

Building Resiliency: How Preparing Teachers in an AEP for Emergency Remote Teaching Fostered Confidence in the Use of Modalities Ranging from Fully Online to HyFlex, and F2F Supported by an LMS

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Introduction

This paper gives an account of the process of preparing instructors in an academic English program (AEP) (Dias & Kikuchi, 2010; Dias, Strong & Reimann 2019), which serves 500 Japanese university freshmen and sophomores, for their first ever experience teaching classes entirely online from May 2020 due to the pandemic. Teacher and student experiences were assessed through surveys given after the first semester of online teaching and midway through the following turbulent year that alternated between F2F, hybrid/hyflex, and entirely online instruction. Weekly online teachers' meetings (through Zoom) provided additional insights into how faculty members and their students were coping with the changes. One of the first things that was required after it was determined that classes would have to be delivered online was which digital tools would be provided and how teachers would be prepared, in less than a month, for teaching in a radically different way than most faculty members were used to. Although some teachers in the program had been using limited features of an in-house LMS (learner management system), Fujitsu's CoursePower (CoursePower, 2021), and/or other LMSs on an individual basis, the vast majority of them had never touched an LMS before and were even unfamiliar with what the acronym stood for.

Before the pandemic and commencement of emergency remote teaching (Ferri, Grifoni & Guzzo, 2020; Hodges, Moore & Lockee, et al., 2020) the relationship between teachers and their LMS, if they used one at all, was akin to the

relationship between people and their dentists. Even if there were some flaws with them, they would be loyal due to familiarity or inertia. When the pandemic struck, they found that despite having happily (or, at least, uneventfully) used an LMS for years, their institutions might have constrained them to use a particular LMS that was formerly something they could safely ignore. Teachers who never used an LMS may have had a far from user-friendly, or pedagogically sound, LMS thrust upon them. Those who had been supplementing their F2F classes with work on LMSs of their choice, may have felt compelled to abandon that LMS and adopt an unfamiliar one, perhaps with a problematic interface that was unsuited to their teaching style and a design contrary to their teaching philosophy. Program coordinators of the IEP described here were obligated to ensure that adjunct lecturers could use the university's official LMS as that would be the only way for them to make initial contact with students. At minimum, they needed to be able to upload their syllabus and basic course materials, know how to message students to arrange the synchronously taught classes (on Zoom), and how reports could be submitted online and assessed.

Although program coordinators felt compelled by the department and university to insist that adjunct faculty use the sanctioned LMS for the sake of accountability, it soon became apparent that, as the adjuncts had too many LMSs to cope with, it would be necessary to tolerate and, to some extent, support the use of a variety of LMSs that the teachers felt more confident and competent in using. The fear that students would be overwhelmed by having to learn how to use multiple LMSs turned out to be unwarranted. We do not believe that a poly-LMS environment is desirable as a permanent solution. However, allowing the use of LMSs that teachers felt comfortable with may have been a necessary bridge toward the official adoption (through pressure and persuasion) of an LMS that can meet the diverse needs of teachers and students and build upon what they already know about how these systems function.

Background of LMSs

Description and brief history

The landscape for LMSs has shifted dramatically since the mainly text-

based systems that emerged in the 1990s such as Nicenet (Seabrooks, Kenney, & Lamontagne, 2000), and the initial version of Moodle released in 2002. As of 2017, the top four LMSs in terms of market share and enrollments were Blackboard Learn, Instructure Canvas, D2L Brightspace, and Moodle (Hill, 2017; Salisbury, 2018).

As a free open-source LMS distributed under the GNU General Public License, Moodle is sometimes used by individual teachers for their courses or for projects such as Eric Hagley's IVEProject (2020), as opposed to adoption at the institutional level in the case of the three other LMSs listed above. With its community-sourced plugins used to enhance its core functionalities, it has a devoted and passionate following.

Although, for the most part, designed for primary and secondary education, LMSs such as Edmodo [defunct as of Sept. 2022] and Schoology (Shuhidan & Lokman, 2020) have been adopted by some university educators due to their ease of use, cost, and integration with Google Drive. Google Classroom (Heggart & Yoo, 2018) provides a space where Google Docs, Google Sheets, and Google Slides can be shared in assignments or presentations and submitted work can be graded according to teacher-created rubrics.

In 2020, Google Meet (an app for video conferencing) became better integrated in Google Classroom so that teachers could create unique Meet links within their classes. Microsoft Teams (Yen & Nhi, 2021)—originally designed for business environments—gained an expanded user base among university educators and students during the COVID-19 pandemic. Like Google Classroom, it also features an integrated video conferencing tool.

Common Features. From the days of the early LMSs until now, there are certain features and affordances that they have in common which are key considerations during the selection process (modified from Poulova, Simonova, Manenova, 2015):

- * Tools intended for generating or displaying content
- * Organizational tools, including schedules or templates for syllabi

- * Communication tools (such as forums or chat)
- * Facilities for collecting and evaluating learners' work
- * Collaborative tools that allow learners to work together to complete tasks

Apart from those basic features that all modern LMSs are expected to offer, are the key considerations of price and steepness of learning curve for both students and instructors. However, as noted above, the choice of LMS is frequently taken out of the hands of those who have the most intimate familiarity with the courses being taught and the students who will be using them. Although this was the case even before the pandemic, the health crisis made this state of affairs more prominent.

Role of IT and LMSs in the Integrated English Program (IEP)

Although some of the courses in the program, particularly Active Listening and Academic Skills, have taken place in computer classrooms which are managed by the university's Foreign Language Laboratory, classes in the program have been, until recently, entirely face-to-face, with some featuring supplemental online assignments or tasks. When students used language learning apps that came to be required for extensive reading and listening in our (4-skills) "Core" and Active Listening courses, respectively, it was mainly outside-of-class and not monitored by the teacher in real time. Some teachers made use of vocabulary learning apps such as Quizlet (Quizlet, 2021), game-like quiz programs, such as Kahoot! (Kahoot!, 2021), or blogging sites (e.g. Google's blogger.com [Blogger.com, 2021c]) for journal exchange.

Few teachers in the program were using learner management systems (LMSs). However, a few used a limited set of features from our in-house LMS, CoursePower, their own Moodle, or one of the LMSs that can easily be set up and used by instructors individually, such as Edmodo (Edmodo, 2021—discontinued after more than a decade of operation) or Schoology (Schoology, 2021). Those instructors who, because of the classes they had been teaching, either had to use the computer labs for their courses or who introduced apps, websites, and LMSs on their own volition, were in a somewhat better position to make the

transition to online teaching. However, using online tools to support pedagogy in what were otherwise face-to-face classes, was quite a far cry from relying entirely on online means for the delivery of content, interacting week-to-week in real-time virtual lessons, and having to evaluate students who might have technological access issues and gaps in their IT skills themselves.

To help with these challenges, program coordinators offered a series of tutorials (through Zoom) and a weekly virtual teacher's room to troubleshoot, support and collaborate in solving problems that came up with the use of LMSs or other online tools. There are approximately 45 teachers in this program and class size ranged between 20-30 students. Most of the teachers are adjuncts who teach at several institutions, each with different policies, programs, and LMSs. This made the endeavor of online teaching much more onerous and motivated our efforts to conduct these inquiries into the teachers' experiences and needs, so that they could be better supported. By understanding teachers' successes, failures, challenges, and preferences we can raise awareness of online teaching issues and develop strategies, support networks, and resources.

Preparing teachers for emergency remote teaching

The university decided in the last week of March that classes would be online for the entirety of 2020, however, by the middle of March, it had already looked as though a move to online teaching would be likely. So, a message was sent out by the program coordinators to adjunct instructors in the program in order to prepare them mentally and practically for that eventuality (Fig. 1).

When teachers in the program were asked how confident they felt about their ability to conduct classes through an online mode, should that become necessary, there was a much larger percentage of them than we anticipated who reported to be very confident (26.1%), confident (17.4%), or a bit confident (37%) in their ability to deal effectively with an online teaching scenario (see Fig. 2). This made it possible for us to set up mentoring relationships between those who felt prepared to engage in online teaching and the teachers who found the prospect daunting.

In order to prepare for the move to an online pedagogy, teachers were

Message sent out to IEP teachers on March 16, 2020 through IEP Google Group

We hope this message finds you safe and well. Most of you work at other schools and universities and may have already been notified about delays in the commencement of the academic year. It seems that a number of other universities have announced delays in the start of their academic year. Regarding the situation at AGU, this is what we can tell you at this point. Due to COVID-19 precautions...

- **AGU has not yet decided to postpone the start of the academic year**, but that decision will probably be made early in the coming week when Japanese private universities will flesh out their emergency policy after consulting with Monka-shou (the Ministry of Education). As soon as we hear the news about it, the information will be conveyed to you.
- The testing that we usually use to divide IE students into the three levels has been cancelled. **Instead of the usual TOEFL ITP paper test, we will have students take the TOEIC IP online on March 28th for placement purposes.**
- At this time, we don't know if it will be necessary, but we have been asked to **begin thinking about how our courses can be moved online should face-to-face (F2F) classes be delayed** for an extended period, or if emergency measures require a suspension of F2F classes sometime after the semester begins. We need to start putting various contingency plans into place. Toward those ends, a committee was formed called the "Information Strategy Promotion Unit," which is now gathering opinions and ideas for how to cope with possible disruptions we may experience in the next semester by taking into consideration as many options as possible.
- In the IE Program, we already use some online resources, such as EnglishCentral and Xreading. We may need to think about how to leverage other online tools, ones offered by the university (such as CoursePower) and outside resources, such as Google Drive, Quizlet, Schoology, and even teleconferencing apps like Google Hangouts or Zoom.
- We would like to ask you to fill out a Google Form to assess how prepared you feel you are to move your classes online should face-to-face teaching be impossible. Rest assured, you will be supported through this process.

Fig. 1: Message to teachers in the program to help them anticipate the move to online teaching.

informed that classes would not start until April 21, 2020, two weeks after classes were originally scheduled to begin. Anticipating the move to online teaching, the program coordinators had already instructed teachers to review the manual for the in-house LMS that we would likely be required to use, Course-

If you were asked to teach your classes remotely (online), how confident do you feel that you would be able to do it (note that you would not be unsupported during this process)?

46 responses

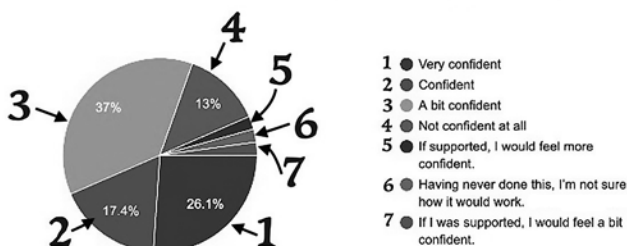


Fig. 2: Self-assessment by 46 teachers in the program of their readiness for online teaching.

Power (at least for making initial contact with students and deliver instructions about how the course would be conducted), and we cooperated with other full-time instructors to assess whether the real-time communication tool selected for use by the university, WebEx (Cisco, 2021), would pass muster for use in language courses or whether an alternative, such as Zoom (Zoom, 2021), would be better suited for the pair/ group work and the intense interactions expected in language classes.

We also petitioned the university to adopt a more modern and user-friendly LMS such as Google Classroom (Google, 2021a) or Microsoft Teams (Microsoft, 2021). In the end, we were told that we had no choice but to use CoursePower for the sake of accountability, since the university could monitor when (and how much) students interacted with the content on that LMS. We were also informed that, although the university had officially adopted WebEx, we could feel free to use Zoom, but without the university's financial or technical support. As the implementation of Breakout Rooms was relatively underdeveloped in WebEx at that time, the program coordinators decided that teachers would be better off using Zoom for the synchronous elements of their courses, despite the lack of support for it.

Pre-(online)service sessions for IEP teachers. The coordinators were apprehensive about how the academic year would unfold as they tried to comfort and prepare anxious and highly stressed teachers who were entering unfamiliar waters in vessels they were not sure how to maneuver, where they

would most likely be encountering (at first, at least) student “sailors” whose levels of anxiety might surpass all of ours combined. They were particularly worried about the freshmen because they did not even know what a face-to-face university education and life should look like, let alone the virtual versions of them. The coordinators sought to be bridges (and build bridges) between...

- the admin’s expectations and the reality of what teachers/ students were able to accomplish
- teachers and the tools they would need to master.
- the tech savvy and less tech savvy teachers.
- the F2F-oriented course content and online-friendly delivery of it.

FOR CORE	Synchronous (ZOOM)	Asynchronous (CoursePower or alternative)
Media Discussions (Group leaders conduct guided discussions on topics of their choice)	Use Zoom breakout rooms for the discussions themselves.	Group leaders submit reports based on their discussions through CoursePower’s “report” function.
Using Xreading (program for extensive reading practice)	Initially, through screen sharing, show students how to get around Xreading and use it effectively. Later, “book talks,” during which students discuss books they’ve been reading, can be done in breakout rooms.	Use the Xreading app or website as we normally did before remote emergency teaching.
Journal writing	Teacher first introduces the journal writing task on Zoom and might show excerpts from past journals and the sort of feedback they might give (and expect to get) from peers with whom they will be exchanging journals.	Can be done on CoursePower’s “Message Board” or through blogging software.

Fig. 3: Suggestions to teachers for how to match tasks to online mode of teaching for the Core class.

After making as much of the content for the courses in the program available online as possible (through a combination of Google Drive and the program's WordPress site), and negotiating for the temporary use of online versions of coursebooks with publishers, three sessions were arranged for teachers in the program over Zoom. In those sessions, each lasting 2 hours or longer,

FOR ACTIVE LISTENING	Synchronous (ZOOM)	Asynchronous (CoursePower or alternative)
"Interactions" activity (like the Core's "Media Discussions" except with broadcast media used to stimulate the exchange rather than print media sources).	Use Zoom breakout rooms for the "Interactions" themselves.	Group leaders submit reports based on their discussions through CoursePower's "report" function, by email, or using alternative LMSs, such as Edmodo or Schoology.
Using EnglishCentral (program for extensive listening practice)	Initially, explaining, through Zoom, how to use EnglishCentral, making it clear to students that 1) their progress will be regularly monitored and, 2) students will need to reach WEEKLY targets instead of waiting until the end of the semester to do all the work. Use screen sharing to give a tour of the site and how it functions.	Use the EnglishCentral app or Website as we normally did before emergency remote teaching.
Listening Logs (students listen to content of their choice and report weekly on what they've been listening to in a set format.)	Students might occasionally share what they've been listening to outside of class in Zoom breakout rooms and the task will initially be explained through Zoom, with example logs showcased using screen sharing.	Google Forms might be used for this purpose or CoursePower's "report" function.

Fig. 4: Suggestions to teachers for how to match tasks to online mode of teaching for the Active Listening class.

teachers were introduced to the university's LMS, CoursePower, and instructed how they could put their course content into the system, set and evaluate assignments, organize (written) discussion forums, and send messages either to individual students or to the whole class. All the key features of Zoom were also explained and demonstrated.

In the final faculty development session over Zoom, teachers took turns as the host, creating breakout rooms, sharing PPT presentations, using the whiteboard, and familiarizing themselves with the chat functions. As the first week of online classes approached, teachers became increasingly confident that they would be able to conduct reasonably effective classes, but they wanted more guidance about how precisely they could adapt each activity for the courses in our program (journal writing, media discussions, presentations, etc.) to an online format. In particular, they wished to know which elements might lend themselves to a synchronous mode of instruction, using Zoom, and which of them would work better asynchronously, through CoursePower. So, the following, non-binding, suggestions were offered to them for the 4-skills Core class (Fig. 3) and the Active Listening class (Fig. 4):

Assessing emergency remote teaching after the first semester of its implementation

In August of 2020, after the completion of the first semester of emergency remote learning, the nearly 500 students in the Integrated English Program were asked to respond to a survey— administered online through SurveyMonkey— inquiring about their experience of this new mode of learning. The completed surveys of 280 of those who responded were processed after several of them were discarded due to incompleteness (determined if less than half of the survey items were left unanswered). The perspectives of the teachers (39 in total) were also solicited through a SurveyMonkey survey that had some items which overlapped with those on the survey for students, particularly ones regarding possible physical and psychological sequelae arising from online instruction.

We were gratified by the many words of appreciation that students expressed about their teachers (Fig. 5), with many students acknowledging the

Expressions of appreciation for teachers
• I think all teachers gave full support for students so I was able to work on all tasks. • I'm getting enough support from the teachers. Teachers supported me a lot. • I appreciate the teachers who sent a survey before the first week of class about the most convenient ways for students to attend class or what challenges they might face. • I know that the teachers are working hard and supporting us. • Regarding IE teachers, I am very grateful that they always kindly responded to any questions. Thank you for your generous support. • Teachers can't help the fact that we're in different places and that often students are mighty shy.

Fig. 5: Students' words of appreciation.

efforts that instructors were making, even showing empathy for how hard the transition must have been for them.

However, students did struggle initially with the real-time element of their classes (use of Zoom) since many of them (as well as their teachers) were still in the process of upgrading their IT hardware and home Internet infrastructure. About a quarter of them experienced weak WiFi (with their Internet connections working only intermittently), or irritating lags that sometimes caused image or sound distortion. Others reported having computer hardware issues, with webcams not working, system or app updates starting when a lesson was about to begin, or the computer screen occasionally going blank suddenly.

Having a poor environment for study was also reported by some students. This included noisy construction near their homes, having to go to a public place for a more reliable Internet connection (but wanting to avoid infection), or having family members come and go in the room where they were trying to participate in online classes. Sixty percent of students needed to purchase new hardware in order to engage in online learning effectively. Students reported experiencing fewer problems later in the semester as they upgraded their IT equipment, became better at trouble shooting, stepped up their organizational skills by making files for the various Zoom/ WebEx access links and codes, and learned how to network with classmates to collectively solve problems.

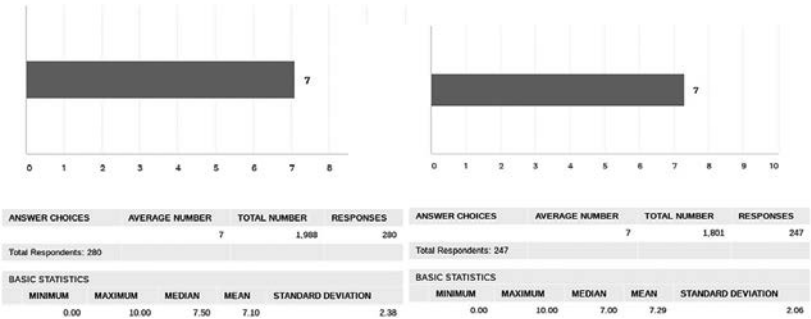


Fig. 6: Self-rated attitude toward online learning after a semester of emergency remote teaching on scale of 1-10 (on the left), and self-rated attitude toward studying and learning, in general, before the beginning of the semester (on the right).

Encouragingly, when asked to compare their attitude toward studying and learning before their experience of emergency remote teaching and after, on a 10-point scale—with 1 representing an extremely unfavorable attitude and 10 an extremely positive attitude—students’ ratings were nearly identical (Fig. 6), suggesting that the move to online learning did not significantly affect their motivation.

Student preferences and their suggestions for change. When asked to evaluate LMSs and other online systems that might have been used in their classes, students rated the university’s official LMS unfavorably compared to Google Classroom, the apps available in Google Drive, Zoom, and even YouTube and Line (see Fig. 7). It should be noted that few, if any, teachers were using Schoology, Edmodo, or Flipgrid, so low ratings for those systems should not be taken as an indication of a low assessment of them, but simply an indication that the students had no basis to rate them.

Physical and mental health consequences. In the survey, students and teachers were asked to rate on a 4-point scale—from “not severe or particularly concerning” to “extremely severe—the level of discomfort they might have been experiencing from a selection of 17 different physical and psychological (stress-induced) conditions (Figure 8).

As we can see, the conditions that were most likely to be of concern to stu-

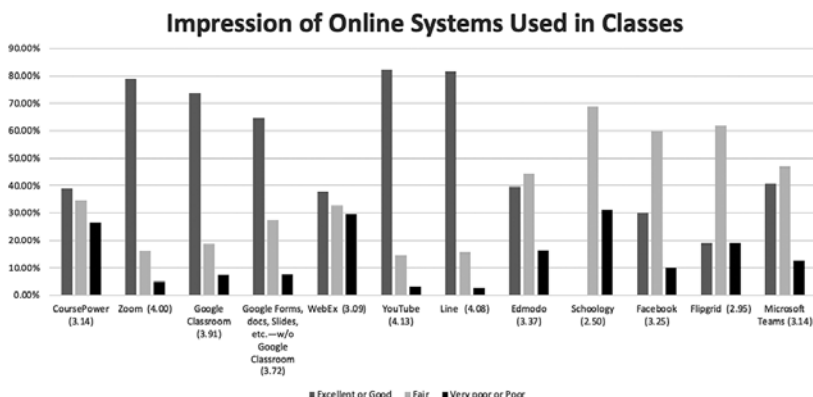


Fig. 7: This chart shows student evaluations of LMSs and other online systems that may have been used in their classes, with the bar on the left indicating evaluations of “excellent” or “good,” the middle bar representing “fair,” and the bar on the right indicating a “very poor” or “poor” evaluation.

exhaustion	2.76
sore shoulders/ neck	2.68
eye-related	2.64
stress	2.57
anxiety	2.42
powerlessness	2.26
sleep loss (too much work)	2.14
back pain	2.12
loneliness	2.08
insomnia	2.06
headaches	1.96
frustration	1.85
depression	1.84
lack of control	1.71
weight gain	1.63
anger control issues	1.54
family relations problem	1.51
weight loss	1.22

Fig. 8: This chart shows the weighted averages, on a scale of 1-4—from “not particularly concerning” to “extremely severe”—the self-reported assessments of how physical or mental health issues have affected students.

dents were, in this order, exhaustion, sore shoulders and neck, eye-related problems, stress, powerlessness, and anxiety. Insomnia and a lack of sufficient sleep due to too much work, were also cited as being issues by a number of students. For teachers, the top complaints were back pain, sore shoulders and neck, exhaustion, anxiety and weight gain. In the case of teachers, 82.35% attributed these problems to the fact that they were teaching online, while 92% of the students attributed their problems to online study.

Sources of support students and teachers seek out. It was clear that both teachers and students suffered from a variety of conditions that were, at least, exacerbated by the added stress of an unfamiliar mode of teaching/ learning and an excessive amount of time sitting in front of screens. Therefore, we wondered who, if anyone, they were turning to for assistance. Fortunately, the majority of teachers and students were reaching out for help from others. However, students were twice as likely, compared to teachers, to avoid seeking out help from anyone (12% vs. 5.88%). Teachers, perhaps because they tended to live together with their families, were much more likely to seek support from them. Students asked their classmates for help more than any other category of potential helpers (Fig. 9).

When you had trouble, did you ask your teacher, or others, for help?

Answered: 275 Skipped: 5

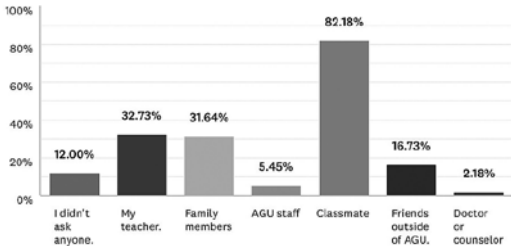


Fig. 9: Chart showing who students would be mostly likely to ask for help.

Teachers depended on colleagues and family at almost equal levels and were more likely to seek the help of medical professionals when necessary (Fig. 10).

Who, if anyone, have you been able to talk to about your problems during the course of the semester or in preparing for it?

Answered: 34 Skipped: 5

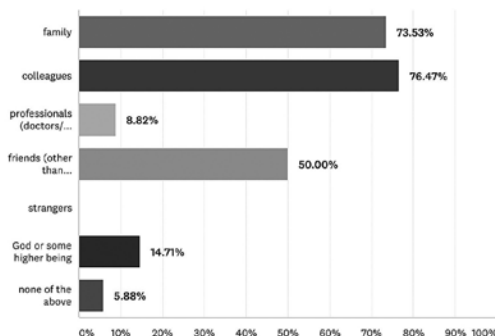


Fig. 10: Chart showing who teachers would be mostly likely to ask for help.

Constructive suggestions made by students. Through their responses to the survey, students offered many suggestions about how the online learning experience could be improved. Most of those suggestions fell into the following categories: workload-related, better communication, social connections, organizational issues, creating a better learning environment, technical improvements, and the continued role of analog modalities. Many of the comments either directly or indirectly concerned the use of LMSs in their classes.

Approximately 45 out of the 280 students felt that their workload was too heavy. From the perspective of teachers in the program, it was felt that, if anything, less was being required of students. However, since most of the classes outside of our Integrated English Program were taught in an “on demand” way, without a synchronous (Zoom or WebEx) component, teachers tended to over-compensate for the relative lack of contact with students with numerous assignments and reports on CoursePower. Therefore, even if the tasks and requirements in the classes in our program remained roughly the same, students may have perceived them as more demanding. It may also have been the case that students had less energy to complete homework assignments and class preparation due to the additional stress that learning through this new mode placed on them.

Students wanted to contact teachers more easily in order to ask questions when necessary and to notify them if they were having trouble connecting over Zoom or might need to be absent from an upcoming online class. They were open to establishing additional channels of communication with their classmates and teachers through messaging apps such as Line (Line, 2021).

Technical issues mentioned included their wish that the university's LMS, CoursePower either be improved or replaced by a system that would be easier to use, such as Google Classroom. They realized that an effective LMS should make it simple for students to manage assignments and to ask their professors questions. Some students also believed that the lagging or other technical problems experienced in Zoom or WebEx real-time lessons was frequently due to teachers having poor internet connections, so they advised teachers to improve their home internet conditions.

Some students recognized the role that traditional analog tools might still play, even in an online learning environment. One student pointed out that in her reading class she had to make a vocabulary notebook in an MS Word file, but she preferred to write words in an actual notebook because she knew that would help her remember how to spell them. For the sake of eye care, students hoped that the time they would need to spend looking at screens could be decreased. Therefore, they requested that teachers provide more course content they could listen to rather than read, including an increased use of audio books.

Conclusions

Online instruction will no doubt play an increasingly important role at all levels of education and subject areas. For it to remain viable, practical and effective, we must offer a more robust system of support for teachers. The nature of this support should entail consideration for the many different types of LMSs available, consolidating these over different institutions so as not to overburden adjunct instructors, provide greater tech and financial support for hardware and connectivity, offer instruction and tutorials to orient teachers to LMSs they are unfamiliar with, and create a support network for communicating, trouble shooting and collaborating. if these can be achieved then the

benefits and successes of online teaching may extend well beyond the pandemic.

We felt that our year of emergency remote teaching prepared us well for the subsequent (2021) academic year that began with hybrid classes (socially-distanced face-to-face teaching with online support), gradually morphing into hyflex arrangements (classes in which online participants needed to be accommodated in otherwise F2F classes), and then back to entirely online classes necessitated by the declaration of another State of Emergency before the Olympics were to take place.

Instead of being disturbed by the uncertainty about which mode of teaching they would be called upon to employ, teachers in the program adopted the appropriate mode, which the conditions allowed and the university required at any given time, with a minimum of annoyance or frustration. The adrenaline-rush fueled adjustments that teachers made in the previous year to move their classes online, and the digital arrows added to their teaching quivers (including their experiences with multiple LMSs), built up a sense of resiliency. In fact, more than 72% of the teachers after the first semester of emergency remote teaching came to have more favorable attitudes toward online instruction than they had before (Fig. 11).

"After this semester, ..."

Answered: 39 Skipped: 0

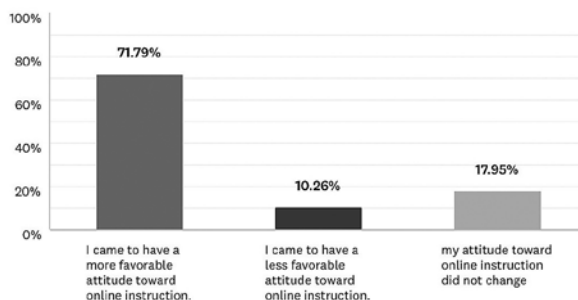


Fig. 11: Chart showing teachers attitudes towards online teaching after the first semester of emergency remote teaching (August/September 2020).

We were surprised to find that the majority of teachers expressed a preference for teaching either through an online or a hybrid mode that combined online and face-to-face elements, once the COVID-19 crisis was behind us (Fig. 12).

In the future (after we get through the COVID-19 crisis), if you were able to choose, which of the following would you prefer?

Answered: 36 Skipped: 3

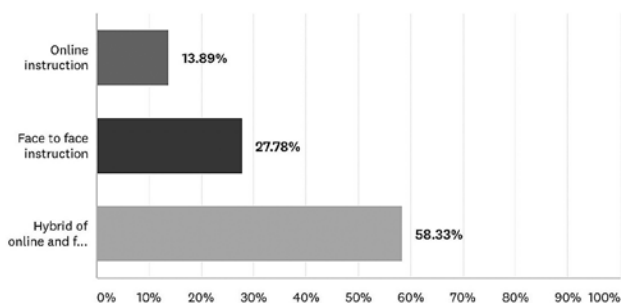


Fig. 12: Teachers' choices of preferred mode of instruction once the COVID-19 crisis has ended.

Nearly 60% of teachers opted for a hybrid mode of teaching, while almost 14% thought that online instruction has sufficient advantages over conventional face-to-face, in-class instruction that they would feel comfortable continuing on with it even after the pandemic ended. This makes us confident that we have the capacity to cope with future crises as long as they do not involve long-term power outages or disruptions of the Internet. With the prospect of cyber warfare potentially affecting not only the government or energy infrastructures, it may be prudent to begin building resilience to a pandemic of the digital variety and re-orient to what we might do should we not be able to rely on technology to carry out our teaching duties. For many of us, that prospect may be even more frightening than the biological threat posed by the COVID-19 crisis.

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