Institute for Studies in Transdisciplinary Engineering Education and Practice
UNIVERSITY OF TORONTO

FASE Instructors' Experiences and Perceptions during the Recent Transition to Online Teaching

—Report on the Instructor Survey at the Faculty of Applied Science & Engineering (FASE)

Prepared by

Qin Liu, Juliette Sweeney, and Greg Evans
Institute for Studies in Transdisciplinary Engineering Education and Practice

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Executive Summary

This document presents the findings from our analysis of the data collected from the *FASE Instructor Survey on Recent Transition to Online Teaching* in late April 2020. A total of 161 individuals responded to the survey, with a response rate of 37%.

The following six key findings have emerged from the data analysis.

1. Overall, instructors tended to be positive about their experiences.
2. Most online teaching tools in Quercus seemed to be under-utilized; however, those who used them generally had positive experiences. In addition, instructors used a wide variety of other online teaching tools to facilitate course delivery.
3. Instructors experienced a number of challenges related to online teaching, particularly around online assessment and student engagement; these issues seem to be exacerbated in courses with design components and larger classes.
4. The Education Technology Office and colleagues within the same department played an important role in supporting instructors.
5. Associated with the swift transition to online teaching was instructors' increased interest in online teaching and adding online elements to existing courses; however, instructors showed significantly less interest in teaching entirely online courses.
6. The data only showed a few significant differences between the experiences and perceptions of female instructors, teaching-stream and sessional instructors, and junior instructors and those of other instructor groups within the Faculty; in areas with a significant difference, these instructor groups perceived less challenge.

These findings, along with the suggestions made by the respondents, have informed the following recommendations to better prepare for the online / remote instruction in fall:

- Share principles and best practices for designing online instruction and online assessments
- Provide training and resources to help instructors become familiar with all the functions within Quercus that could facilitate online course delivery and assessment design
- Provide training for using online teaching tools.
- Make dedicated efforts to support instructors in designing assessment methods appropriate for online instruction; maintaining student engagement in the online environment, particularly in large classes; facilitating student teamwork in online teaching; and creating tools and approaches that allow design components and other "hands-on" activities to be moved online.
- Provide venues for discussing online teaching and learning practices on a regular basis within departments to support online course delivery.
- Streamline communication with instructors and offer support resources for online teaching through one web portal.
- Designate funding for appropriate online teaching tools to be available to instructors and teaching assistants.

In the following report, we will provide data for each of the six key findings listed above. The data collection process and the characteristics of the respondents are outlined in the Appendix.

Please contact Professor Greg Evans at greg.evans@utoronto.ca should there be any questions about this report.

Introduction

The purpose of the FASE Instructor Survey was to capture the experiences, perceptions, and challenges of instructors within the Faculty of Applied Science and Engineering, or FASE, arising from the rapid transition to online teaching that started on March 16, 2020, due to the COVID-19 pandemic. The survey was administered for two weeks in late April 2020 by the Institute for Studies in Transdisciplinary Engineering Education and Practice (ISTEP).

We have organized the results from both quantitative and qualitative data around these areas:

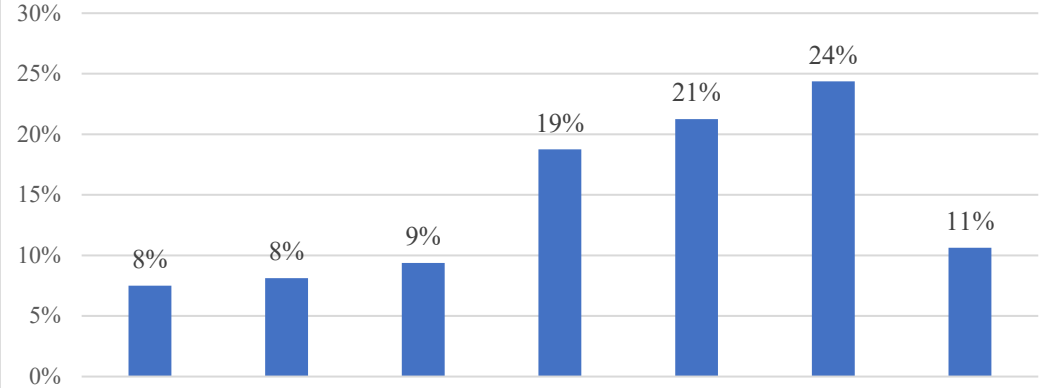
- Overall experience
- Use of online teaching tools and strategies
- Challenges and supports
- Interest in online teaching
- Differences among instructor groups
- Suggestions from instructors

Overall Experience

Key Finding 1: Overall, instructors tended to be positive about their experiences.

The overall experience with the transition to online teaching among the respondents tended to be positive. Fifty-six percent of them rated positively (5 to 7) on a seven-point scale about their overall experience (Figure 1), with a mean of 4.54 (SD=1.72).

Figure 1. I found the transition to online teaching ...



In written comments, the majority of the respondents indicated that the transition to online teaching had gone very well, considering the short notice and tight execution window involved. The majority noted that the transition was smoother than they had expected while a few individuals found that the transition went badly, but that was what they expected.

Use of Online Teaching Tools and Strategies

Key Finding 2: Most online teaching tools in Quercus seemed to be under-utilized; however, those who used them generally had positive experiences. In addition, instructors used a variety of other online teaching tools to facilitate course delivery.

Over half of the respondents did not try some of the teaching tools (as highlighted in light blue in Table 1) that could potentially facilitate student presentations and discussion or course delivery after the transition. However, over 80% of the respondents had already used Quercus to send announcements to students and half had used online submission for assignments and quizzes before the transition (Table 1).

Table 1. Uses of Online Teaching Strategies

Online Teaching Strategies	Did not try	Had already used
Created online student breakout groups in class sessions	75%	3%
Assessed students' recorded presentations offline	75%	4%
Created online space for collaborative work among students	75%	12%
Assessed student online presentations in real time	70%	3%
Created course content recordings before class and then shared them with the class	60%	12%
Created a course calendar about events and due dates	52%	36%
Created an online discussion forum dedicated to addressing student questions	39%	29%
Recorded live class sessions and then posted them for student use after class	35%	9%
Offered online office hours	26%	11%
Provided online feedback for individual or group student assignments	25%	36%
Ran online course sessions in real time	14%	6%
Used online submission for assignments and quizzes	6%	50%
Sent students announcements via Quercus	4%	82%

n = 161. Sorted out in the descending order of the percentages for "Did not try."
Those strategies that over 50% of the respondents did not use after the transition are highlighted in light blue.
Those strategies that over 50% of the respondents had already used before the transition are highlighted in light orange.

Survey questions focused on use of the functions embedded in Quercus. Table 2 shows that during the transition, instructors used other online tools such as Microsoft Teams, Skype and Zoom, much less often than Quercus. However, written comments suggested that more than 40 online tools were being used, such as Crowdmark, Piazza, YouTube, and Discourse (the top few), in addition to those listed in the survey.

Table 2. Uses of Online Teaching Tools

Online Teaching Tools	n	Never	Seldom	Sometimes	Often
Google Calendar	156	89%	3%	2%	6%
Breakout rooms in Zoom	157	89%	6%	4%	2%
Skype or Skype for Business	157	82%	6%	8%	4%
Recording tool in Zoom	156	81%	6%	6%	7%
Google Docs	156	80%	6%	8%	6%
Breakout rooms on Bb Collaborate in Quercus	159	79%	5%	7%	9%
Microsoft Teams	157	78%	6%	6%	10%
Calendar in Quercus	158	70%	9%	8%	14%
Discussion Board in Quercus	157	61%	10%	13%	16%
SpeedGrader in Quercus	157	44%	6%	17%	33%
Quizzes tool in Quercus	158	37%	22%	24%	17%
Recording tool on Bb Collaborate in Quercus	158	35%	8%	11%	45%
Assignments tool in Quercus	157	20%	6%	21%	53%

The data are arranged in the descending order of the percentages for "Never."
Those tools that over 50% of the respondents indicated that they never used are highlighted in light blue.

Table 3. Ratings for Using Online Teaching Strategies

Online teaching strategies	Valid n*	Not well	Somewhat well	Well	Very well	Well or Very Well
Created course content recordings before class and then shared them with the class	44	-	18%	34%	48%	82%
Used online submission for assignments and quizzes	70	4%	14%	43%	39%	82%
Recorded live class sessions and then posted them for student use after class	90	1%	18%	39%	42%	81%
Ran online course sessions in real time	128	2%	19%	44%	35%	79%
Provided online feedback for individual or group student assignments	61	3%	18%	49%	30%	79%
Assessed students' recorded presentations offline	31	7%	16%	26%	52%	77%
Assessed student online presentations in real time	43	5%	19%	33%	44%	77%
Created a course calendar	15	7%	20%	33%	40%	73%
Sent students announcements via Quercus	21	10%	19%	10%	62%	71%
Created an online discussion forum dedicated to addressing student questions	48	17%	17%	38%	29%	67%
Offered online office hours	99	4%	30%	38%	27%	66%
Created online space for collaborative work among students	19	11%	26%	32%	32%	63%
Created online student breakout groups in class sessions	33	12%	27%	33%	27%	61%

*The n values do not include those indicating "Had already used" or "Did not try."
The data are arranged in the descending order of the percentages for "Well or Very well."

The majority of the respondents (61%-82%) who used online teaching strategies viewed their experiences positively (Table 3). Written responses showed that the respondents were generally satisfied with tools provided by the University. Blackboard Collaborate was particularly popular. Nearly all instructors had some level of experience with Quercus prior to the transition, but reviews of Quercus functionality were mixed, with the quiz feature being found problematic. Below are a couple of illustrative quotes, which show that the online assessment tool did not fully facilitate the design of final assessments.

> "I am trying to use Quercus Quizzes for my final assessment, but it is terribly limited. If I had a choice, most of my questions would be multi-part formula questions where the variable parameters were carried forward from part to part, but this is not allowed in Quercus Quizzes."
>
> "I administered an online timed quiz for the first time. From my perspective it worked really well. It released on time and all students completed it. However, my students did not feel the same way. While they "completed it", questions requiring uploads were not answered and many of the quizzes were not complete."
>
> "There is HUGE challenge in devising the format of the Final Exam. Students feel strongly that they do not TRUST that their peers will not cheat in a take-home final. In response to the student concerns, I personally must have spent at least 40 hours to design the randomized exam questions, to figure out the quirks of the Quercus quiz tool, to monitor technology issues during the final assessment. This has been a HIGHLY STRESSFUL experience both for students and for the instructor and for the TAs."
>
> "Quercus Quiz tool has many quirks... Lack of centralized documentation made it very frustrating to use…the Quiz has availability time, it has a due date/time, and it has Time Limit -- all can be set independently. Nowhere in the documentation does it explain what happens if the time limit expires before the due time, or if the available time window closes before the time limit… Final Exam is where we cannot tolerate any hiccups for a large class of 180 students. The overall experience of using Quercus Quiz for final assessment has been frustrating and stressful."

Further, requests for better integration and support of iPads with UofT tools were common, as was technology that enabled handwritten notes or drawings to be effectively displayed online. Funding for these tools was an issue for some participants. The wide variety of tools used by instructors, while providing flexibility, has significant implications for support resources, standards and procedures, expectations of students and replicating successful techniques from one course to another.

Challenges and Supports

Key Finding 3: Instructors experienced a number of challenges related to online teaching, particularly around online assessment and student engagement; these issues seem to be exacerbated in courses with design components and larger classes.

The quantitative data showed that the top three challenges were: designing final assessment, monitoring student understanding, and maintaining interactions with students, for which over half of the respondents rated "quite a bit challenge" or "a huge challenge" (Table 4). In addition, other common challenges related to the short notice about the transition, large classes, increased workload, competing life responsibilities, and student teamwork, whereas managing technology access (for instructors themselves and students) and organizing student presentations were among the least challenging issues.

Table 4. Perceptions of challenges experienced

Experiences	n*	Not a challenge	Some challenge	Quite a bit challenge	A huge challenge
Designing and building an online exam/final assignment	137	14%	30%	22%	34%
Monitoring student understanding while teaching	158	12%	31%	24%	33%
Maintaining interpersonal interactions with students	159	10%	29%	33%	28%
Not having enough time to plan for the change	154	27%	32%	18%	23%
Dealing with issues related to managing a large class in online	98	32%	28%	19%	21%
Managing increased workload	154	15%	38%	25%	21%
Managing competing responsibilities (e.g., childcare and eldercare)	128	36%	25%	20%	19%
Facilitating student teamwork (including team projects)	88	25%	36%	21%	18%
Not sure where to get definitive guidance on best practices	152	32%	34%	18%	16%
Responding to heightened socio-emotional tensions	147	29%	45%	16%	10%
Dealing with issues related to collaborating with a large teaching team	72	49%	32%	11%	8%
Managing technology access issues for students (e.g., internet access and time zone differences)	157	43%	40%	11%	7%
Tackling technical difficulties when using learning management systems	134	37%	43%	14%	7%
Organizing online student presentations	77	38%	46%	12%	5%
Managing a technology access issues for myself and teaching team (e.g., internet access and access to devices across teaching team)	160	54%	33%	9%	5%

*The n values do not include those indicating "not applicable."
The data are arranged in the descending order of the percentages for "A huge challenge."

Written responses revealed challenges in four areas: (a) final assessment; (d) student engagement, which was more challenging for large classes; (b) design components of engineering courses; and (d) increased workload.

Respondents reported multiple concerns about final assessment. Many participants expressed concerns about creating online assessments that accurately measured students' performance, were fair and ensured academic integrity. A sizeable minority of the respondents who had already implemented online assessments prior to the survey reported mixed results. While some instructors had very positive assessment experiences, especially with students recording video presentations, some instructors had discovered a number of students cheating on mid-terms or tests. The majority of respondents anticipated significant challenges in ensuring that academic integrity was maintained in final exams, and noted that students shared their concerns. A number of instructors reported that students had indicated that they believed that some of their peers may cheat, and that honesty would, in effect, be penalized in online exams.

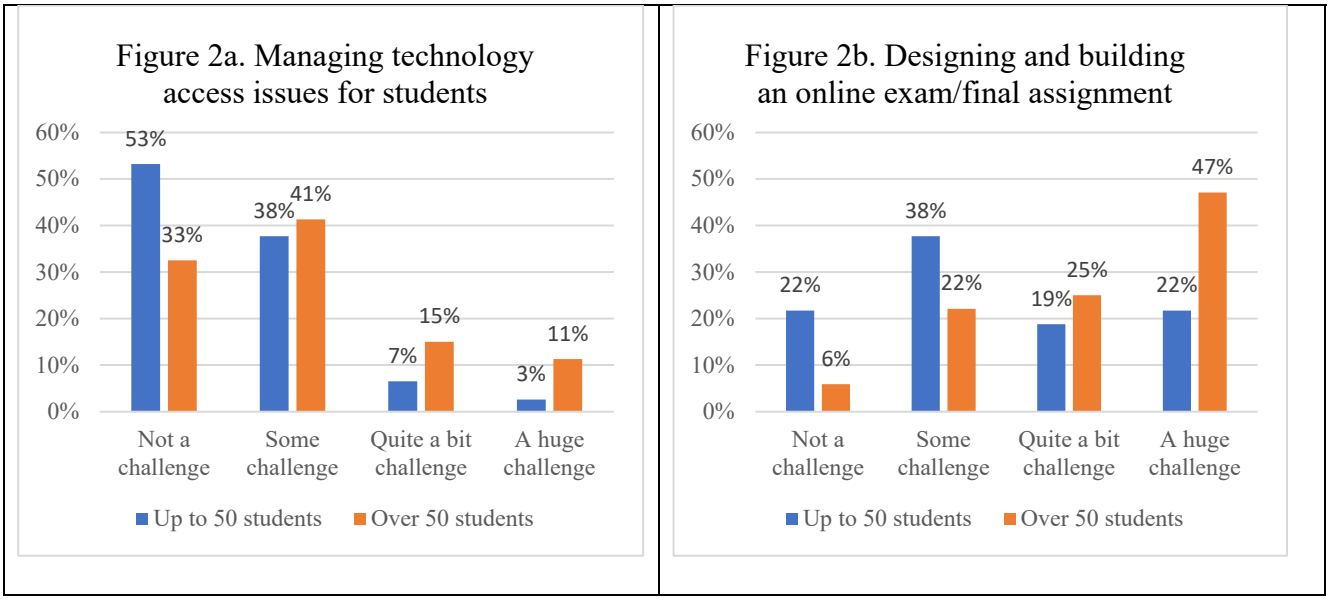
The majority of respondents reported challenges in maintaining the same levels of engagement in an online environment compared to traditional classrooms. Some instructors did report an improvement in student engagement after changes in instructional approaches or introduction of new tools and assignments. However, many instructors noted that students would not turn on their videos for online lectures, thus significantly decreasing interaction. Only two respondents noted that they had explicitly requested students to have their cameras on after they observed low interaction. Some instructors noted improved engagement with shyer students who appeared to be more comfortable with asking questions through chat than they would have in person. A number of respondents noted that as the switch to online occurred after courses had been in session for a couple of months, these online classes leveraged rapport that had already been established with students within in-person classrooms, but to build such rapport from scratch in September with new students, in a purely online environment, would be far more challenging.

Engagement appeared to be less challenging for small classes. Larger class sizes complicated the transition. The following quotes illustrate the challenges in student engagement, particularly in larger classes.

> "I think one of the most difficult aspects was lack of feedback from students...it was very hard to see if they felt they were getting it or what their thoughts were. Especially difficult for large classes."
>
> "Team teaching (read: team lecturing) a class that is bigger than Bb Collaborate is with students spread across at least 12 different countries (some with limited technology access due to location) was a challenge and required us to develop new mechanisms for teaching and COMPLETELY overhaul our lecturing approaches."
>
> "Lack of student interaction and feedback are a big problem. I do not know how many of the 170 students actually watched the lecture videos. In my online discussion sessions, only about 10-20 students would show up… Students report lack of motivation to keep up with the course when all the materials are online. I have personally invested probably twice as much time as I would in normal teaching, but I have no reliable way to assess whether these investments have paid off. "

Quantitative data also revealed that instructors who taught classes up to 50 students ($M = 4.86$, $SD = 1.54$) reported more positive experience than those who taught classes with over 50 students ($M =$

4.23, SD = 1.84), t(156) = 2.34, p < .01, Cohen's d = .37). Instructors teaching larger classes (those with more than 50 students) had more challenges in managing technology access issues (U = 2242, p < .01) and designing / building an online exam or final assignment (U = 1467, p < .001) (Figure 2).



The qualitative data contained multiple references to the fact that courses with design components were much more difficult to transition than others, as the following quotes illustrate:

> "Drawing sketches to explain design options on a screen, using a mouse, is impossible; a tablet with specific software might have been more appropriate to use. It is nearly impossible to get ALL students to participate in the solution of design related issues."
>
> "You cannot build or validate a design in the world of physical distancing and self-isolation."
>
> "Not every single course can go online. My students can not build [removed] online (in a team, too). And our learning objectives include hands-on and team components."
>
> "Design courses could have different nature from 'design-based core technical course', which was not considered by the survey. The fact that this survey did not even consider that a possibility further strengthened my experience of 'the faculty did not care about how to move design course online or if it was even possible' when the transition to online teaching first started."

Increased workload was a recurring concern in written comments. Most participants reported significant effort was required to move their content online, especially given the short notice period. Many also pointed out that additional ongoing efforts were required to fine-tune content, to maximize student engagement, address problems with technology from both instructor and student perspectives, and to design and implement online assessments. A number of respondents were managing this transition while also providing care for their children at home, which in effect meant that they needed to accomplish more work in less time. Some instructors found the move to online teaching resulted in increased isolation which added to the stress of the transition. In addition, transition activities exacerbated workload stress for courses that had been under-staffed prior to the transition.

Key Finding 4: The Education Technology Office and colleagues within the same department played an important role in supporting instructors.

Four-fifths of the respondents indicated that they had used more than three of the seven sources of support that were asked about in the survey. Of those who used a support, 40-70% rated it "helpful" or "very helpful" (Table 5). Among the seven sources of support, individual support and resources provided by the Education Technology Office, and discussion and support from colleagues at the departmental level were more helpful than guidance from the University or the Faculty and external resources.

Table 5: Ratings of Sources of Support

Sources of Support	Did not use (% of 161)	Valid n*	Not helpful	Somewhat helpful	Helpful	Very helpful	Helpful or Very helpful
Individual support from the Education Technology personnel	47%	83	8%	22%	24%	46%	70%
Discussion and meetings within your department	22%	123	7%	39%	33%	22%	55%
Teaching resources from colleagues	33%	105	5%	40%	37%	18%	55%
Resources created by the Education Technology Office	31%	110	7%	40%	36%	17%	53%
Emotional support from peers making a similar transition	43%	89	7%	47%	30%	16%	46%
Guidance sent by FASE and/or U of T	13%	139	7%	50%	33%	10%	43%
External teaching resources through online search	52%	76	9%	51%	32%	8%	40%

*The n values do not include those indicating "Did not use."
The data are arranged in the descending order of the percentage for "Very helpful."

In qualitative data, many individuals cited support from the IT team, engineering administration, their departments, peers and students as being instrumental in their successful transition. Some respondents noted they also utilized tools provided by vendors or educational and professional organizations outside of UofT. A sample of the comments supplied by respondents on the subject of support is provided below.

> "EdTech was fantastic. Our IT team in the dept was fantastic too. [Name] deserves a medal."

> "Online discussion boards within ECE."

> "Talking to colleagues, also outside of FASE and outside UofT about best practices and experiences."

> "We had students beta-test different technologies, making sure the adaptations were accessible and workable. We had them propose different mechanisms for meeting course learning objectives and we spoke with them about their limitations to understand what were appropriate asks."

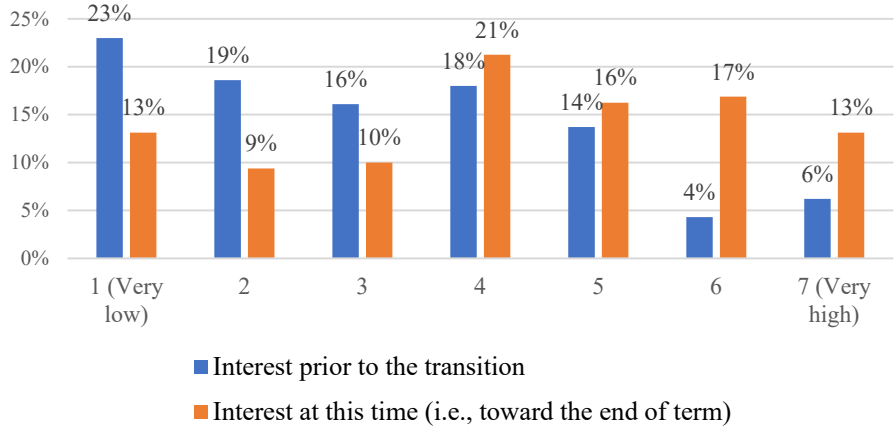
Regarding support from the Faculty, the consensus was that communication had been helpful and plentiful, but many found at least some of the content was duplicated or contradictory. Many respondents noted that communication concerning the format of the final assessment contained contradictory messaging which added to the work and stress involved in creating final assessments.

Interest in Online Teaching

Key Finding 5: Associated with the swift transition to online teaching was increased interest among instructors in online teaching and adding online elements to existing courses; however, instructors showed less interest in teaching entirely online courses.

Respondents' reported interest in teaching online toward the end of the term (M = 4.21, SD = 1.91) increased significantly when compared with the interest prior to the transition (M = 3.18, SD = 1.79), $t(159) = 6.84$, $p < .001$, Cohen's d = .56 (also shown in Figure 3).

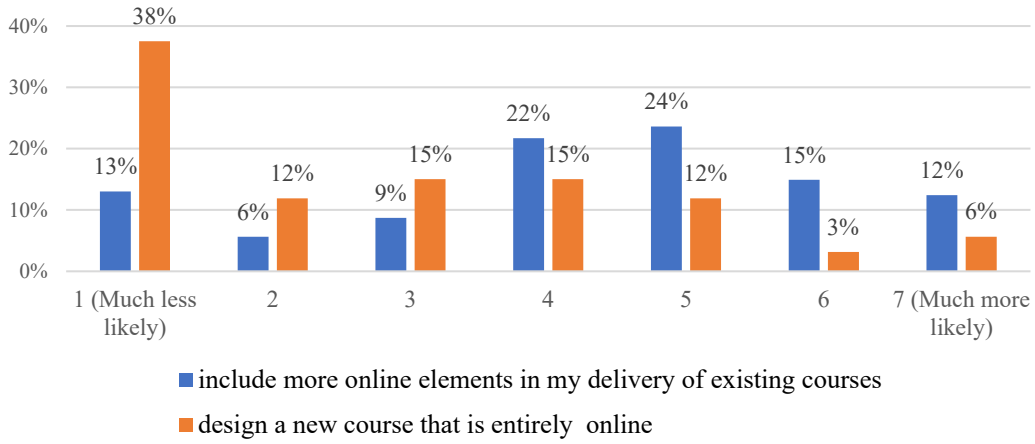
Figure 3. Changes in interest in teaching online



Respondents were significantly more likely to add online elements to the delivery of existing courses (M = 4.3, SD = 1.83) than to design a new entirely online course (M = 2.84, SD = 1.85), $t(159) = 10.12$, $p < .001$, Cohen's d = .80 (also shown in Figure 4).

Written comments echoed results within the quantitative data. Over a third of respondents reported that the transition had merely reinforced their previous positive or negative attitudes to online teaching. While the majority of the respondents stated that the transition had positively impacted their attitude to online teaching, they favored a blend of in-person and online, with 50% planning to include an online component in their courses going forward. Interestingly, only 20% of the respondents who provided comments would contemplate designing a fully online course. Many instructors believed that a purely online environment, while necessary to deal with an emergency, was not the best teaching environment for students and that courses with a high "hands-on" component were difficult to translate to a virtual teaching experience.

Figure 4. Perceptions of the influence of the transition to future teaching practices



Differences among Instructor Groups

Key Finding 6: The data showed few significant differences between the experiences and perceptions of female instructors, teaching-stream and sessional instructors, and junior instructors and those of other instructor groups within the Faculty; in areas with a significant difference, these instructor groups perceived less challenge.

Comparisons were made in quantitative data among instructor groups by gender, type of appointment and seniority.[1] Overall, no statistical significance was found in most of the survey questions. Significant differences in perceived challenges are reported below.

Gender difference

- Male instructors were more likely to report that maintaining interpersonal interactions with students was a challenge.

Differences by type of appointment

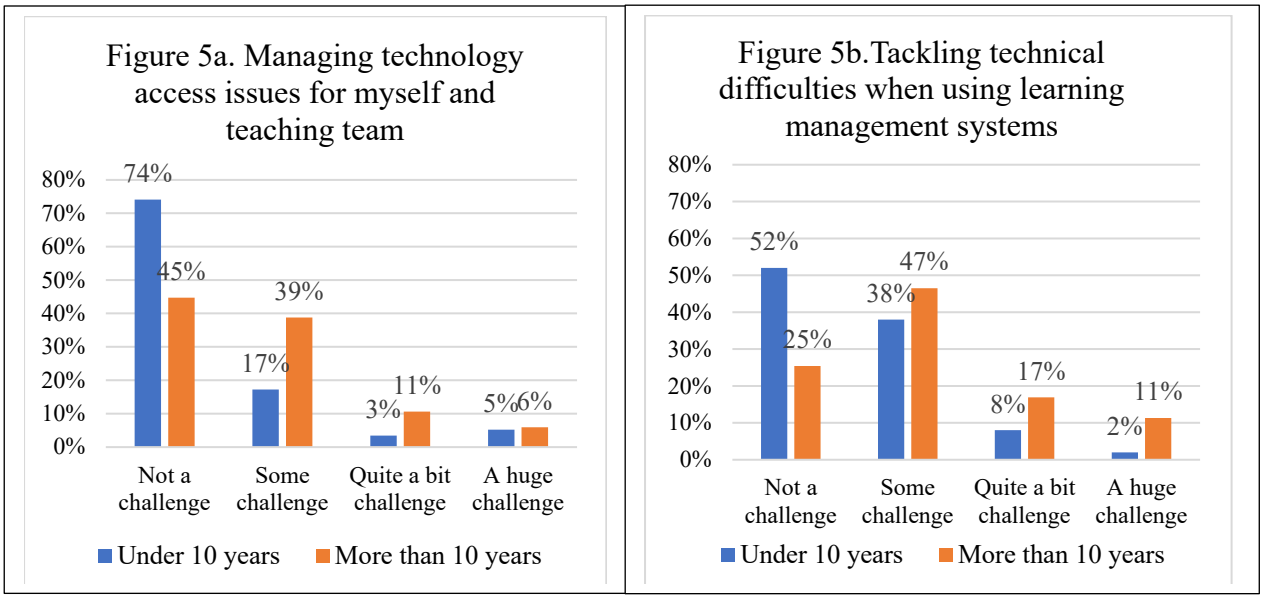
- Monitoring student understanding while teaching was more of a challenge for tenure-track instructors than teaching-stream and sessionals.
- Sessional instructors perceived less challenge in ten of the 15 areas being asked in the survey.

However, sessionals reported that communication to them lagged behind that to other instructors; this reduced the ability of sessional instructors to respond quickly and/or provide students with direction.

[1] Mann-Whitney U and chi-square tests were used to inspect group differences. Independent t-test was also applied to the five question items using seven-point Likert scales.

Differences by seniority

- Those instructors with longer teaching experiences perceived more challenges in managing technology-related issues than those with shorter teaching experiences (Figure 5).



Suggestions from Instructors

Written responses included a number of suggestions from instructors. These suggestions can be grouped in the following three areas.

Assessment

- Provide virtual proctoring tools or services
- Publishing clear guidelines and policies for instructors and students
- Provide templates for common exam formats
- Investigate and publish best practices from other institutions

Course delivery:

- Share best practices from successful online lectures with examples from other institutions
- Provide training and how-to videos on online teaching tools, particularly how to present online courses in real time and how to edit videos
- Publish guides/templates on how to plan online course and create content
- Subsidize costs for TAs and sessional instructors for using online instructional tools

Communication

- Create one site for all online teaching support resources and communications so that the most current status and instructions are readily available and to reduce “noise” in recipients’ mail in-boxes
- Publish recommended minimum hardware and internet specifications for students, TAs and instructors to minimize issues and simplify support

Appendix: Data Collection and the Characteristics of the Respondents

All FASE faculty members and sessional instructors (N = 431) were invited to participate in the *FASE Instructor Survey on Recent Transition to Online Teaching* from April 13-27, 2020. A total of 161 individuals responded to the survey, with an overall response rate of 37%.

Characteristics of the Respondents

Two thirds of the respondents taught one course during the Winter Term (January to April, 2020) and two thirds of these instructors reported that they were the only instructor of the course. The number of students that respondents taught ranged from 3 to 960 students while those who taught ≤ 50 students constituted 49% (79 respondents).

The majority of the respondents (71%) taught undergraduate courses, 16% taught graduate-level courses, and 12% taught classes blended with undergraduate and graduate students. Fifty-eight percentage of the respondents taught core technical courses, 31% taught technical elective courses, and 8% taught Humanities and Social Sciences. Four respondents indicated that they taught Design, Communication and Teamwork courses.

Ninety percent of the respondents answered demographics questions. Among these respondents, 76% are male and 22% are female. Four fifths had never taught in an entirely online environment prior to the transition. It seems that almost all teaching-stream faculty members responded to the survey, constituting 18% (Figure a). Within the respondents, there appeared to be a good mix of junior and seasoned instructors: those who had less than five years of teaching experiences and those with more than 20 years of teaching experiences both constituted 26-7%; and those with 6-10 years and 16-20 years of teaching experiences accounted for 13-4% while those with 11-15 years of teaching experiences were 19% (Figure b).

Figure a: Respondents by appointment

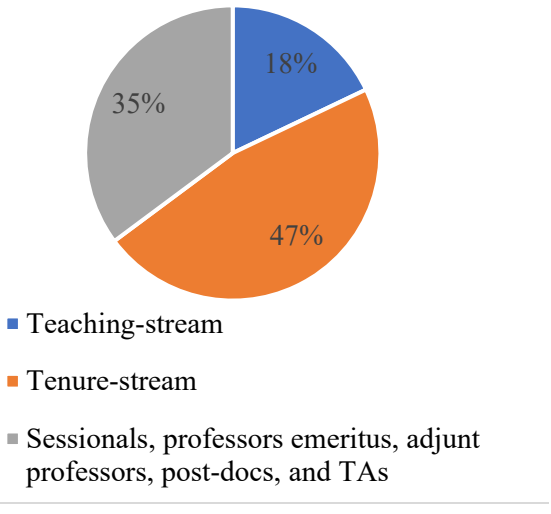


Figure b: Respondents by number of teaching experiences at the postsecondary level