

The Future of Learning is Blended

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Abstract

The adoption of online learning within universities has been sporadic and rare. However, with the onset of COVID-19, higher ed institutions worldwide have been forced to switch from in-person to online learning. This transition, while challenging, is dramatically increasing the adoption of online learning in higher education. However, for online learning to endure, it must be integrated across the entire campus, or in other words, it must truly scale horizontally. Blended learning, which allows universities to integrate online learning with in-person learning, provides the best of the two learning models and offers a much lower resistance path to campus-wide adoption. Blended learning increases business continuity and has unique pedagogical benefits which increase learning outcomes. It is the future of higher education.

Keywords: blended learning, at-scale learning, MOOCs, future of higher education, educational transformation

Introduction

The COVID-19 crisis has been a wake-up call to higher education, which until recently had sporadic adoption of online learning. As many as one-third of colleges and universities nationally in the US offered no or few online courses before the pandemic hit (Lederman, 2020a). Even in instances where courses or programs were available online prior to the COVID-19 crisis, offerings were limited to a specific department or program, such as an online MBA or nursing degree, rather than scaled horizontally across the institution. Similarly, while the MOOC movement, or massive online open courses, brought many universities into online education, with the exception of a few, it often was a separate "teach the world" activity rather than an integral part of the college curriculum.

With universities and colleges now having to rapidly adapt to online learning, there is a new opportunity for schools to further embrace remote learning by horizontally scaling access to online courses across all departments. However, for enduring adoption across a school, online learning must become completely synergistic with campus education.

Blended learning, which combines online learning with face-to-face learning opportunities, allows schools to bring online learning onto campus in a more gradual fashion, sort of a gentle slope approach, thereby increasing the likelihood it will be integrated across campus.

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Why Blended Learning Is an Advantageous Model for Higher Education

Blended learning allows students to switch between face-to-face and online synchronous and asynchronous learning seamlessly. There is no one-size-fits-all model, and its implementation may look quite different from institution to institution, and even program to program. However, the flexibility that blended learning offers students and schools to switch between in-person and online instruction offers unique benefits over in-person learning or strictly online learning.

For starters, blended learning enables greater business continuity and resiliency because it allows you to dial up online instruction when needed, which is becoming critical as universities grapple with disruptive circumstances such as the COVID-19 crisis and the threat of future pandemics. Climate-related natural disasters are also on the rise, with fires, hurricanes, snowstorms, and floods increasingly forcing universities to shut down temporarily. The impact of these disruptions has been detrimental to some schools and students. Temporary closures of campuses have decreased enrollment and slowed students' progress toward graduation, and in some cases, even caused faculty to seek employment elsewhere (Mello & West, 2020). A blended learning environment would ensure that colleges were prepared and able to switch to online learning when there were disruptions that limited the ability of students and faculty to gather in person.

Second, blended learning can also increase learning outcomes and engagement. The majority of students (85 percent) who have taken both in-person and virtual classes believe the online learning experience was equal to or better than attending in-person courses on campus (Magda & Aslanian, 2018). However, while online learning can be more engaging, it's not the right fit for every student. Time management and motivation can be significant obstacles to an exclusively online learning environment. Some students simply need the additional accountability and face-to-face human interaction an in-person class can offer. Blended learning acknowledges the challenges associated with online learning as well as the advantages by providing for in-person interaction while also allowing students access to online learning and its benefits, such as greater flexibility and convenience.

Even during normal times, access to online learning offers more flexibility. Students can stay on track with their courses, even when classes conflict or students take a semester off for an internship or to study abroad. Online learning also allows students to learn at their own pace, making it more productive for many students and boosting learning retention by allowing students to revisit the lectures as often as they need.

Many of the mechanisms common to online learning also increase learning outcomes. For example, instant feedback, an affordance of online learning, is a proven approach to increasing learning outcomes (Kadlowec, Chen, & Whittinghill, 2005). Professor Michael Cima created a blended version of his freshman chemistry class at MIT by replacing written homeworks with computer graded versions for this reason (personal communication, August 4, 2020).

At Harvard University, Professor Greg Nagy, previously used components of his edX course, *The Ancient Greek Hero*, on campus where he teaches the same subject to undergraduate campus students. Now, during COVID times, when his course is no longer offered live on campus and is being taught completely remotely to campus students, Professor Nagy is replicating experiences previously used in the online edX version of his course to help engage his students and drive a feeling of community in addition to successful learning outcomes. For example, Professor Nagy has redeployed assessment techniques developed for his edX MOOC as part of the Harvard undergraduate remote experience.

In Professor Nagy's words, "It is possible in an online classroom setting to create community that is not impersonal. The potential for achieving a new sense of community was the big thing that we learned from our experience in working with edX. Also, more generally, we discovered that humanities can in fact be done online in a successful way."

Online learning, together with a study buddy or as part of a group, also provides a way for students to collaborate and connect in a richer and deeper way while learning than in-person lectures. Research by Alison Burke at Southern Oregon University has shown that collaborative learning results in college students achieving better grades, feeling more satisfied with their education, and being more likely to remain in college (2005).

Amol Bhave, who participated in a blended learning experience while attending MIT, noted that he was more comfortable with being able to take online courses because they allowed him to learn in a manner that worked best for him. "I could skip things I had already learned, fast forward through the lectures or follow along at my own pace," He also felt that the online courses enhanced collaboration between students. "Everyone can see a question and post an answer," Bhave said. "This is something the traditional model isn't able to achieve in the same way."

Incorporating online learning into traditional learning models is also more appealing to Gen Z and millennials. They have a strong preference for greater flexibility in their lives, including in their academic experience. Even before the coronavirus pandemic, 59 percent of Gen Z and 66 percent of millennials said they expected technology to transform how college

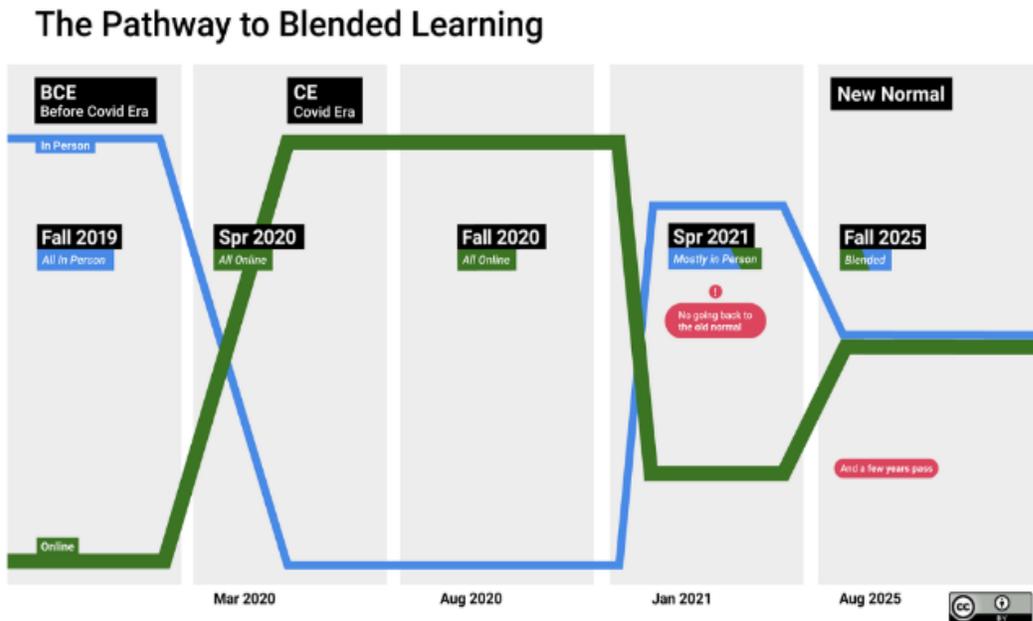
students learn in the future (Pearson, 2018). And within ten years, 76 percent of people of all ages think more college and university students will attend school online versus attending a traditional school (Pearson, 2019).

The Path to Blended Learning

From finance to telemedicine, COVID-19 has significantly sped up the adoption of remote work and virtual communications across a number of industries. As companies have moved to fully remote work environments, many are finding that their workers have increased productivity (Gelles, 2020), and are thinking about blended work environments where certain weekdays are designated work-from-home days for everyone.

Figure 1

The Pathway to Blended Learning



As Figure 1 illustrates, COVID-19 will have a similar impact on online learning in higher education. Following the green curve in the chart which reflects the *ultra tawa* (inverted pan in Hindi) curve of online learning adoption, in the Pre-COVID Era (PCE), universities rarely offered online learning opportunities for on-campus students. Instead, in person and on campus was the universal model. However, with the onset of the COVID Era (CE), universities were forced to shut down in-person classes and pivot to fully remote learning in a matter of days. Given the continued spread of the virus and the estimates on when a vaccine may be available, remote

learning will continue through the end of calendar 2020 and possibly even into the start of Spring of 2021 for most universities.

Results are mixed on how effective this transition to online learning has been so far. According to an Inside Higher Education survey, two-thirds of campus leaders said their institutions were “extremely or very successful at having technology support available, achieving faculty buy-in, and ensuring the availability of technology tools”. Yet, when it came to maintaining student engagement, only 31 percent of leaders said they were extremely or very successful, and 53 percent said they were moderately successful (Lederman, 2020b).

Faculty reactions have also varied as they pivoted to teaching online, but many have embraced it. edX works with academic institutions around the globe to help them transition to online learning, and as CEO of edX I've heard from a few converts. One colleague of mine, who pivoted to remote teaching halfway through the spring semester, mentioned that his first online lecture was the most engaging lecture he'd given the entire semester. There were more students attending class, they asked more questions, laughed (via emojis) and by virtue of being able to revisit the online lectures at any time, I'll wager they retained more knowledge as well.

Given the bumpy start to online learning, the Summer/Fall of 2020 will be crucial to improving the online learning experience. Universities will have had more time to train faculty and create online experiences using proven techniques specifically designed for great learner experiences and outcomes, including providing active learning with short videos and interwoven exercises, online assessments with instant feedback, self-paced learning, peer learning, gamification, and virtual labs, spaced repetition, and mastery learning. This will allow students and faculty to achieve better outcomes and engagement with the online learning model.

As it becomes safe to meet in-person, likely sometime in Spring 2021, many universities and faculty will try to rubber-band back to the in-person teaching model. However, it won't be a complete regression to the PCE days of zero online learning. As depicted by the trough in the green curve in Figure 1 there will still be a fair amount of online teaching and learning on campuses as many faculty and students will have realized the benefits of online learning and will be eager to continue to reap those benefits. In engineering speak, there will be some hysteresis in the system.

After Spring 2021, the pace of blended learning will steadily increase as schools build more capacity and experience with creating and sharing online content. Rice University, for example, is suggesting a dual delivery approach starting as early as Fall 2020 (Ramapriyan, 2020). Australia's Curtin University is going even further and planning a move to an "online first"

model for new course development (J. Downie, Deputy Vice Chancellor, Academic, Curtin University, personal communication, May 27, 2020) that universities around the world will be well served to emulate, which will accelerate the blended model for campus teaching.

Samantha Fisher, managing director of the education practice at Accenture, has commented that "the COVID-19 crisis may have spurred the shift to an era of pervasively hybrid education" (Lederman, 2020b). A survey by Inside Higher Ed affirms this viewpoint with eight in 10 campus leaders saying they would "reassess the long-term mix of in-person vs. virtual education they offer post-COVID-19" (Lederman, 2020b). Thus, I anticipate that by 2025 most universities will have a more or less even split of online work co-mingled with in-person activities, thereby ushering in the "new normal" of blended learning in higher education as depicted by the pan handle of the *ultra tawa* in Figure 1.

Approaches to Blended Learning

Viewed in the broadest sense there are three primary modes of blended learning: Online Before Campus, (OBC), Online During Campus (ODC), and Online After Campus (OAD). The three differ in the granularity and timeframe over which in-person learning and online learning are interwoven. Universities that incorporate all three modes will have the most success in staying relevant in the decades to come and horizontally scaling online learning across departments of a university. Here's a deeper look at each mode of blended learning.

Online Before Campus (OBC)

With this form of blended learning, the traditional timing of higher education beginning, and high-school secondary education ending, is completely blurred. OBC is a model in which high school students take online courses from a university before entering a college campus and can get college ready and start earning college credit while still in high school. Students also benefit from this model because they can sample and complete coursework in a field they want to explore or are interested in at a low cost before committing significant time and money toward applying for and enrolling in an on-campus degree program.

For example, edX learner and MIT graduate, Amol Bhawe, took courses from MIT via edX while still in high school in India. This experience provided a powerful tool for expanding his learning, opened up the door for him to attend MIT, and gave him a head start once he got to MIT for his on-campus degree. "I didn't know what MIT was or have any plans of going abroad for college, but these courses introduced me to MIT. It got me really motivated to continue learning and apply to universities outside of India," said Bhawe, who went on to work at Facebook, and most recently joined an investment banking firm in New York City.

MicroBachelors® programs and MicroMasters® programs offered by edX provide students two different ways to participate in online learning before campus. MicroBachelors programs enable students to learn online and accumulate credit on a university transcript. They can then transfer to a degree program on-campus that accepts the transfer credit.

MicroMasters programs are a series of graduate-level courses designed to provide deep learning in a specific career field. Not only do many employers recognize these certificates for their job relevance, but in a survey of MicroMasters students who earned the credential, 87% said that they achieved a career advancement as a result of the credential (edX, 2020). Students interested in pursuing a full master's degree can also earn a MicroMasters and then apply to a university that accepts their MicroMasters program certificate. If accepted, the MicroMasters certificate enables students to accelerate earning their degree because it counts towards 25 percent to 50 percent of the credit and cost of the Master's degree.

Online During Campus (ODC)

The second and most common mode of blended learning is offering online learning courses or course components to on-campus students. While on-campus, online learning can be interweaved at various granularities - course level or within a course.

Having fully online courses available to matriculated students allows universities to address course scheduling conflicts and provides a solution for completing courses off-cycle, particularly when students are participating in off-campus internship programs, study abroad programs, or have other work/life conflicts.

In an A-B experiment at MIT, they used the edX platform to offer a fully online version of their Circuits and Electronics course to on-campus students for credit during Fall 2016 and Spring 2017 semesters in addition to the usual in-person version. Students not only performed comparably well, but also reported feeling less stress and had more flexibility (MIT, 2017). Many other universities, including Georgia Tech, have conducted similar studies with similar results (Joyner, 2018).

ODC can offer even more blended learning opportunities, such as interweaving in-person learning and online learning within a single course. In a blended learning experiment at San Jose State University, they implemented a blended model of learning, merging learning activities from an online MOOC on edX with in-class, team-based problem solving as part of a required undergraduate circuits course. Given that this blended learning model provided students with the benefits of both online and in-person learning, it's not surprising that the results showed significantly better outcomes. In the SJSU study, the pass rate went from 59% in the traditional in-person approach to above 90% (Ghadiri, 2014), and these results at SJSU

were repeated over multiple semesters. Other blended learning versions of ODC have also shown success at community colleges as well (Bebell & Petersen, 2015).

Before the COVID Era, some universities were already toying with blended learning online/on-campus delivery. I believe that in CE, or the COVID Era, with faculty and students more comfortable with the online learning format, we will see many more schools look at implementing more online learning opportunities for students while on campus.

Online After Campus (OAC)

Blended learning can also be a powerful tool in helping people upskill or reskill to remain relevant and competitive in the workforce. OAC is a model in which a learner continues to take online courses once they transition into the workforce after moving on from a traditional four-year undergraduate experience.

Given the rapid advance of technology, it is estimated 65 millions of millennial-aged people and younger will need to continually reskill for the 40+ years of their work-life (Fry, 2020). Additionally, a recent edX survey showed that over a quarter (26%) of those surveyed were likely to seek additional education to help them find a recession-proof job. Even for employees who may not have immediate concerns about their job security, a LinkedIn 2018 Workforce Learning Report found that 93% of employees are more likely to stay with a company longer if it invests in their careers (LinkedIn, 2018).

The continuation of online learning, even after campus, makes it possible to incorporate upskilling and reskilling seamlessly into a busy schedule. Larisa, an edX learner, is a great example of how blended learning can still be valuable in life after campus. Larissa earned her bachelor's degree in Biology but decided after graduation that she wanted to learn web development. She started by taking a professional certificate program in Front End Web Development from W3 (the World Wide Web Consortium) on edX. The online format of the program allowed her to learn more about web development without taking time off from her current job. After finishing her certification, she was able to pivot into an entirely new career path and is now in a leadership role with a new company (Goulart, 2018).

How to Rapidly Implement and Scale Blended Learning Horizontally across The Academe

Historically, the biggest barriers to online learning have been a lack of acceptance by both faculty and students. But the need to pivot to online-only learning due to COVID has dramatically changed faculty and students' acceptance and comfort with online learning. Thus, the remaining challenges deterring broad adoption and implementation of online learning are tactical.

Addressing Faculty Capacity to Develop and Deliver Online Courses

One of the biggest barriers to greater adoption is the capacity to develop online courses. Course creation can take considerable time and effort and requires faculty training. On average, pre-COVID -19, my experience has been that even universities at the forefront of the MOOC movement had capacity to create only about 10-20 quality online courses per year, which means it can take three to four years to build an entire online program for a single department. Remote lectures with zero instructional design or online problem sets delivered as a talking head via your favorite webinar software like Zoom, Google Hangouts, Webex do not count.

The recent shift to online learning due to COVID-19 has already helped faculty begin to make this leap and get training. Pre-COVID-19, 97 percent of institutions reported using faculty with no prior online teaching experience for some of their courses (Cengage, 2020). However, a recent survey of college presidents from Inside Higher Education, showed that from March to June 2020, the level of success universities reported in training faculty less familiar with digital delivery grew 29 percent, from 18 percent in March to 47 percent in June (Lederman, 2020b). While there is still more room for improvement, the ability of colleges to rapidly ramp up faculty training shows that moving successfully to an online learning environment is possible, even in a short amount of time.

For instance, to address the urgent need to provide university faculty around the world with training in teaching online courses, ASU, UT Arlington, and edX have all launched courses on the edX platform that provide strategies and best practices on online learning and teaching. Because these courses are online themselves, it is easy to scale the offering to as many faculty and universities as need the training. Additionally, the courses provide insights into how to make online learning engaging and relevant to students by top scholars and practitioners in the field of online learning.

Yet, even as faculty training increases, the ability to add additional content could also be impacted by budgetary concerns. In an Inside Higher Education survey, 55 percent of universities said they believe they will be reducing their academic portfolio in the future, further constraining the development of online courses (Lederman, 2020b).

Implementing Modular Design and Development of Content

One way to overcome budgetary and time constraints with online course creation is to share content horizontally across departments and even universities through modular and stackable education blocks. After all, we share textbooks and not everyone writes a new book for their courses. Similarly, there is an opportunity to curate modular education blocks for use across other universities. Modular education blocks partition degrees into smaller, Lego-like

building blocks of learning, each with their own credentials, learning, and skills outcomes. MicroBachelors and MicroMasters Programs discussed earlier are examples of modular education blocks.

Learning platform mechanisms beyond the usual MOOC features are also needed to facilitate sharing of courses. Mechanisms include the ability of faculty at the university that is using a course created by faculty at another university to monitor the progress and obtain grades of their own students. edX Online Campus is an example of such a sharing platform.

The University of Iceland has embraced this type of modular learning by offering online summer programs this year to their students that combined modular edX course content and a final assignment. For example, the program, "Leading change: Gamification, storytelling, and superheroes to the rescue," was comprised of four different edX Online Campus courses, including courses on climate change education, gameful learning, storytelling for social change, and the rise of superheroes and their impact on pop culture. These courses came from a diverse array of universities and educational institutions, including IDB, Microsoftedu, Michigan, and Smithsonian.

Dartmouth College has also used modular content with great success. Having to make a rapid shift to remote teaching and learning in March 2020, the university leadership wanted a way to deliver learning continuity for their students, partners, and other members of their community. They also wanted to ensure that the online learning experience they provided would uphold their reputation for providing an atmosphere of rich intellectual engagement between faculty and students.

Through edX Online Campus, Dartmouth was able to gain full access to edX's entire catalog of 3000+ online courses from other top universities and companies in the edX partner network. This allowed Dartmouth to provide students, partners, and community members access to these courses as well as to their own online courses and content.

Even for Polytechnic University of Valencia (UPV), which already had significant experience in developing online content and had some of the most advanced infrastructure to support its creation, speed and scale remained a challenge when it came to making a rapid and complete transformation to online learning due to the pandemic. However, by using edX Online Campus, UPV was able to make online courses, or MOOCs, available to students within one week of closing in-person sessions. Students could choose from a variety of courses and had the opportunity to earn certificates for their coursework. These certificates could then be used as benchmarks for awarding credit as well as standalone signals of knowledge and skill development for use with potential employers. UPV also used the diverse edX course catalog to

allow students who were unable to continue their internships in-person to take online courses that aligned with the professional skills the students would have learned during their internships. During its initiative in the spring of 2020, UPV saw more than 20,000 enrollments in edX's Online Campus, and received very positive feedback from students and staff.

Access to this kind of modular content from others helps to expand online capacity for a university rapidly, and can be done during the transition period or even permanently, because at the same time it benefits students by allowing them to tailor their education to their interests or to improve their job prospects or career mobility. Modular learning also enables lifelong learning because working professionals can learn new skills in shorter amounts of time, even while they work. It also allows them to build a unique skill set for the career they want. For instance, someone can combine humanities courses with computer science, soft skills with technology skills, communication skills with coding skills, or data science and analytical skills with design skills.

As exemplified by UPV, Dartmouth College and the University of Iceland, modular content blocks also allow universities to share content not just across their own school, but across schools nationally and internationally. This gives universities more flexibility in meeting on-campus students' needs for specialized courses or programs. Platforms like edX Online Campus can be used to both host a university's content and to share its content with other schools. There are also interesting business model questions to explore here. For example, does the university using the content pay subscription fees for the content much like they do for library content today? These fees can be shared by the university supplying the content and the platform provider.

Stackable education blocks allow students to go even further, by "stacking" their modular certificates together to earn a higher level of credential, certificate, or even a full degree. The stackable certificates can even come from multiple institutions. For example, edX, ASU and MIT have partnered together to offer an innovative stackable online Master of Science in Supply Chain Management. Learners who complete and pass the MIT MicroMasters program in Supply Chain Management can then upon admission stack this credential up to earn a full Master's degree on edX from ASU's W.P. Carey School of Business and ASU Online. Both MIT and ASU are currently ranked in the top 3 for graduate Supply Chain and Logistics by *U.S. News & World Report*. (edX, 2019).

As this example shows, by utilizing modular and stackable education blocks, universities can provide students with greater flexibility and the opportunity to synthesize their education

with the customized skill set they need to advance their careers. This is truly blended learning at its best.

Conclusion

Blended learning that is available before campus, during campus, and after campus facilitates access to higher education in a way that increases learning opportunities for everyone as well as improving learning outcomes. Additionally, when learning becomes integrated at every stage of a learner's life as well as integrated across the entire campus, true horizontal scaling is finally achievable.

edX and our partners are helping to reimagine education by pushing for greater adoption of blended learning. The approaches outlined here are just a few examples of how education is being – and can be – transformed. Much more potential from using a blended learning model remains to be unlocked.

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