
How to build the future of teaching and learning while growing from the changes and challenges of 2020–21

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Abstract The challenges of the last two years that the COVID-19 pandemic directly caused or exacerbated will have long-lasting impacts on teaching and learning in higher education. The need now is to thoughtfully evaluate lessons learned and areas of growth to apply in the move forward instead of succumbing to the pressures to return to old systems. Will administrators, instructors and students choose productive and effective paths forward that will enhance learning for all? Or will they slide back into old norms out of comfort or fatigue? How do we extract positive changes from these events? There have been many conversations related to this reflection within higher education. This paper presents the early and hypothesised lasting impacts of the past two years' events on teaching and learning organised across seven themes: course logistics, tools, activities and assessment for learning, student services and programmes, work culture, attitudes, and relationships. Each theme includes the relevant challenges, the short-term reactions and solutions and examples of continuing positive practices. The process to develop the future of teaching and learning in higher education requires reflection on the past two years and deliberate action to grow from the lessons learned to avoid the pullback to fully pre-pandemic practices.

KEYWORDS: higher education, assessment, blended learning, online learning, digital learning, COVID-19 pandemic

INTRODUCTION

Numerous institutions had significant experience with online and blended learning before the COVID-19 pandemic, but the

residential experience still dominated the idealised vision of going to college. The Massachusetts Institute of Technology (MIT) had many examples of courses applying

blended learning, especially those integrating digital learning materials developed through massive open online course (MOOC) projects. The hands-on approach to learning for practical application combined with a culture of collaboration with peers meant all MIT courses still had a significant in-person component before the pandemic. Undergraduate students normally could not take a completely online course for credit before 2020.

Since early 2020, the challenges of the en masse shift of in-person courses to online and more blended learning experiences in higher education came hand in hand with tremendous stress for students, faculty and staff managing their changing academic worlds and personal lives. Unlike online courses previously developed, emergency remote teaching¹ for instructors in response to a pandemic involved converting an in-person to an online modality in a matter of a week, with minimal training, while at home with family and managing research groups during shutdowns. Similarly, emergency remote learning for students included disruptions from their planned tracks for earning a degree and serious distractions from the world around them and at home. These challenges of different modes of teaching and learning were minimal compared to those in the community facing the physical and emotional toll from health battles, loss, racism or economic consequences of the pandemic.

The forced shift to remote allowed instructors at many institutions to rethink what and how they taught through the reflection of the following questions. What are the learning goals? Do all of these topics strengthen the learning experience? How is learning assessed in an online format? What about academic integrity? How do labs run in a virtual space? What learning experiences are possible online but not in person? What is the best purpose for video?

As higher education around the world returned to in-person courses, work

and student life during the more recent stages of the pandemic, everyone had to critically evaluate what returned from the pre-pandemic era and what new practices continued or expanded. Those at MIT with prior expertise in online learning shared perspectives across departments through the Digital Learning Lab,² a community of practice between those deeply involved in MOOC and blended learning projects. Since several departments committed to MOOC projects over the last decade, these units had colleagues to turn to during the pandemic-induced transition to remote teaching and learning. Conversations expanded beyond the Digital Learning Lab to include departmental meetings, community talks highlighting case studies and the formation of an ad hoc committee on leveraging best practices from remote teaching for on-campus education, which hopefully indicates broad interest and commitment to moving forward with careful thought. MIT even established the MIT Task Force 2021 and Beyond to focus on recommendations for academic, administrative, finance and data and community and culture workstreams. Similar talks took place at an international level as well, such as in the like-titled workshop at the Online Educa Berlin (OEB) conference,³ providing a venue for the exchange of ideas across diverse perspectives from different institutions and cultures.

These discussions happening within higher education gave everyone a chance to focus on the positive or productive shifts that have happened over these past two years despite the negative catalysts. To start the reflection and evaluation process, the following sections highlight challenges that learners, teachers and staff faced in higher education recently. The pandemic did not cause all of the issues, but many problems became even more predominant under these conditions. Next, the analysis presents the immediate and modulating solutions and approaches to addressing the challenges. Examples are often presented in the MIT

context, but they represent solutions that many higher education institutions in North America tried. Finally, the discussion includes what approaches continue today at the institution, why and thoughts on how successful implementation works to share these solutions with others. For organisational purposes, the lasting impacts are divided across seven themes: course logistics, tools, activities and assessments for learning, student services and programmes, work culture, attitudes and relationships.

SEVEN THEMES OF LASTING IMPACTS ON TEACHING AND LEARNING

Course logistics and academic policies

Challenges

Across academia, the challenges of course logistics that higher education administrators and instructors encountered included, but were not limited to, immediately modifying the academic calendar, implementing emergency grading policies and running a course in a different modality. The start of each semester often brought last-minute announcements of calendar adjustments and decisions on the mode of course delivery, in-person, fully online, hybrid or hyflex,⁴ as administrators closely watched and reacted to COVID-19 case numbers. Frustratingly, instructors and students could not fall into a routine, putting more of a toll on mental health.⁵

Initial solutions

The logistics of running a course continually adjusted over the last two years, even for courses already in an online format. Many instructors rewrote course syllabi in response to new academic policies set at the institute level and the stresses that students faced. Contingency planning became a routine activity for semester preparation. Instructors increased flexibility for assignment due dates, overall schedules and grading criteria and expanded the number and types of

assignments beyond summative exams. With so many COVID-19-related absences, recordings of class sessions became the norm even as course formats returned to in-person.

Lasting positive outcomes and solutions

Instructors are now more likely to show compassion for student issues with flexible course policies, but the freedom is not always to the extent as in 2020. More instructors enact policies enabling partial flexibility such as dropping the lowest score on assignments or submitting one late. These strategies are an attempt to prevent some students from getting very behind in the work, a problem when the policies required too much self-regulated pacing of learning over the entire semester. The de-emphasis on high-stakes exams determining grades and the diversification of assignment types remain for some courses and are areas of promise for deliberate expansion. Finally, many institutions are learning that holding a class in-person again does not mean that students will show up,⁶ despite how adamant leaders are about in-person classes. The majority of undergraduate students surveyed prefer to have online course options,⁷ and there is significant evidence showing little difference in learning between in-person versus intentionally designed online learning experiences.⁸ Therefore, residential colleges relying on completely in-person education have to evolve to incorporate more blended learning and online courses for students interested in that option. Furthermore, instructors have to talk to students to solve why they are not attending. Is it related to mental health, COVID-19 risk or are the instructors offering an in-person or synchronous online experience exchangeable with the video or did they fail to communicate the goal of that in-person class with students? Instructors who create blended learning experiences that take advantage of the best use of in-person

space and time versus what can be more convenient to complete online will likely see better student engagement.

Tools to support teaching and learning

Challenges

For residential institutions to quickly pivot teaching and learning mid-semester to a fully remote mode at the start of the pandemic, the answer had to involve technology.

Many instructors, staff and students tried a tool new to them in the past two years that enabled remote teaching and learning. The involvement of technology in higher education has a long history, but never before have so many teachers and students had to integrate tools to digitise teaching and learning in such a short amount of time and as a necessity rather than a choice. Just like pre-pandemic, the application of a tool alone does not mean the student learning experience is better. The implementation and pedagogy still determine the effectiveness of a tool. With so little time for training and planning and misguided attempts to replicate a lecture hall online, instructors and students felt irritation with technology at some point during the last two years.

Initial solutions

Without the large selection of existing tools ready to assist, the shift to fully remote teaching and learning that most in-person schools made in just a week or two during 2020 would not have been possible. Luckily, MIT had the resources and staff that rose to the call to quickly negotiate licences and vet tools not already under university-wide licences. With the widespread adoption of tools, self-provided or university-provided training helped with implementation. These tools enabled efficiencies or functional improvements to work and learning that may have gone unrealised if so many were not forced to try them.

Lasting positive outcomes and solutions

Numerous examples of tools that instructors and students adopted during the last two years have staying power. For example, MIT even transitioned to a different learning management system (LMS)⁹ during the last two years. Even though the expectation to make the switch was already in decision-making stages pre-pandemic, all of the on-campus courses moving to remote learning necessitated a rapid conversion that would have stretched on for more years without the pressure to convert. The most valuable functions of the LMS, as for many teachers and students, proved to be the organisation of course events and materials and the integration of the multitude of learning tools in one place with one login (eg web conferencing, discussion forum, grading, video and calendar). Gradescope,¹⁰ a tool with broader realised value when online exams and assignments became compulsory, helps facilitate the delivery, logistics and grading of exams and assignments and has continued usage at many institutions. The benefits of Gradescope include increased efficiency and consistency of grading with rubrics for every question. Decreasing the time to grade is extremely important for the morale of graders and allows increased time for valuable interactions with students while teaching or research. The ability to anonymise submissions in the grading process helps reduce subconscious biases, while students also gain transparency from the rubrics to learn from mistakes and trust the process. Overall, the application of tools in higher education is not a novel practice but instead now involves a larger percentage of teaching staff and students and a greater number of tools, surpassing a threshold of users sharing a common familiarity with a tool and overcoming the activation energy to change. This mindset and behavioural shift enables blended learning — the mix of in-person and online learning experiences — to become more the norm.

Activities and assessments for learning

Challenges

Instructors who had to immediately transition to remote teaching and learning mid-semester faced a challenge never imaginable before 2020 and under conditions of great stress and distractions for their students and themselves. The high stakes and minimal timing led to rethinking the entire course, from the learning goals to how they assessed student learning. Instructors of lab courses had to quickly figure out ways for students to experience the lab from home. They sought out help and advice on how to translate the in-person student learning experience to online but also became interested in the best practices of online course design as emergency remote teaching and learning recurred over several semesters.

Initial solutions

For those instructors not lucky enough to already be teaching online or prepared with a lot of resources for blended learning, all aspects of the course changed. During remote class sessions, instructors incorporated active learning techniques and took advantage of the labelled boxes of student names and the chat function for discussion to avoid the disengagement of lecturing, especially in synchronous meetings over video conferencing. Many students completed different types of assessments of their learning, such as art or multimedia projects in a science subject.¹¹ They still had more traditional summative assessments like exams, but in a different online format or with an increased frequency of smaller assessments. Even the study sessions and office hours had to exist via video conferencing. Although, staff could schedule more easily outside of the usual 9–5 hours with the ability to connect from home. Lab courses shipped out at-home kits to mimic the in-person experience and found ways for students to analyse data. Not all attempts at making these shifts worked well,

however. Going forward, it is key to know what methods effectively served students and their implementation details to recreate a successful experience.

Lasting positive outcomes and solutions

Interestingly, many of the adjustments to activities or assessments that became more common during the last two years in response to the pandemic align with evidence-based best practices for student support and learning. More conversations emerged on how to take advantage of in-person interactions to prioritise activities of value in that mode for learning and work. Instructors and students intentionally kept online approaches that enriched the experience as students returned to campuses. Some digital components enhanced student learning, mental well-being, equity or inclusion and could be as easy as providing a course chat channel for peer-to-peer and peer-to-staff conversations during synchronous sessions. Some instructors maintained more creative, open-ended assignments and online exam policies that seemed experimental during 2020. Given the burnout that many felt with the continual changes of the past two years, decisions also reflected what was realistic for the instructors and students to handle at the given time. For example, some percentage of students did complain of too many assessments for those that increased numbers, despite the research from the learning sciences supporting frequent testing.¹² Therefore, student feedback on the activities and assessments is crucial for proper execution in the future, as well as informing students why instructors make the pedagogical decisions in the course structure to better align with the research on how to learn.

Student services and programmes

Challenges

Disruptions to life on campus during early 2020 introduced a ripple effect of student

problems, several of which a residential institute like MIT did not previously field at all or as much. After immediately figuring out the orchestration of returning to a home with locations around the world, the students dealt with heightened health concerns for themselves and family but still had to manage a system to continue learning. Since the student backgrounds are diverse, unequal housing and resources outside of the MIT campus meant that some students continued studying in ideal homes with private rooms, great Internet access and parental support, while others lived with distractions from many family members or did not know where to go, struggled with unreliable Internet access or felt the weight of financially supporting family. There was a general concern about the loss of the existing community as everyone dispersed to a home base and about new students being able to build relationships during subsequent semesters fully remote or under a lot of restrictive in-person socialising protocols. The students' mental health that is already normally tested while trying to earn a degree stretched to deal with a pandemic, racism and economic issues.¹³

Initial solutions

To maintain academic continuity, higher education institutions offered many new services and programmes or expanded existing ones during these past two years, a feat more possible for schools with more resources. Per course, instructors accommodated a myriad of student support requests with topics ranging from connectivity to health to international time zones. To address technical inequalities, the institute's technology offices shipped out Wi-Fi hotspots or devices to students in need. Schools ramped up student support services to handle individual cases of stress or health issues. More students sought out help. Virtual advising and peer mentoring systems appeared at the university, department and

even course levels in efforts to maintain or develop community while physically apart.

Lasting positive outcomes and solutions

Despite the return of in-person life on campus, the effects of the pandemic combined with normalising taking care of mental health resulted in the sustained high demand for student support services.¹⁴ To meet this demand over the long term, institutions have to invest more in the staffing of these services that have been stretched thin during the last two years. As an example of the continuation of a new programme, the MIT physics department created a peer mentoring programme that resulted in such positive academic and attitudinal gains for students that they expanded the system.¹⁵ With the right funding and support, these programmes can continue and expand at any institution. Additionally, instructors are generally more aware of how to positively influence students to seek help with simple actions like a warm tone and intentional inclusion of a statement about student services.¹⁶

Work culture

Challenges

Before 2020, most staff and faculty at MIT, like others in higher education, commuted to their offices. Since over 70 per cent¹⁷ of MIT undergraduate students live on campus, the students did not travel far for a class and had easy access to resources. But the order to shut down all in-person operations meant that even the graduate student researchers in the lab had to find ways to work remotely. For those already using digital channels for communication and tools for work that mostly lived online anyway (like the Digital Learning Lab), the transition to working from home for a long period was smoother than for others with the expectation to be back in the office after a few weeks or who were in the middle of wet-lab experiments.

In addition to adjusting to working from home, parents had to simultaneously take care of children and their schooling or other older family members. Not surprisingly, early academics and women researchers reported more negative impacts on their careers as a result of lab shutdowns or increased childcare, but most surveyed found a positive aspect of working from home as well.¹⁸ The extra demands from all of the academic policy changes and the blurring of lines between work and personal space meant that work hours extended to any time awake for many. And just like students, having the right setup and equipment to focus and function was equally important to those trying to teach or support students from home.

Initial solutions

From computational data analysis to teaching with tablets instead of boards, researchers and instructors alike found ways to accomplish at least some aspects of work from home. Over time, day-cares and schools opened again to relieve parents from double duty. As work from home became more routine, higher education professionals appreciated the benefits of eliminating long commutes and comforts of a home 'office'.

Lasting positive outcomes and solutions

Despite talks of everyone looking forward to returning to campus, most employees wanted fully remote or hybrid work to continue,¹⁹ analogous to the conversations happening in the business sector. The never-ending waves of high COVID-19 cases also disrupted this big return. Human resources within higher education now even describe the benefits of allowing remote work for better retention, recruitment, productivity and job satisfaction as a result of reduced commuting costs and time and greater flexibility for employees in how they structure their workday.²⁰ To stay competitive for talent, higher education has

to adjust work cultures to give employees the ability to complete work remotely if the task is possible and the worker desires. Remote or flexible work continues as an option for many types of positions within higher education, but this is not the case at every school.

Attitudes

Challenges

The uncertainty of the last two years left instructors and students burnt out, demoralised or resentful toward the decisions of leadership in higher education, hindering the energy to move forward with optimism. The sudden move of studying and working remotely led to a wide range of reactions, from open-mindedness and acceptance of the inconveniences for the greater good to resistance and anger. A number of people focused on the return to the comfort of old routines, an issue when leadership seemed to ignore the concerned voices of instructors, staff and students in their rush to 'return to normal'. Others held on to pre-pandemic systems that benefit specific groups. This latter attitude is very problematic given that the pandemic has only made inequities of populations within institutions and broader communities more obvious.

Initial solutions

Attitudes have shifted in some interesting areas for higher education during these last two years. The intensified media attention on racism and the greater negative effects of the pandemic on certain student populations brought more attention to ongoing diversity, equity and inclusion (DEI) efforts. This led to additional training, DEI-related surveys of students, faculty and staff, and the creation of new positions specifically focused on these topics. In addition, almost all students and instructors participating in some form of online education resulted in a great variety of experiences. Still, many gained an

appreciation for the good online learning experiences and expressed gratitude to staff in positions to help during the demands of the transition.

Lasting positive outcomes and solutions

Although some people sabotaged any positive personal growth during this period to ‘return to normal’, many accept and understand that their outlook on teaching, learning and working within higher education has changed. With recommendations to institutionalise DEI commitments and broaden the DEI responsibilities to everyone,²¹ awareness and interest in positive change forward have never been higher. At the course level, instructors have the training and resources available to learn how to become more inclusive teachers (through free resources available such as MOOCs or internal efforts) and have the student and institution pressure to do so. How much progress occurs in this area will likely depend on if institutions hold those accountable who ignore DEI in their teaching and work and if there is the implementation of effective rather than performative strategies. Low morale²² among staff and instructors makes it difficult to rally behind planning the future of teaching and learning. As one example, however, MIT did respond to good investment returns with a special 3 per cent raise for eligible faculty, staff and graduate students.²³ As many institutions are feeling the consequences of employee disengagement or loss, action is required to stay competitive. If institutions can boost morale through listening to staff and students and taking action to improve the culture and make systematic changes, then the attitude shift toward incorporating DEI and best teaching practices that involve more blended and online learning have a better chance of persisting. One structural change in a positive direction includes the creation of many DEI positions at departmental and institutional levels.

Relationships

Challenges

In the virtual world, everyone had to maintain or start relationships online. Some easily converted to all school or work conversations through video conferencing and chat, while others struggled with the lack of the serendipity of in-person exchanges and feelings of isolation. At first, those in higher education also suffered fatigue from a schedule of video meetings during every hour of the day, overcompensation for the lack of in-person activities and also a necessity for planning to manage all of the policy changes.

Initial solutions

As everyone realised that remote studying and work would last longer than a couple of weeks, they adjusted to better use of communication tools, shorter and less frequent video meetings and purposeful engagement with those who may need more connection. Students with no prior experience at MIT participated in remote summer research programmes — a first for the biology department. Despite never meeting in person or being on campus, students connected with research groups and peers to complete projects from their homes via video conferencing, chat and asynchronous working documents. Other schools created analogous programmes and reported similar rich research experiences for remote students.²⁴ Within courses, instructors and teaching assistants understood the importance of checking in with students, especially those missing in the remote world.

Lasting positive outcomes and solutions

Many early sceptics now realise that one can foster and create relationships completely online. Video meetings continue out of convenience and as the method of choice during COVID-19 outbreaks. The summer research students felt such a connection to

the people at MIT that a large percentage from the remote programme applied and decided to join the graduate programme. In general, outreach mentoring now easily extends beyond just the summer months for students in many different locations via remote methods. For courses, a number of instructors continue informal check-ins with students after seeing the relationship gains from small actions. Although possible before, more researchers see collaborations across states or countries as less of a hurdle. Instructors enhance authentic experiences for students by bringing outside experts into the classroom virtually for discussion — a method not taken advantage of much before the pandemic.

CONCLUSION

The emotional toll on the individuals within higher education and the broader community as a result of the COVID-19 pandemic and amplification of existing inequalities continues today. In that context, instructors and higher education administration across all institutions must apply the lessons learned from these past two years to create a better future of education for students and the staff and instructors working within the system. It is critical to remove the focus on the ‘return to normal’ when the pre-pandemic routines had many flaws and structures in which they worked for only some groups. Given that the attention to online teaching and learning in response to the pandemic affected everyone, there is an opportunity for widespread maintenance of practices that worked well and benefited students. The question remains, however, to what extent this reflection and investment in maintaining new ways will happen and the consequences to those institutions ignoring this process.

This discussion of the challenges, the short-term reactions and solutions and the examples of continuing positive practices across the themes of course logistics, tools,

activities and assessments for learning, student services and programmes, work culture, attitudes and relationships exemplify how broad, interconnected and multifaceted the path forward is. The input for decision making to build a better future has to involve everyone within an institution. For change to sustain, everyone must apply change theories like the four frames — structures, symbols, people and power — for systematic change in science, technology, engineering and mathematics (STEM) departments²⁵ to be successful. As others in the higher education space have similar conversations and dive deeper into what works well, it is important to have space to share findings within and across institutions so that everyone can continue to learn and grow.

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