

Moving college to the web: the push for online higher education

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Ian Greene

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Signed: _____

Approved: _____ Date _____
Peter Norton, Department of Engineering and Society

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In 2019, about 200 million students were enrolled in higher education programs around the world (World Bank, n.d.). Education technology can supplement or replace classrooms, making teaching these students easier. Already, three-fourths of surveyed educators said they use new technologies in some way (Sabo, 2019). Private investors have been quick to notice this change; in 2018 education technology providers gained \$511 million in investment to develop postsecondary education technology (Wan, 2019). One trend in education technology is the movement of educational materials and lectures online. Because these trends affect teachers, students, educational institutions, publishers, and educational tech developers, these groups are competing to influence the shape of education technology. They compete by forming partnerships, marketing offerings, advocating for opinions, and implementing policies all designed to advance their agendas. To do so, they create a network of alliances and advocacy groups.

This competition is influenced by opinions on the purpose of education and by groups' interests. Groups measure education technology's effectiveness with metrics such as ease of access or effectiveness of knowledge transfer. This causes differences in opinion over the role and form of education technology. Interests competing with educating students, such as profit or resource management, exert their own influence on the shape of education technology. The competition is also influenced by opinions on existing technology. Some groups believe that current technology provides new tools and opportunities, fueling a desire to expand it under its current form. Other believe current technology inhibits the learning process and creates

unnecessary work, leading them to believe that it must be radically altered or removed from the education system.

Review of Research

Many factors can shape a student's view of online education. Park (2019) found that subjective norms, perceived pressures to engage in a behavior, were a key factor in students' decision to use e-learning. This implies that if parties can convince students to adopt e-learning with a norms campaign, they will be more likely to make the switch. Scagnoli et al. (2019) found that students thought video lectures were a "positive overall learning experience" and could "enhance a feeling of engagement" with the material. They found a positive correlation between satisfaction with video lectures and satisfaction with the course, as well as satisfaction with online lectures and the number of lectures watched. Jonas & Norman (2011) found that students with access to optional online educational resources for class tended not to use them unless required to do so by their instructor. While these studies examine how students feel about online education, they do not examine how technology providers aim to shape that feeling.

There is evidence that once students have made the switch to online learning, they perform better in class. Van Camp & Baugh (2014) found that 55% of survey-responding students said Pearson Education's education technology helped them earn better introductory psychology grades and 70% said it helped them earn better test grades. Arora et al. (2013) found that engineering students earned significantly higher scores on final exams when they completed homework online rather than on paper. They also found that the course's professor could identify difficult subjects for students using this homework system. Two of the authors of this study are

employees of Pearson publishing, indicating that publishing such statistics is good for education technology providers.

Education technology may not be accessible to all students. Although online materials and lectures rely on internet connection, Gonzales et al. (2018) found that 20% of survey respondents had difficulty maintaining access to technology. These respondents were mostly students of lower socio-economic status and students of color, revealing inherent biases in education technology. The authors recommended that institutions provide funds to offer lower opportunity students equal access to required technology. Research of this kind pressures institutions to modify their use of education technology to better suit students' needs.

Researchers have examined the behaviors of students enrolled in massive open online courses (MOOCs) to understand their actions. Xing and Du (2018) constructed a deep learning model to create dropout predictions for MOOCs. They claim that this model can help instructors identify students at risk of dropping out and convince them to continue the course. Another study examined the motivating factors for high and low performers in MOOCs (Littlejohn et al, 2016). They found that low performers were motivated by “extrinsic motivation factors, and used external markers as evidence of their learning” while high performers were motivated by “development of knowledge and expertise that was tied specifically to their workplace context.” This research exemplifies the way online content providers tailor offerings to attract and retain the most students.

Online Materials

Pearson, one of the largest textbook publishers (Davis, 2016), seeks to benefit from instructional technology by moving from print to digital materials. One of its three listed

strategic priorities is to “grow market share through the digital transformation” (Pearson, n.d. (a)). It sells products to fulfil this goal such as Aida, an artificial-intelligence-powered calculus tutoring app (Pearson, n.d. (b)). It also offers services such as contracts to act as a school’s online program manager (Pearson, n.d. (c)). Pearson claims that by expanding its offerings it will “improve access and outcomes in education” (Pearson, n.d. (d)). Such digital products and services make up a large part of Pearson’s income: in 2017 they accounted for 59% of Pearson’s sales (Wan, 2018). By selling instructional technology, Pearson can deliver more content to students.

Pearson has had to justify its movement from print to digital. In 2019, Pearson announced that it would update its printed textbooks less often than its online textbooks (BBC, 2019). The CEO stated that printed books will become a “progressively smaller part of the learning experience”; instead, “The Spotify generation—they want to rent, not own. They’re much more comfortable with access, not ownership model” (BBC, 2019). Renting is marketed as a less expensive than purchasing textbooks, but critics note that when books are online students “can’t resell them once they’re done with the course” (McKenna, 2018). As print offerings vanish, students must turn to Pearson’s education technology products. This grants Pearson greater control over learning materials.

To expand in education technology, Pearson has developed partnerships with learning institutions by promising to increase access to education. In 2013, Pearson partnered with more than 400 institutions to provide remedial learning materials to incoming students (Pearson, 2013), including the MyLab and Mastering online learning programs. In 2016, more than 30 institutions partnered with Pearson to “put digital learning resources at students’ fingertips on the first day of class” (Pearson, 2016) through college bookstores. Institutions also partner with

Pearson to reach remote students. Maryville University was one of many institutions to select Pearson to be its online program manager (McKenzie, 2018). According to Maryville's president "it's better if you can partner with industry and develop a more robust and cutting-edge approach" (McKenzie, 2018). These partnerships align Pearson's and institutions' financial interests while attempting to preserve quality of education. Through them, Pearson gains exclusive rights to provide the education technology students use.

Other parties offer free online homework programs. The Mathematical Association of America offers an open source resource with the goal of "providing the mathematical community with the most robust, flexible, and mathematically capable online homework system possible" (MAA, n.d. (a)). This system, called WebWork, offers professors thousands of math problems to assign students online. MAA quotes students as saying "WebWork is the only way that I can push myself to really do something about the homework," and "immediate feedback makes sure you have accomplished something" (MAA, n.d. (b)), claims similar to those made by Pearson. MAA markets Webwork as easy to use, but some professors refuse to use it because it possibly requires using the Linux operating system and PG programming language (Ziemer, 2004). Though harder to use than Pearson's products, WebWork represents professors' efforts to cut out for-profit technology providers with open-source alternatives.

Students and professors are divided about online materials. Reviewers of Pearson claim that Pearson's tools aid in "creating assignments and assessments that are tailored to each student's needs," but that non tech-savvy instructors "struggle regularly with how to use certain products" (Captera, n.d.). 64% of MyMathLab reviews on Amazon give it a five-star rating and 10% gave it four while 19% give it one star, indicating majority approval among reviewers and a minority voicing strong dislike. The top positive comment notes that MyMathLab's

“lessons/content can be personalized and adaptive based on my personal learning needs” but both it and the top negative comment bemoaned the \$85.88 cost of the access code (Amazon, n.d.). While many students and professors agree online materials are beneficial, some believe the cons outweigh the pros.

Online Lectures

Because professors can transmit videos to students using the internet, many schools offer lectures online. This creates new ways to reach students while fundamentally changing the format of traditional lectures. Proponents and opponents draw on comparisons with in-person lectures to highlight perceived advantages and disadvantages of online lectures.

Students organize to voice disapproval for online lectures, claiming that they create problems that inhibit learning. During the 2020 coronavirus outbreak, many colleges moved previously in-person lectures online. In response, a petition made by University of Virginia students called for all online classes to be graded pass/fail and gained over 5000 signatures (Appiah-Ofori, n.d.). It claimed that online classes prevent “meetings with professors and TAs in person”, pose “challenges to students' educational quality”, and jeopardize “the mental health of a plethora of students.” Similar petitions put up by students at the University of Pennsylvania (Kohan, n.d.) and Georgetown University (Woonprasert, n.d.) said that “many...classes do not properly translate to an online environment.” By organizing and exercising collective influence, these views were turned into a demand for change. That demand was answered: all three schools allowed students to opt into pass/fail grading for the semester (Moss-Horwitz, 2020; Snyder, 2020; Paschall, 2020).

Some professors also voice disapproval and believe that in-person lectures are superior. Ohio State professors claim that “You can’t just post things on Canvas and expect students to be able to have the same experience” and that “Some [classes], like laboratory experiments, can’t be done online” (Garrison, 2020). Inside Higher Education’s 2019 poll found that most professors “oppose colleges’ use of external vendors to deliver online academic programs” but that 46% of professors have taught an online course for credit (Lederman, 2019). The same poll found that only 32% of professors agree that “online courses can achieve student learning outcomes at least equivalent to in-person courses at any institution” meaning more surveyed professors teach online courses than believe in the effectiveness of them.

Other educators believe that online education is a maligned tool that provides many benefits, and organize to express that opinion. Online educators affiliated with the MSc in E-learning programme at the University of Edinburgh published a manifesto asserting that “distance is a positive principle” and “online teaching should not be downgraded into ‘facilitation’” (SWOP, 2011). They reject the idea that e-learning should be described “in terms of replication of offline practices, or in terms of inadequacy.” Instructors in California have formed the nonprofit group Computer Using Educators, professing that “technology is a critical instructional resource required for all K20 teachers, administrators, and students” (2014). They advocate for “support of underserved areas,” “administrative uses of technology,” and “fully funded professional development.” The National Education Association recommends that states “Ensure that state licensure requirements accommodate online courses” and “Expand professional development programs to prepare a cadre of educators who can effectively instruct online” (n.d.). These parties attempt to overcome negative perceptions by encouraging naysayers to give online lectures a chance and seeking funding for expanded online programs.

Many for-profit schools offer entire degree programs online. The University of Phoenix advertises that its classes have “no scheduled meeting times” and claims students can “learn from anywhere with an internet connection” (n.d.). They do this partially to market towards those who have a job or a family preventing them from attending in-person universities. This has historically included veterans attending school with G.I bill funds, leading the Department of Veterans Affairs to announce that it would no longer allow use of the G.I bill to attend the University of Phoenix due to the school’s “deceptive recruiting practices that target veterans” (Beynon, 2020). Many credits obtained at the University of Phoenix are not accepted for transfer by other institutions, leaving students who leave the school with nothing to show for their coursework (Beynon, 2020). Another for-profit school, ITT Technical Institute, declared bankruptcy in 2016 after it was prohibited from enrolling students receiving federal aid because it was “a risk to both students and taxpayers” (Smith, 2016). A student said “I’ve been going to school for three years now and I’m about to have nothing to show for it, and at the same time I’ve used my entire Post-9/11 GI Bill [benefits] on going here” (Smith, 2016). By adapting their education technology offerings to entice students receiving federal aid, for-profit online schools were able to reap government funds at the expense of students’ education.

Other online college programs aim to offer legitimate paths to a degree. Many brick-and-mortar universities offer “the same degree as on-campus students” online (US News, 2020). Further, “the curriculum for an online bachelor’s degree typically matches the on-campus curriculum” (US News, 2020). These statements are meant to assuage doubts about the legitimacy of online degrees rooted, in part, in stories about for-profit schools’ exploitive practices. The University of Florida has the stated goal of “delivering a comprehensive offering of high-quality, fully online baccalaureate degree programs at an affordable cost” (2020) Oregon

State University's online program promises that "all classes are developed by OSU's renowned faculty, who are known worldwide for their research, expertise and innovation" (n.d.). These schools aim to make their online degree programs extensions of their in-person lectures that promise the same experience and prestige.

Some brick-and-mortar institutions offer classes online as part of on-campus degree programs, requiring them to justify the switch from traditional lectures. Virginia Tech (n.d.) claims that its educational computer lab, the math emporium, will "encourage collaborative work," helping a student to "grow more responsible for his own learning." A writer for American Higher Education says that "saving the university money" and not "putting anyone with a pulse in charge of a class" are other reasons behind the emporium (Mills, n.d.). Various institutions have joined the National Council for State Authorization Reciprocity Agreements, an organization that aims to "provide broad access to postsecondary education opportunities to students across the country, to increase the quality and value of higher learning credentials earned via distance education, and to assure students are well served in a rapidly changing education landscape" (2020). Institutions join this organization to lend credibility to their online programs and assure students that offerings will not be poor substitutes for an in-person education. In both of cases, institutions seek to placate doubters of online lectures in order to reap the benefits of the format.

While almost all college courses cost money to take, some parties provide free classes using online lectures. EdX, a nonprofit, claims to provide the "highest-quality, stackable learning experiences" while "removing the barriers of cost, location and access" (EdX, n.d. (a)) by offering courses from Harvard, MIT, and other universities for free on their website. Students cannot enroll in a degree program using EdX, but they can opt to pay for select courses and

receive college credit or certificates of completion (EdX, n.d. (b)). This is a notable change in format: by making these classes freely available, EdX removes much of the exclusivity of college courses in order to make education more equitable. It also seeks an alternative to degree programs by encouraging companies to validate its certification programs.

Various parties offer the technology that enables online classes. Zoom, makers of a video conferencing platform, claim that their product can “Enrich teaching & learning”, “Maximize your resources”, and “Improve learning outcomes” (Zoom. 2020). They say it will do this by using existing resources to provide new tools and opportunities to students and professors. Zoom highlights the financial savings it can provide institutions, quoting a Western Sydney University representative as saying Zoom Rooms “have saved us about \$1.5 Million” (Zoom, 2017) and Mount Holyoke representative as saying Zoom helped provide “services to a global audience” (Zoom, 2019). By highlighting these features, Zoom argues that online lecturing can be an aid to students and professors and that Zoom is the best way to provide it.

The 2020 coronavirus outbreak prompted a mass transition to online classes, leading to discussion over how this would affect online education’s future. A dean at UC Santa Cruz said that professors would “learn ... about ways to make selective practices, such as prerecorded lectures or message board-style discussions, effective tools for learning” and be “more inclined to use these tools and practices in the future” and the CEO of Coursera, an online learning platform, said the change “tragically illustrates the need for higher ed institutions to build a technological backbone and digital competency” (Lederman, 2020). These statements paint the painful transition to online classes as a growing opportunity to push support for online education. Others reject this notion and seek to prevent education technology from being shaped by what they see as improper outside forces. The executive director of Quality Matters said that “Any

suggestion that this is the time to evaluate the efficacy of online education is more than absurd. It's ignorant at best and disingenuous at worst.” And Michael Horn, author of *Choosing College*, said that the crisis would “result in blowback against online learning at traditional colleges and universities” (Lederman, 2020). Both parties draw on the current experience of students and professors to make their cases and sway opinion.

Conclusion

While education technology may seem like a simple tool shaped by a drive to educate, it is actually shaped by competing agendas and by the success parties have vying for their opinions. Successful parties need not have the best interests of the student at heart and if they do, they may not know exactly what students want or need. This illustrates how technology aimed at a goal, in this case educating students, is not shaped exclusively by that goal.

Education technology also exemplifies the effects of turning a low-tech solution into a high-tech one. While education technology promises to provide new features and make learning easier, users have difficulty adapting to new methods and don't trust promised advantages. Users lash out with petitions, reviews, and publications while refusing to use high-tech solutions. Providers placate users and modify their offerings accordingly. Any technology provider should take note of the potential difficulties associated with high-tech offerings.

Finally, this exemplifies the power dynamics at play when shaping technology. Companies and institutions exert greater control over education technology's form than professors and students as they are the producers and deployers of it. This puts them in a position to easily attain their goals. Professors and students, as unorganized participants, must organize in order to express a collective will and demand change using collective power. Other parties use

technology to provide traditionally expensive and exclusive services for free, reducing the power technology producers have.

Education technology is not limited to online educational materials or online lectures: automatic grading systems, graphing calculators, plagiarism checkers, and other tools are widely used. Future research could examine the competition over the shape of these tools and the effects these tools have on education. Researches could also examine the use of education technology in K-12 schooling where students may not have the same familiarity with technology.

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