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Saving a Semester of Learning: MIT's Emergency Transition to Online Instruction

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Abstract

Prior to March 4th, 2020 only a handful of MIT courses had ever been delivered exclusively online. Over a 25-day period (March 4th - March 30th) approximately 1,250 spring term courses transitioned to being remote online offerings in response to the COVID-19 pandemic. Throughout that time five groups on MIT's campus were primarily responsible for supporting the transition of residential courses to remote online delivery. The Office of Open Learning (OL), the Office of the Vice Chancellor (OVC), including in particular the Teaching + Learning Lab (TLL), Information Systems and Technology (IS&T) and Sloan Technology Services (STS) have long played crucial, yet somewhat siloed, roles within MIT. Together these groups were able to engage in new communication processes and collaborations, initially established by the university's Academic Continuity working group, in order to address three key goals – 1) support all faculty and instructors in transforming residential courses to remote online instruction, 2) support all students in transitioning to remote online learning, and 3) support teaching assistants as they transitioned to online instruction. In this paper we describe the organizational structure (both distributed and centralized) that allowed for such collaborations. Critical decisions made by the group are described and connected with the key goals they addressed. Lastly, examples of specific tools and supports that were implemented during the transition period are highlighted. While we recognize that certain factors existed to allow MIT to make such a massive instructional transition (e.g. scaled lecture capture capabilities, members of the digital learning lab embedded within a number of departments, and an extensive library of previously created open and free online resources), the overarching process and decisions presented within are likely to resonate across institutions. The potential impact of these changes and future community opportunities are also discussed.

Saving a Semester of Learning: MIT's Emergency Transition to Online Instruction

1. Introduction

On March 4th, 2020 a group of faculty, administrators, and staff from across MIT's campus gathered to begin discussing how best to maintain academic continuity in response to the spreading COVID-19 health emergency. As it turned out, March 12 was the last day of on-campus teaching and by March, 30th MIT's campus was shut down, including most research facilities, and all of the spring semester courses at MIT had transitioned to an emergency remote structure. This transition required an enormous effort across multiple units within MIT. These units were brought together under the umbrella of the COVID-19 Planning Team, which was coordinated by Suzanne Blake (Director of MIT Emergency Management). Within this broad response team were 6 working groups tasked with achieving various goals. One of these working groups was focused on Academic Continuity and was led by Ian Waitz, MIT's Vice-Chancellor for Undergraduate and Graduate Education.

The Academic Continuity working group was specifically tasked with "determining plans and procedures needed to ensure academic continuity...and determine alternate ways to provide classes in a worst-case scenario situation". Teams rapidly formed within this group, with Dean for Digital Learning Krishna Rajagopal charged with leading the team focused on supporting remote teaching and learning, a team made up of MIT's Vice President for Information Systems and Technology (IS&T) and the Directors of: the Digital Learning in Residential Education group from the Office of Open Learning (OL), the Teaching + Learning Lab (TLL), and Sloan Technology Services (STS). This subgroup's role came to be described as "supporting and advising faculty and instructors as well as departments -- vis a vis IT, pedagogy, and everything in between -- as they

teach 1251 classes remotely this semester. This [core] team engages with a distributed cast of hundreds doing this work within their departments.”

This charge was predicated on central features of the culture of MIT and the institute’s approach to instruction and learning. The modes, and culture, of teaching differ considerably in different departments and schools. Within each department there is a strong sense that it is the individual faculty member who shapes the curriculum and pedagogy of the course that they teach. No approach in which any central entity had given faculty and instructors templates for how to teach remotely would have worked. Instead the approach for supporting the transition to emergency remote instruction needed to include two key components; 1) The procurement and deployment of technological tools for remote teaching and 2) A non-technical communication strategy that empowered individual educators (faculty and instructors) and departments to make their own plans. This included communicating our trust in their abilities as educators, their creativity, and their resilience during a crisis to support the learners in their classes. The subgroup communicated this belief and trust from the first briefing given by Krishna Rajagopal to all department heads on March 11 with a simple question and message: “What is YOUR plan?...You need to formulate a plan that starts from your learning goals; we will then support you.”

Although a great deal of autonomy exists in how departments and individual instructors approach their pedagogical work, most members of the subgroup shared a similar set of philosophical beliefs and background in teaching and learning. This allowed the subgroup to collaboratively coordinate and deploy two new websites focused on providing resources to faculty and students (teachremote.mit.edu & learnremote.mit.edu), procure and deploy five tools (Zoom, Slack, Piazza, Gradescope, an upgrade to Dropbox, and ProctorTrack), provide nine virtual webinars, launch a student success team of 550 coaches who are now coaching more than 5,000

students, and coordinate responses to faculty and instructor requests and questions. In the sections that follow we describe the general remote instructional approach that grounded much of the subgroup's work, the key decisions that supported faculty and students as they transitioned to remote instruction and learning, and how those decisions were actualized and communicated in support of department and faculty needs.

2. Theoretical Frameworks

2.1 Instructional Approaches

Like many universities, MIT has been focused on continually improving its on campus (internally referred to as residential education) offerings and instructional approaches. Building on research from cognitive psychology, the learning sciences, and disciplinary based education research; the groups and people responsible for supporting the teaching portion of the institute's mission have encouraged the use of frameworks (Van Merriënboer et al. 2002; Sweller, van Merriënboer, Paas 2019) and instructional practices (Henningsen and Stein 1997; Cartier et al. 2013) grounded in theories of motivation (Hulleman 2010; Schunk and DiBenedetto 2020), instructional design principles (Merrill 2002; Mayer and Moreno 2003), and supporting learning communities (Wenger 1998; Kirschner et al. 2018). Although individual departments will actualize their own pedagogical strategies, instructional approaches centered on active and task centered learning have been a central and common approach for some time (Freeman et al. 2014; Merrill 2002).

While the move to remote instruction would include attending to a number of challenging factors (e.g. access to materials for design and lab courses, supporting group and project collaboration across time zones, issues of equity) the plans and suggestions for emergency instruction were still framed and grounded, as best as possible, in these familiar approaches.

2.2 Organizational Change

For years a number of units have been working to support the educational mission of MIT. These units, described in more detail below, have been driven over time by a number of key reports produced by various faculty working groups and ad hoc committees. One of these reports - Online Education: A Catalyst for Higher Education Reform (Willcox, Sarma, Lippel 2016) - highlights the importance of developing “change agents and role models” p. (28) in order to enact the types of instructional approaches cited above.

The idea of change agents in education has existed for some time (Berman and McLaughlin 1975; McLaughlin 1990). In higher education these agents have been thought of as people with the experience, social capital, and expertise to champion transformations in pedagogical approaches to instruction (Borrego and Henderson 2014; Wieman 2017). Within MIT the use of change agents had previously been leveraged across many units including the Digital Learning Lab (DLL), overseen by the Dean for Digital Learning. This unique program between MIT Open Learning and MIT's academic departments is composed of Digital Learning Lab Scientists and Fellows. Over the past 8 years these scholars, mostly postdoctoral, have been learning, collaborating, and innovating with digital learning across MIT and beyond. Although nobody knew this in advance, the DLL and the colleagues whom they catalyzed were building skills that have proved exceptionally valuable in transitioning to remote learning.

Having this history of educational change agents within MIT played a critical role in how instruction and learning was transitioned online. It was key that the subgroup had people whom we could connect with, and who knew to find us, in every department. While some were faculty, many others were Digital Learning Lab members.

3. Units and Responsibilities

Key to the subgroup membership was representation from across a number of units that have traditionally served the instructional mission of MIT. Two units came from within the Office of the Vice Chancellor. First, the teaching and learning lab (TLL) has a stated mission “to partner with MIT educators, staff, and administrators to create an educational environment where students are academically challenged, actively engaged, and personally supported.” Led by Janet Rankin, the work of the TLL has primarily focused on more traditional modes of instruction (face-to-face lectures, recitation, and lab classes taught using active learning strategies) facilitated through workshops, community events, and formal TA and instructor training programs and maintaining a website of resources.

Second, Lauren Pouchak is the Director of Special Projects and in the context of this work she and two colleagues were responsible for developing an entirely new Student Success Team consisting of 550 coaches for more than 5000 MIT students.

Within the Office of Open Learning (OL), the mission of the Digital Learning in Residential Education group is “to empower MIT faculty to use digital technologies to augment and transform how they teach, making it more effective and efficient for MIT students and faculty.” Under the direction of Sheryl Barnes, the group instigates, explores, tests, and institutionalizes pedagogical models that enhance MIT's unique brand of education through digital and open learning technology and practices. This work takes many shapes including administering and supporting the residential MITx platform (a locally hosted version of Open edX that in the most recent year was used by 10,022 students in 79 MIT courses), supporting and running five lecture capture systems throughout campus, two lightboard studios, conducting educational research, maintaining a website of resources, and hosting community events to share and disseminate results and best practices associated with using technology to support learning.

The Office of Open Learning additionally encompasses OpenCourseWare (which for 19 years has been building online learning resources consisting of materials from almost 2500 MIT subjects) and MITx (which, with the DLL, has produced 191 online courses run on edX for the world, based upon 130 MIT courses from 29 departments). MIT's investment in Digital Learning - exemplified by OCW, MITx, the DLL and the DL in Residential Education group - was, as it turned out, building internal capacity needed for the transition online.

Information Systems and Technology (IS&T), led by vice president Mark V. Silis, develops, supports, and maintains all of the Institute's core IT systems. IS&T collaborates with teams across MIT to provide and integrate technology solutions that support the needs of students, instructors, departments, labs, centers, and central offices. IS&T supports instruction and learning at MIT by providing custom and cloud IT services along with support resources to ensure community members can effectively use technology in support of their activities.

Under the leadership of Wesley Esser, and similar to the work done across MIT by IS&T, the Sloan Technology Services (STS) group is responsible for supporting the teaching and learning technology needs of faculty and students within the Sloan School of Management.

Together, and in the matter of days, these key units fully operationalized their resources and experience in order to acquire and integrate new technologies needed for remote instruction, communicate those acquisitions and critical resources to appropriate users, and provided pedagogical supports for the faculty, instructors, and students tasked with teaching and learning remotely.

4. Goals and Implementing Key Decisions

To better understand how decisions and collaborations unfolded, data in the form of firsthand accounts, emails, internal documents, and publicly available materials were compiled and used to retroactively capture the work completed. Based on those materials, one of the authors created an

initial document of goals, decisions, actions, and communication categories. This document was shared across all authors for input and refinement before a final version of the document was prepared. This iterative process allowed for group members to reflect on the experience and provide evidence and justification for critical decisions.

Table 1 presents the final version of this work and includes the 3 major goals of the subgroup, key decisions and actions taken in order to achieve those goals, and communication structures used to inform stakeholders of tools, resources, and responsibilities. Table 1 reports on actions taken to address individual goals in a linear style, however, the work itself was discussed and completed in a concurrent and iterative nature. Although a full accounting of all decisions listed in Table 1 is beyond the scope of this article, key points pertinent to the community beyond MIT are discussed below.

Table 1. Academic Continuity Subgroup Goals, Decisions, and Actions.

Goal	Key Decisions	Action	Communication
1) Support all faculty and instructors in transforming residential courses to remote online instruction.	Create a stable set of sharable resources	Created teachremote.mit.edu site	Daily 8am call with department heads Multiple Email to entire Faculty from different central figures (Krishna, Chair of Faculty, MIT President)
	Create Virtual sessions and accessible supports focused on online instruction	24/7 support line	Daily 8am call with department heads Multiple Email to Faculty from different central figures (Krishna, Chair of Faculty, President)

			Listed on central teachremote website
		TLL and OL MIT wide webinars and training sessions	Daily 8am call with department heads Multiple Email to Faculty Listed on central teachremote website
		Dozens of departmental sessions and trainings provided by DLL	Emails sent within departments (mostly from department heads)
	Create an evolving community based set of online instruction resources	Create Open.mit teachremote site Crowdsource ideas, resources, & celebrate input from the MIT community	Linked on teachremote site Referenced at a number of Daily 8am call with department heads Emailed to Faculty and Instructors
	Set appropriate expectations for addressing learning outcomes while adequately completing the semester	Pass/No Record grading policy, introduced as a part of MIT's Emergency Academic Regulations by a team led by the Chair of the Faculty	Emails to faculty and students Daily 8am call with department heads Links on teachremote and learnremote sites
Pursue adding site licenses and support for key tools to enable remote teaching in a safe and effective way	Getting & rolling out the tools Dedicated 24/7 support for faculty (phone & email) Knowledgebase pages (IS&T)	Emails to faculty Links and information on teachremote site Daily 8am call with department heads	

		<p>Links to support materials from tool vendors</p> <p>Integrated support/escalation (IS&T & OL)</p>	Video posted on teachremote site
2) Support all students in transitioning to remote online learning.	Assure academic progress for students despite the urgent public health need to move as many people as possible off campus	Create Learnremote site	<p>Daily 8am call with department heads</p> <p>Email to all students</p>
	Set appropriate expectations for learner actions while adequately completing the semester.	Pass/no record grading policy	<p>Email to all students</p> <p>Text on learnremote site</p> <p>Main page of COVID response page</p>
	Provide proactive support for students, since so many aspects of on-campus learning that go beyond teaching are strained or absent	Student Success Team Coaches	<p>Email to faculty and Daily 8am call with department heads</p> <p>Email to all students from Cynthia Barnhart (Chancellor), Suzy Nelson (VP and Dean for Student Life), and Ian Waitz</p>
3) support teaching assistants as they transitioned to online instruction.	Create Virtual sessions and accessible supports focused on online instruction	<p>Many TLL webinars/training sessions</p> <p>reassurance the funding continues</p>	<p>Daily 8am call with department heads</p> <p>Email to all teaching assistants</p>

	Create an evolving community based set of online instruction resources	Creation of MIT Open community page	Daily 8am call with department heads Email to all faculty and instructors Link on teachremote site
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4.1 Supporting Teaching

Very early in the remote instruction transition it became clear that two critical decisions related to the goals of supporting faculty, instructors, and TAs would need to be addressed simultaneously. First, the acquisition of new tools needed to facilitate scaled remote instruction would be necessary. University wide site licenses for tools such as Zoom, Slack, Piazza, Gradescope, and ProctorTrack had been in discussion prior to the COVID-19 emergency. Group members from IS&T and STS were responsible for vetting, integrating, and supporting the technological requirements in order to finalize these deals. This included working with MIT Procurement and the Office of General Council to review terms of the agreements.

Second, having a central website (teachremote.mit.edu) where everyone could go to learn about these and other resources for online teaching was critical to achieving the transition. The timeline for implementation made it impossible to offer workshops or prepare adequate video tutorials for all departments, faculty, and students. While regular documentation for “how to use” the tools would be available, the lack of specificity related to addressing remote instruction made it clear that a central “one stop shop” for resources and support on emergency remote instruction would be needed. Representatives from TLL, OL, and IS&T convened to produce the website, and were faced with the challenge of reconciling the organizations' different approaches and roles. Given the rapidly unfolding situation in early March and the difficulty encountered in quickly folding the different

kinds of guidance and support that were needed into a single page of content, the group published two sections - one focused on pedagogy (TLL/OL) and one focused on supported tools (IS&T). Faculty viewing either section would be guided to the same key tools and resources. A third section provided the contact information for a newly established integrated team featuring members from IS&T, TLL, and OL to provide 24x7 support for remote teaching. Perhaps most important, the team kept the site curated and tightly focused, referring the dozens of members of the MIT community with useful resources to add and share to an Open MIT group page (open.mit.edu/teachremote) that was monitored by members of the DLL and staff from OL.

The main teachremote site also contained links and information to promote a series of workshops and webinars - later links to recordings of these sessions - designed to 1) support engaging students in synchronous zoom sessions and 2) the tools and techniques to support distributed learning communities. Beyond these sessions, which were organized and run by TLL and OL, there were dozens of impromptu workshops conducted within departments. Some were led by faculty who had previous experience with online teaching, while many more were led by members of the Digital Learning Lab.

Common across all the presenters was a shared understanding of teaching and learning remotely that allowed for the facilitation of sessions that utilized harmonious ideas and suggestions without direct coordination or oversight of content. As well as shared understanding, all of these groups, especially the Digital Learning Lab, were familiar with existing resources and contacts within units who could provide ideas, feedback, and suggestions, if needed. This distributed yet connected model of collegial training was very successful at supporting community needs in the highly time-sensitive nature of the remote instruction transition.

At the same time that this work was unfolding the whole MIT community was beginning to receive communications on what they could expect in a transition to online teaching and learning. Many of the earliest communications were centered on empowering and supporting departments and faculty to begin their work by asking “what were the learning objectives of your course and which should be prioritized as the most important moving forward during a pandemic?” Institutional leaders (Rajagopal, Waitz, and many deans and department heads) suggested that “it is fine if you only achieve $\frac{2}{3}$ of them”, a mantra that was repeated many times across many different communications. Departments and course leaders could then develop plans for how best to achieve their core learning objectives using the tools available. It is to the departments credit that all but four of the 1251 classes taught this semester transitioned to remote learning.

Most critical to the communication strategy was that it came from trusted authorities on teaching and learning and was inline with the MIT wide decisions to transition all spring courses to a pass/no record grade structure. The role of leaders who had gained the respect of their peers within MIT to disseminate such difficult information was important. These leaders have, often for years, been working as agents of educational change within the MIT organization and have built enough social capital and good will to be trusted in a time of emergency like this.

Beyond external communications, it was also critical that the members of the various subgroup units could internally communicate beyond traditional email. The addition of the Slack site license afforded just such a tool. A Slack channel (teachremote) was created allowing for real time notifications between IS&T and OL Residential in order to quickly answer both internal (part of the subgroup) and external (faculty, instructors, and students) questions. This communication included identifying and solving technical challenges while also notifying critical stakeholders in a single space that was accessible to appropriate community members.

4.2 Supporting Students

Similar to how the remote teaching resources were developed, the remote learning materials and resources were developed through a collaborative process that involved many members of the subgroup. Beyond the official website (learnremote.mit.edu), a number of resources for supporting online learning were created and shared on the Open MIT teach remote site. Although initially constructed as a place to share community developed teaching materials, it also acted as a community space for resources related to student learning. Both the formal Learnremote site and Open MIT site contained materials grounded in research on learning and again encouraged students situated in very different learning contexts to engage with instruction with flexibility and patience.

Communication related to remote learning did not begin until March 10 as to allow other critical information that needed to be shared with students - moving off campus instructions, financial and legal resources. When communication was made related to remote learning it almost always came from the Office of the Vice Chancellor, usually as email, and was focused on two key points 1) resources and expectations associated with academic related work and 2) supporting students overall wellness. Much of the communication around the academic work was initially nested in daily alerts that targeted all members of the MIT community.

The student success team coaching strategy was developed out of the OVC and Division of Student life under the direction of Lauren Pouchak, to help students find their way successfully, both academically and personally, through this challenging period of remote learning. The coaches (some of whom are coaches in “real life”; others are librarians, department administrators, emeritus faculty, and staff from across MIT) reached out to their students proactively, weekly, to listen and empathize, to connect our now-remote students back to MIT in many ways, and to prompt them to connect with each other to reduce the isolation and challenges of learning remotely.

One of the key components of the program included a Slack site for the community of coaches. This allowed for issues that “bubbled up” to be addressed in real time and to be passed along to the remote instruction team. For example, coaches had been reporting that students mentioned having trouble sleeping and managing their time while off campus. As a response, MIT Community Wellness developed a workshop/training and materials for coaches to share with students on sleep and time management. More will be need to be learned from end-of-semester surveys, but based on high participation rates and anecdotal feedback, this proactive listening-centric approach succeeded in both supporting students and provided a structure for identifying high priority needs.

5. Conclusion

It is critically important to point out the role of the subgroup was and is to catalyze, to galvanize, to cajole, to advise, to nudge, to encourage, to support and to applaud the work of teaching done within MIT's departments. The members of the subgroup provided departments and individual faculty with the encouragement, in fact the insistence, that they figure out their own plans, which they have been improving and optimizing continuously since the beginning of remote instruction on March 30th, 2020. It is the departments, the individual faculty, and the students that come first when thinking about the outcomes associated with remote teaching and learning for this semester.

While not all Higher Educational environments may take a similar department and instructor first approach, several key elements and structures reported above may exist and be leveraged within other organizations: 1) A shared understanding of educational research and instructional approaches across units in order to allow for quick and accurate dissemination of actionable instructional resources. 2) Now is the time to utilize the years of established contributions by educational units to

the community and social capital built by leaders and key department members. 3) Releasing materials as they became available in a single and reliable place with clear and concise messaging from and across the organization can help keep people from being overwhelmed and ensure harmonious messaging.

At the time of publishing, uncertainty around what instruction and learning will look like for the Fall 2020 term still exists. In better understanding the process by which decisions were made and enacted we can better prepare for a number of potential scenarios associated with remote or hybrid instruction. The culture of how MIT faculty and instructors teach remotely emerged from within our departments and is richly variegated. This will serve us very well going forward, as we now have the opportunity to share what is working across departments, engaging in a sort of wide scale iterative design project. Continuing to utilize key organizational structures that enabled the initial remote teaching transition is situating our community to be responsive to short term uncertainty, will at the same time provide confidence that any short-term changes can and will address learner needs in the longer term.

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