yes. Or we had some international friends who were also here and couldn't go home for the break

I: I would expect most of them [international student friends] stayed on campus?

MGT: Umm yes. Most of them live off campus though. But they stayed all of them in Waterloo, yes.

I: aside from what First Year was running [the academic/social intervention], did you know of anything else that was happening on campus? Were other groups doing things?

MGT: Cannot think of any actually. No, just the help sessions that they had. I cannot think of any other things that I saw or activities going on.

I: And not in your residence either? And like your Don [live-in residence mentor] disappeared as well?

MGT: Yes. She was gone for most of the week.

Another common theme from the interviewees was around the break in routine, or mindset, after returning from the fall break. CIV in particular commented on this several times in the interview, both about herself and what she saw in her classmates:

CIV: Because when we started with the midterms we had the whole midterm mindset and I remember when I went to the calc[ulus] exam, everyone was there half an hour before, everyone was with their pencils and erasers and there for the midterm. After the fall break, everyone was like it's vacation, it's just another test, so yeah when we wrote our mechanics and calc, everyone was in a really serious exam kind of mindset, but after the fall break, everyone was really relaxed. And I think it's kind of evident from our averages too!

During the fall break, help sessions were organized through the First Year Engineering Office for courses with impending midterms. These were originally implemented in 2018 to combat the break in academic routine that students were experiencing. All three of the interviewed students attended at least some of these help sessions during the week, and were happy that they were taking place, though there were some concerns around their friends who were away from campus during the break missing something important in these tutorials:

CIV: ...because I was like on campus, so I would definitely prefer more tutorials, but at the same time, a lot of people are off campus, so they are missing out on them, so when we had important tutorials, I had to like keep clicking pictures and send them to my friends. So it does get stressful for them because they are not present and they are like, "what's happening? Did he say something about the midterms?" and especially because we had midterms after that, it was even more stressful, because what if they said something that was really important for the midterms and I missed it? So that kind of a thing.

There were also social events running in association with the Engineering Student Society, but awareness of these was not as strong:

MME: Honestly, no. I had no idea, I learned about that from the previous survey [the PB survey] when it was asking about all the resources that I didn't know existed, but I think if I knew they existed, I might have gone looking for it, because I didn't really have anything else to do, it might have been useful

In particular, MGT felt there should be more social events:

MGT: Umm I would like to say that there could be more. Well, the help sessions are fine, so on the academics we are good, we're covered, but maybe if there were a bit more social events, that would be good.

Expanding on this line of questioning, all three students were asked if UWaterloo should be doing more for students during the break. There was not much consensus except for the appreciation for the academic tutorials, and a request for more social events, though the students also recognized that ultimately they are in control of their own fates:

MGT: That's the thing, what could the university actually do to do something like that? Because the break, the students are free during the break, and they have all these options that they could optionally take. But I don't know if the university could do anything specifically to help students because that falls more into each individual's time management skills, what they choose to do with their own behaviour

MME: I don't think so. I think at this point, if you got into Eng, if you got into the program, you know how to discipline yourself over the break, so like as long as you have the opportunity to go to those study sessions while also, like you're able to study yourself, if you got into the program, you should be able to manage that without too much intervention from the university side

The last major discussion point in the interview was around the timing of the break. In fall 2019, students wrote two midterms, went on break, and then came back to write the remaining midterms. Some Canadian universities and colleges are experimenting with breaks much later in the term, such as around Remembrance Day which occurs on November 11. When the students were asked when the break should take place, their answers were inconsistent with each other and occasionally with their own previous comments. The students saw value in the break for studying for impending midterms, they also saw value in the break for relaxing after having written some midterms. MME in particular liked the break's timing as his hardest midterms followed the break, and so he had time to study while mixing in some relaxation time. He did comment that he wished the break aligned with other universities in the province so that visiting friends at other campuses would be easier. CIV and MGT also mentioned that the break felt too long for them, MGT in particular had an interesting perspective on this as they had experienced the shorter break in fall 2018:

MGT: I don't know if it was because I was on campus the whole time and there was nothing to do, but I did feel it was a bit too long, yeah. Because I went through the one last year when it was only 3 days in the fall term and that felt good, that was good enough.

RQ4: What is the impact of the break on students' sense of community with campus?

In speaking with the students, the fall break didn't seem to have an impact one way or the other on the sense of community on campus, though there was certainly evidence that UWaterloo has room for improvement, more broadly. CIV was asked directly about this:

I: So with the fall break, did you find it interrupted making friends? Any social impacts of it?

CIV: Not really, no.

I: Life picked up like normal once everyone got back?

CIV: Yeah, like I said there was a little transition period, like when fall break began, I was like Oh everyone's gone, I'm so lonely, I don't have friends! [laughs] and then they came back, and I was like ok... people? So that was like a little two-day transition, but after that it was normal again

MGT, speaking about the student support groups on campus, outlines one of the issues the institution faces in connecting students and in communicating messages to them:

MGT: I feel like in the instance of the International Office, I personally am a really involved person on campus, I always try and be connected to them with the events that they have and all that, but I do feel that most of my peers, at least my international friends, have no idea of the things they're doing, of what's going on... The Engineering Society perhaps a bit more, but still, I feel like most students, at least my friends, most international students that I know are not that involved with the Engineering Society and other services on campus

Historically, the Orientation Week that took place before classes start in September was important for students to forge connections with their peers, and start making friends. Counter to this view, in asking students about the length of Orientation Week (that was shortened to make room for the fall break), MME mentioned he made few lasting connections there:

MME: It was fine, like I think I would rather have the break than the orientation week. Honestly, I don't talk to that many people that I met during orientation week, and I viewed orientation week more as an opportunity to meet people and make friends, but I don't talk to anyone there at the moment, and I don't really think that I would have talked to more people had that been longer

CIV on the other hand enjoyed her time during Orientation Week but pointed out the additional difficulties for students who just landed in Canada, and who may be experiencing jet lag:

CIV: It was so much fun. But at the same time, I think the length of orientation week was perfect, because I'm an international student so I had a long long flight and I had a long long day, and I was adjusting to the weather and that, so I think the initial few days were really tiring for you... but even for local students, the people from Canada, I think even a lot of my other friends were like you know adjusting to the new place, just left home for the first time and... What is this place? And oh my god, we needed so many maps! We got lost on campus like every 5 minutes and we were like "I don't know...!"

Limitations

In reading through the “other” locations in the 2019 PB survey, it was clear that students may not have been interpreting the locations as the researchers had. The intention was that “on campus” would include residence, and “at home” would be your place of residence before becoming a university student. The category of students who had their own apartments in Waterloo, but were technically off-campus, may not have been captured well by this question; the researchers saw some indicators of this in the responses to the “other” prompt in the question. These students may have had a similar experience as the students who live in residence on campus, and so should have been included in our interview invitations. This question will need to be corrected if the survey will be run again in 2020.

The survey was also not explicitly validated beyond the face validity of the questions. Additional steps could be taken for future offerings of the survey – like conducting a think-aloud version of the survey with select students to correct any other misperceptions like the “on campus” vs “off campus” issue mentioned above. Having said that, the qualitative data collected in this study – both through the open questions embedded in the survey, and the interviews – add rigor by allowing the authors to triangulate responses.

Lastly, it is worth commenting on the types of students who participated in the interviews. Generally speaking, the three students that volunteered to be interviewed were all out-going and very social. This is not surprising, as introverted people may be reluctant to be interviewed by a stranger. Their comments around loneliness, and lack of social activities then, need to be seen through that lens. Having said that, nine days is a long time for anyone to be alone in a new city.

Discussion

Diehl et al. [18] in a large study of loneliness in German university students, analyzed the determinants for both social and emotional loneliness and found that younger students, students without a partner, students living alone, students with a lack of money, students with weight issues, and students with an immigrant background were more likely to be lonely. Many of these factors describe first-year engineering students at UWaterloo, and in particular, they describe our international student population well. First-year students, then, represent an at-risk population for loneliness as they transition to university life, and need to be supported. Diehl et al. give several recommendations that seem to reduce loneliness: physical activity was found to be a protective factor for social loneliness; and social support groups and curricula with cooperative learning opportunities may also be effective. Targeting these types of activities may be effective at reducing student loneliness. Diehl et al. conclude their study with the following:

Universities are a perfect setting for conducting interventions to support students in attaining a healthy lifestyle (e.g., by offering sport courses) and also for giving them the opportunity to start their professional career being healthy. Giving support at this stage of life is important in preventing lonely students from “being trapped in loneliness as they age”

Moving forwards, the authors are planning improvements for the 2020 fall break intervention. Speaking with students who remained on campus, there is clearly appetite to increase the number and variety of social activities running during the week. However, attendance at these social events has been poor. The academic sessions were well received, and should continue, with additional steps taken to share these sessions with the students who are off campus (e.g. as recordings). Given the lack of awareness of open campus services, it is also clear that the advertising around the intervention and campus resources more generally needs to improve. Schedules for these activities should also be ready much earlier in the term so people who are planning on leaving campus can make an informed decision. Lastly, additional conversations need to take place with other campus support groups about what supports are in place, and what should be in place for those remaining in residence during the break.

There is no clear-cut answer for the timing of the break – before midterms, during midterms, or after midterms. For those students with strong self-discipline and time management skills, the break before midterms can be a welcome time to study, whereas other students spent the week relaxing and not studying, and many then regret how they spent their time. On the other hand, if the purpose of the break is to let students unwind and relax, the break may be more effective if it took place later in the semester. This would also decouple the break from a Canadian holiday in which not everyone participates, and/or may reduce the familial obligations of that particular weekend. This change may allow students to focus more on personal wellness, and removing family commitments associated with the holiday may also open the possibility of a shorter break achieving the intended outcome (that of relaxation). Several Canadian universities are experimenting with this scheduling choice.

Wherever the fall break goes from here (both at UWaterloo and elsewhere), the rigor of the evaluations that universities are undertaking of these programs needs to improve. There is a significant lack of research on student behavior during breaks; on programs to support students during breaks; on whether the breaks are achieving their desired effects (and at what cost, including the cost to staff and faculty of the institution itself); and on what is effective (or even necessary) for academic institutions to offer during these breaks. While this study represents one small step in this direction, much more research is needed here.

Conclusions

This paper presented a mixed-methods study into how first year engineering students spend their time during an unstructured break in the fall semester. Data were collected through online surveys, offered 2-3 weeks after the break, and at end of term in 2018/2019. Interviews were also conducted in 2019 with three students who remained on campus for most of the fall break.

The surveys showed that, generally speaking, all students who could go home, did, and that their main activities during the fall break were studying/homework, spending time with friends and family, and relaxing. Based on student self-reported data, the median student studied 8-9 hours a day during the break, though there was a significant minority of students who reported studying 16+ hours per day. When asked in the second half of term, over 40% of respondents from 12 engineering programs stated they regretted how they spent the break, with the number increasing from 2018. Lastly, there is some evidence of inefficient studying in a significant population, showing an opportunity for improved instruction on time management and study skills in future.

A linear regression model was calculated to predict the term average for 2019. This model controlled for demographics (like gender, program, and coop stream) and controlled for where students spent their break. This model showed a statistically significant reduction in term average for students who regretted how they spent their break. There was also a statistically significant reduction in term average for students who studied inefficiently (i.e. those who studied the “wrong” course). Interestingly, where students spent the break didn’t seem to have an impact.

Interviews conducted with students who remained on campus during the break showed they were lonely, and largely retreated to their rooms. These students did, however, appreciate the academic and social events during the break, if they were aware of them, and would appreciate more social events in the future. Lastly, when asked about the timing of the break in relation to midterms, there were mixed feelings, as the students saw both advantages and disadvantages for the break being before, during, and after midterms.

The students interviewed did not report any direct social impact of the break. They are also not perceiving any loss with the shortening and change in format of orientation week. Lastly, students are not well connected to the support groups set up for them, and so finding an efficient communication channel to reach them is difficult.

In conclusion, many first-year engineering students in their first academic term do not use an unstructured week away from classes very well. Not all students have developed the time management and/or study skills necessary to use a mid-semester, week-long break effectively. If

mid-semester breaks are becoming the norm for post-secondary education, additional supports are needed to ensure that all students can experience the stated benefits.

References

- [1] P. Irish, "Ontario universities embrace mid-term "fall break" to ease students' minds," *The Star*, 14 October 2013.
- [2] K. Cramer and R. Pschibul, "Student Time Usage During Fall Reading Week," in *Collected Essays on Learning and Teaching*, 2017.
- [3] H. Poole, M. Agnew and A. Khan, "One Week, Many Ripples: Measuring the Impacts of the Fall Reading Week on Students Stress," *Collected Essays on Learning and Teaching*, vol. 10, pp. 163-172, 2017.
- [4] M. Agnew, H. Poole and A. Khan, "Fall Break Fallout: Exploring Student Perceptions of the Impact of an Autumn Break on Stress," *Student Success*, vol. 10, no. 3, pp. 45-54, 2019.
- [5] C. Brozina, A. Johri and N. Naderi, "Engineering Time: Learning Analytics Initiative to Understand how Firstyear Engineering Students Spend their Time," in *ASEE Annual Conference and Exposition*, Tampa, 2019.
- [6] S. Bradley and W. Bradley, "Increasing Retention By Incorporating Time Management And Study Skills Into A Freshman Engineering Course," in *ASEE Annual Conference & Exposition*, Chicago, 2006.
- [7] L. N. Fleming, I. N. Moore, D. G. Williams, L. B. Bliss and K. C. Smith, "Social Support: How Hispanic and Black Engineering Students Perceive the Support of Peers, Family, and Faculty," in *ASEE Annual Conference & Exposition*, Atlanta, 2013.
- [8] University of Waterloo Associate Vice-President, Academic, "Fall Reading Week Project," 2019. [Online]. Available: <https://uwaterloo.ca/associate-vice-president-academic/fall-reading-week-project>. [Accessed 29 01 2020].
- [9] "University of Waterloo Fall Break Task Force," 2019. [Online]. Available: <https://uwaterloo.ca/associate-vice-president-academic/fall-break-project/findings>.
- [10] E. Maggs, C. Hulls, C. Rennick and M. Robinson, "How Do First Year Students Form Their Project Teams?," in *CEEA-ACEG Annual Conference*, Toronto, 2017.
- [11] C. Hulls, C. Rennick, M. Robinson and S. Mohamed, "Effects of a Fall Reading Break on First Year Students' Course Performance in Programming," in *CEEA-ACEG Annual Conference*, Vancouver, 2018.
- [12] S. H. Kang, "Spaced Repetition Promotes Efficient and Effective Learning: Policy Implications for Instruction," *Policy Insights from the Behavioral and Brain Sciences*, vol. 3, no. 1, pp. 12-19, 2016.
- [13] L. Thiele, N. C. Sauer and S. Kauffeld, "Why extraversion is not enough: the mediating role of initial peer network centrality linking personality to long-term academic performance," *Higher Education*, vol. 76, no. 5, pp. 789-805, 2018.
- [14] M. Robinson, C. Rennick, C. Hulls and S. Mohamed, "Fall Break: Making the Most of It," in *STLHE Annual Conference*, Winnipeg, 2019.
- [15] J. W. Creswell and C. N. Poth, *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*, 4 ed., Thousand Oaks, CA: Sage Publications, 2018.
- [16] Council of Ontario Universities, "Common University Data Ontario (CUDO) 2017," [Online]. Available: <https://uwaterloo.ca/institutional-analysis-planning/university-data-and-statistics/common-university-data-ontario-cudo-0/common-university-data-ontario-cudo-2017>. [Accessed 02 02 2020].
- [17] University of Waterloo, "Student Headcounts," December 2019. [Online]. Available: <https://uwaterloo.ca/institutional-analysis-planning/university-data-and-statistics/student-data/student-headcounts>. [Accessed 02 02 2020].
- [18] K. Diehl, C. Jansen, K. Ishchanova and J. Hilger-Kolb, "Loneliness at Universities: Determinants of Emotional and Social Loneliness among Students," *International Journal of Environmental Research and Public Health*, vol. 15, no. 9, p. 1865, 2018.