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Back to Basics

Quality in Digital Learning

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Contents

The Five Pillars of Quality Digital Learning

In early March 2020, COVID-19 was surging through New York City and the City Colleges of New York had yet to shut down. Students—many of whom were commuters—were scared for their health and fearful that they would bring the virus home to vulnerable family members.

They knew private colleges in the area were shutting down and evacuating their dorms. One student remembers "waiting for any sort of confirmation that our health and safety matters and that we should stop coming in for classes." Students pulled together a petition with more than 70,000 signatures. They organized a protest. And they waited and waited to hear if the college would close its doors.

Finally, the governor announced on March 11 that the college would pivot to virtual learning.[1]

Then, things went very fast. In the dorms, "people were banging on their doors. Telling them, you have to get out. You have to leave in a couple of days. You have to pack up your stuff or it will be moved for you,'" confided a student at the time. Many students did not have any place to go and many more felt scared to go anywhere in the face of a raging pandemic. And then they had to figure out how to learn in a totally different way.

In a matter of days, faculty pivoted to offering course material online. Most had little or no training in distance learning. Many simply moved their lecture-style classes onto Zoom while struggling to learn how to use their college's online learning management system or recreate their course another way. One student told us, "when everything shut down, it kind of felt like the teachers shut down. And it was honestly really difficult finishing up our classes just because everyone went home. Teachers went home. No one knew what they were doing. So everything just kind of fell apart."

Students and faculty finished the spring term as best they could. During the summer months, as the pandemic continued to grip the nation, many institutions designed training to equip faculty for the challenges that the following full semesters of online learning would bring. Even so, students reported little improvement from the spring semester despite faculty feeling more confident in their abilities.[2] It was a time of crisis management: for administrators, for faculty, for staff, and for students.

Now, the immediacy of the crisis is over. As the nation enters a new phase of recovery, colleges will begin to return to in-person learning. At the same time, many colleges and faculty want to make the most of the investment they made in online learning. Some students are also considering keeping some portion of

their education online.[3] Colleges and universities across the nation who were newer to online education can pause and reflect on how they can offer equitable, high-quality online education outside of crisis mode. By learning from this disaster, we can make higher education more flexible, resilient, and student-focused into the future.

Prior to the pandemic, the number of students taking online classes was steadily increasing, as were the number of colleges offering online courses.[4] At the same time, the higher education student population as a whole became increasingly diverse, with more students of color, adult students, low-income and first-generation students, and students with dependents enrolled than ever before.[5] Many of these students choose to take online courses because they work better with their responsibilities.

Research suggests that online courses are typically about as good as comparable in-person courses. But the evidence also shows that some student populations, including first-generation and academically at-risk learners, are especially vulnerable to poorly-designed online programs.[6] In one study of California Community College students, students who took online classes were more likely to have to retake a course.[7] The equity gaps that persist across the higher education system are also prevalent across online classes.[8] In Washington State, a study examining the performance gap between in-person and online classes found that males, students with lower GPAs, and Black students experienced the greatest declines in academic performance while online.[9] Researchers found similar results in a study on Virginia community college students.[10]

Research also shows what *does* work for online learning.[11] Several decades of practice, millions of online learners, and organizations like the nonprofit Quality Matters have synthesized that knowledge into best practices that should guide educators, institutional leaders, and policymakers in making the post-COVID landscape of online learning effective for all. This report combines those insights with a series of nine student focus groups and 25 interviews with digital learning experts across the country, ranging from instructional designers to digital learning. We talked to 44 college students – sophomores, juniors, and seniors from across the country – in October 2020 about their experiences with online learning since the Covid-19 pandemic happened. These focus groups were conducted virtually over Zoom and were sixty to ninety minutes each.

The pandemic was, in some ways, a sneak preview of higher education's future, one in which technology-mediated and -enabled education is ubiquitous, but with the potential for deep inequities in access to high-quality learning. This report describes some of the ways in which higher education succeeded and fell short during the remarkable 2020–21 year of distance learning. It proposes a trio of federal policy changes to build the ecosystem needed for online learning to ensure it is more equitable for students of color and low-income students, and to improve the quality for everyone.

In many ways, teaching well online is similar to quality teaching in person. Classes of any kind need to be well-organized with clear objectives, regular feedback, and opportunities for students to connect with one another. But while technology can make education more affordable and accessible, students learning at a distance lack access to many of the informal, interpersonal, and place-based benefits of on-campus learning communities. That makes some elements of class design and engagement especially important online. It is crucial that online courses:

1. Implement an organized class structure and clear communication,

2. Delineate clear and aligned learning objectives,

3. Provide regular feedback,

4. Build on supportive technology, and

5. Support student connection and community

As we learned during the pandemic, each of these pillars have elements that practitioners and policymakers should be mindful of in building a digital college infrastructure for all.[12]

Implement an Organized Class Structure and Transparent Communication

The sudden shift online showed how important it is for such a course to be well structured. Due dates, materials, processes, expectations, and other instructions need to be clear and easy to find. Many students we spoke to said that their classes were unorganized throughout the pandemic, which caused frustration and decreased the quality of their education. One student told us her class was "like a dump of different files and materials and [the professor] was like, 'okay, do that one'. I'm like, 'there are multiple [file] names.'" While they gave their professors grace given the unique nature of the crisis, the lack of organization also made it more difficult for them to learn.

This same student and her classmates also struggled to keep track of due dates because verbal changes were not reflected in the online syllabus or calendar. "One professor has not updated her syllabus or the assignment due dates even if we mentioned it in class. So, since we missed that day last week...it still shows that it's due and me and my peers are making sure we know the real due dates in our group chat," said one student. Yet another student said her professor would not use the LMS platform and would send all assignments, deadlines, and instructions through email, creating confusion. LMSs can show when and how students access learning materials, their performance on assignments, and participation in discussion boards.

While in-person classes and syllabi also need to be well organized, face-to-face interaction makes it easier to facilitate changes to due dates, instructions, or expectations. Pre-pandemic, most professors could rely on in-person meetings to make or clarify these changes. But when all classes went online in 2020, this practice made things more confusing for students.

That is why online classes need to be especially well organized. Online learning is a highly learner-autonomous activity, meaning that it requires students to be more self-directed, self-disciplined, and independent to succeed compared to in-person classes.[13] Since there is no seat-time, students need to be able to keep themselves on track. There is some evidence that women, older students, and students with more academic preparation tend to be more self-directed than other students, especially those from disadvantaged groups.[14] Online classes can be especially challenging for students with little to no online course experience or for students with lower levels of academic preparation.[15]

This makes clear guidelines and an organized class structure all the more important for all online students, but especially those from underserved groups, to succeed.[16] Survey data show that students value an organized and easy to navigate course and several online quality frameworks recommend that

instructors should invest time guiding students through the course structure, policies, and course materials in order to help students succeed.[17] Organizing a class may seem obvious, but clearly articulating the basics and having clear, consistent organizational communication can reduce confusion for students and increase the quality of an online course.

To make an online course as easy to navigate as possible, instructors can adopt a couple of practices. First, ensuring course content and materials are organized, easy to find and clearly labeled will help students find materials easily.[18] An intuitive setup can prevent confusion.

Instructors can also take the time to articulate the basics of the class, such as how to navigate the online course platform, class structure, and course policies. Professors can upload a pre-recorded video to send to students prior to the first class or share their screen during a synchronous class to walk students through the course basics. Course policies, such as for academic dishonesty, late assignments, assessments, and participation should be clearly articulated and easy to refer to at a later time, such as in the syllabus, a separate guide, or in a video.[19]

When online courses are well organized, students can focus on what really matters: learning the material and developing their skills. One student compared what this was like pre- and post-pandemic: "Even before COVID we always had the syllabus, but it was more like they relied on you to come into class and hear the information rather than a whole scheduled-out [class]....Since it's all online, they have everything more organized." Students saw organization like this as one benefit of classes going online. They felt empowered knowing when things were due, allowing them to focus more on learning rather than on digging through emails for due dates.

Synchronous vs. Asynchronous Teaching and Learning

	Synchronous	Asynchronous
Definition	Entire class meets online at a predetermined time.	No designated meeting time; students complete assignments by deadlines.
Pros	Because it mimics the teaching and learning structure most people are used to, the transition to synchronous online learning can be relatively easy. Can help keep students accountable for their schoolwork.	Since students can complete tasks at their own pace and convenience, asynchronous learning can help those with demanding schedules, a lack of quiet space to have synchronous classes, and external responsibilities, like dependent care or multiple jobs.

	Synchronous	Asynchronous
Cons	Can be challenging for students with other responsibilities, those who share a computer or Wi-Fi, or those who are very self-motivated.	Potentially challenging for students who are not accustomed to setting their own learning schedules.Greater risk of isolation, apathy, and lack of support. Can take longer for students and instructors to get feedback.
Sample Student Opinion	"It keeps your schedule slightly normal" and "feel[s] like you're in a classroom setting."	One student said that she works better at night "because I have the idea that the faster I get this done the sooner I can go to sleep, so I'm motivated to actually do my work."

Delineate Clear and Aligned Learning Objectives

The new-to-many learning modality during the pandemic highlighted the importance of clear guidance and learning objectives.

In many of our focus groups, students said that they felt they were completing tasks without knowing the purpose behind them and sometimes even felt that they were not learning anything. As one student put it, "right now online I'm reading the same paragraph over and over again....And then I'm like, what did I just read? And I read it again and pick a little more up, but then I have to read it again."

Another student shared that her professor would primarily present PowerPoint slides for her three-hour class and that it felt repetitive and pointless. While the teaching method certainly had something to do with it, not knowing what one should get out of a lecture can make it difficult to find meaning in a lesson. For both of these situations, clear learning objectives could have helped students see the purpose behind a task and be better able to focus and retain information.

Designing a course with clearly defined learning objectives that are aligned with each class meeting and task is important for all courses, but especially when they are online. Learning objectives help students learn material better and stay engaged and motivated. One study showed that a clear grasp of learning objectives before starting to read made it easier for students to understand the purpose of a piece and in turn look for relevant information that supported their learning and comprehension.[20] Students can learn more of the right content and skills when they know what to look for.

In a digital space, opportunities for informal conversations between peers and faculty are limited. That makes clear and aligned learning objectives essential for students' engagement and motivation, too.[21] Without that interaction, students could have a difficult time understanding and achieving the learning goals for the class. Research has shown that learning objectives can improve students' motivation and performance.[22] In one study, students expressed increased motivation to learn and engage with course content when instructors had clear learning objectives.[23] Students also told us that staying engaged and remembering prior class content was even more difficult during online learning. One student said, "I feel like [it] has to do with the motivation part of it, and especially being around other people in a social setting....I feel like my brain's working at like 60 percent or less of the capacity when I'm working online and through a screen. In-person was easier for me to learn and retain information." A course designed around learning objectives can help students retain information, feel more motivated, and learn better despite the challenges of online learning.

A couple of practices can help students know what the class learning objectives are and how to engage with them. Chunking course content into smaller sections and breaking down main concepts helps students make meaning of information, retain it better, and meet learning objectives. Being clear on how students will be assessed and designing courses in ways that validate students' diverse perspectives and learning styles are ways to support them in meeting learning objectives.[24]

Provide Regular Feedback

The switch to online also affected the feedback loop for students and faculty. Feedback in this sense is any information instructors and students provide each other on their performance in relation to achieving class goals or expectations.[25] It can include traditional, formal assessments such as exams and written essays, but can also include more informal opportunities for both students and faculty to check their understanding, reflect on their progress, and make adjustments along the way.

In an in-person learning experience, students and faculty can rely on those around them to guide their teaching and learning. One student said he missed this part of in-person learning. He said you lose the ability to just "lean over to your person sitting next to you [and ask] 'Hey, how did you do that?' and they would just take a couple of minutes and show you real quick." Instructors also struggled to get immediate feedback in online courses. One student said that his professor required students to keep their camera on because he hated "talking to a bunch of little black boxes." The professor likely wanted to be able to see students' reactions to what he was saying to guide his lecture. When things went online, however, the way students and faculty received feedback changed. Online education made it harder for them to quickly see how they were doing in a class.

Without many of the typical sources of feedback from in-person classes, instructors need to incorporate structured feedback opportunities throughout the course.[26] Historically, research has documented the importance of feedback for learning regardless of modality because it is a way for learners to identify misconceptions or areas for growth that would otherwise go unnoticed.[27] Feedback is also important for students because it provides an opportunity to reflect on their progress in relation to learning goals and class expectations.[28] For faculty, it can help them understand the student experience, how students are progressing in the class, and how they can improve their own teaching.[29] Both parties can benefit from a structured feedback loop.

A quality digital learning experience has various means by which students and instructors can give and receive feedback. One method is by consistently monitoring student progress. Faculty can do this through traditional means of assessment, such as tests, quizzes, essays, and projects for which students receive a grade. They can also take advantage of online learning management systems (LMSs) to gain real-time insight on how students are performing that could go otherwise unnoticed in in-person classes. All of these data points can alert instructors if a student is struggling so that they can reach out and offer support. While LMSs were available pre-pandemic, many instructors did not use them due to lack of familiarity.[30] The pivot to online served as an opportunity for faculty to

embrace the platforms and tools they offer and integrate this type of feedback into their traditional face-to-face classes upon the return to normal.

Similarly, a quality online class should incorporate opportunities for students to reflect on their own progress. Effective online learning requires that students frequently reflect on their progress, make and adjust goals and learning strategies, and identify areas for improvement.[31] Many students might not know that they should do this, or how to, so incorporating self-reflection opportunities is important. Self-reflection opportunities can vary. They could be as simple as an exit question at the end of a lecture or module or as complex as an essay about learning goals and challenges.[32]

Finally, instructors can incorporate opportunities for students to give feedback on different aspects of the class, like their teaching, how the class is going, or how students are doing outside of class. This opens an opportunity for instructors to make adjustments to ensure students are engaged and can succeed. Students can give feedback through surveys, during an assigned time in a synchronous lecture, or through questions incorporated into an exam. A student in our focus groups liked that his professor included this kind of an opportunity in a final. He said, "whenever you give a test or a quiz of some sort, one of your questions that is graded [should be] 'What do you like about what I'm [the professor] doing in Zoom and what don't you like about it?'...[The professor thought] it was the best thing ever." Faculty can also offer opportunities for check-ins with students individually or in small groups.

Build on Supportive Technology

During the pivot to online learning, faculty and students struggled to get access to basic technology and learn how to use that technology. A community college student told us, "unfortunately, a lot of faculty weren't equipped to go online....And so...a lot of courses floundered and were eventually dropped or cancelled. And so that was particularly challenging." One sophomore at a public university said that colleges should give "teachers the resources and the lessons that they need to teach virtually, because especially in March, they just dumped it on them. And a lot of my teachers struggled a lot to figure it all out."

Research and common sense tell us that any technological tools used to facilitate distance learning must be accessible and intuitive. Students and faculty need support to learn how to use them effectively. Research shows that characteristics like a user-friendly structure and minimal tools and links were associated with better engagement with learning technologies.[33] Other studies highlight the fact that certain design principles help support student agency and empowerment when interacting with technology.[34] Technological tools include physical technology like computers, webcams, and microphones as well as software like communications platforms such as Zoom, collaboration tools like Slack, or learning management systems like Canvas. But, as with all technology, it is the human element that makes it function successfully. As one researcher put it, "dazzling technology has no value unless it supports content that meets the needs of learners."[35]

There are two key elements when deploying technology to support learning. The first is to ensure students can access and navigate technology. The other is to support faculty with access to technology and training to use that technology for teaching.

Ensure students have access to and can navigate the minimum technology.

The digital divide is a fact of life for college students, not just those enrolled in K–12 schools.[36] As one student at a private nonprofit college put it, "I am absolutely confident, 100 percent sure, that I had classmates that didn't have access to technology, whether that was a computer or internet...[everything from] 'I don't have a computer at all,' to 'my computer suddenly stopped working,' to 'I don't have internet' to 'I don't have the best internet to do Zoom calls.'" Another student at a community college said, "I live out in the middle of the country. I didn't have access to Wi-Fi. And here I am having to call into these [classes] and I'm scrambling trying to get a mobile hotspot and ended up buying a whole second cell phone just for the Zoom meetings just to be able to devote the data usage on that phone." That community college student was not the only one to turn to a phone to support online learning. One senior at a public university shared that "there are definitely students who don't have as much access. And

are ending up writing essays and stuff on their phone. One friend told me, 'I'm getting points off because my formatting is off. And I've tried to explain this to my professor. I can't really fix the formatting on my phone.'" Students cannot participate in their education if they do not have the basic tools to do so.

Students should also be trained on how to use technological tools and these tools should be easy to use.[37] It may seem obvious, but if students do not know how to use the technology, the experience of online learning devolves into frustration for everyone.[38] We heard from many students who were frustrated with a lack of training in using the technology that was essential for the pivot online. One sophomore at a state university who was taking hybrid classes pointed out that "the students just need more support in learning the new technology. Learning how to use all these crazy third-party websites. How are we supposed to automatically know how to use this? [Last semester] it was, 'here's the website, click on it. If you know it, you know it; if you're having trouble reaching the third party's help desk, don't come to us about it.'" Another sophomore at a community college recommended that colleges "have better resources as to how to teach people how to use Zoom. The biggest issue...is stuff crashing and people not understanding how it works." Clearly, colleges need to consider the quality of tools and the training around tools to make a quality online experience.

Help faculty understand the tools and technology at their disposal.

In our research, we also heard a high level of frustration with the lack of training for and adaptation from faculty. One junior at a state university who was taking virtual classes said, "our professors did not get good, in-depth training on how to use the necessary technology. I think it was quick and rushed. I have one teacher who doesn't know how to use Canvas—I have to email her every day. It's ridiculous." Another senior at a state university this fall said, "even now, a professor I have doesn't understand how to properly use Zoom, and screws up a lot, and he has crashing problems, and file-sharing problems, like the PowerPoint won't update, and he doesn't know how to fix this, and we spend 15 minutes of our hour-long class of him doing technical issues, and then it's like, 'OK, we didn't get to that, so go teach yourselves now guys, later.' And that's happened a lot more....You're expecting a lot from professors who aren't technologically savvy in the first place." Another senior at a public college told us, "I had one instructor who would just post her lecture transcripts onto our student portal, as opposed to recording a lecture, and those notes were not easy to interpret. They were not easy to learn from and l get that she was doing her best and had her own children. I'm not mad about it. It just wasn't an effective way to teach students. Eventually she figured out how to do recordings." Not only do these failures create frustration, they waste precious learning and teaching time.

For some students, disabilities make it hard to engage in online classes that do not have accommodations. Not only is it the right thing to do for colleges and faculty to ensure that students with disabilities have access to online learning, it

is also federal law. One expert told us that some colleges "did not pivot [online] with accessibility in mind, and they were not able to provide a reasonable accommodation to their learners who needed one at that point. A lot of accessibility advocates and allies have pushed for institutions to integrate into their procurement processes, an accessibility check to make sure that the products that they're buying are actually accessible." A high-quality online experience needs to be accessible to all learners. Faculty should have the support to make this a reality.

Support Student Connection and Community

For students, being alone in a room all day without the opportunity to mingle with peers during or after class made digital learning during the pandemic even more challenging. One student shared his perspective, stating, "I feel like not having the in-person interactions just makes the learning...less effective for some reason. I'm not sure if it's atmospheric, if it's your other senses, [or] if it's having the human connection...because there is a disconnect when you see screens. There's been research showing that you don't view people as human when you're viewing them through a screen as you would in person; it's just something with mirror neurons. I think that might have a pretty significant effect on why my learning just feels like it is operating around 60 percent of normal capacity."

Opportunities for informal interactions, like bouncing ideas off of peers and learning from each other, are much more limited in online learning. This makes it difficult for students to foster meaningful relationships with classmates and faculty and create a sense of community and belonging. Even before the pandemic, students and faculty had difficulty creating connections online.[39]

While creating connections online is challenging, it is important for increasing student engagement and creating a virtual sense of community. Research has shown that interpersonal interactions are even more important online due to the isolated nature of the modality.[40] And because it does not happen naturally in a virtual space, instructors must be intentional about designing a course that will create a digital learning community.[41]

There are different types of relationships that can help students stay engaged and improve the quality of an online class, including the student to instructor relationship and the student to student relationship. The student-instructor relationship consists of the quality of the relationship between students and instructors, which some researchers argue is the most important.[42] This type of interaction can include communication via emails, discussion boards, lectures, and office hours. In one study, the strength of the student-instructor connection was most predictive of student course grades.[43]

Courses with high-interaction instructors had higher levels of student satisfaction, as high-interaction instructors frequently posted announcements, reminded students of upcoming deadlines, responded to students' inquiries in a timely manner, and frequently asked for and responded to student feedback. In one study, students reported feeling greater motivation and satisfaction with their class when the instructor requested feedback because they saw that their requests, needs, and opinions were important.[44] This helped students feel connected to their professors as well.[45]

The student to student relationship is another important avenue for creating connection. Students told us that interaction with their peers helped them stay motivated and engaged with their courses. One student we spoke to said, "I found that whenever I was in the learning setting, I would always learn off other students in breakout rooms," and they "kind of just let everyone talk it out together. And I found that to be a little less dry learning, which helps me stay motivated." In addition to fostering connection and motivation, peer connections help students work together to learn and resolve questions.

Students in our focus groups said they really missed opportunities to interact with their peers. Breakout rooms helped create a stronger sense of connection for students. Beginning each synchronous session with exercises and icebreakers and scheduling virtual study groups were other ways to create a space for students to motivate each other and stay engaged with their courses.[46] We even heard from a student whose favorite class was a Slack channel, after the pivot to online in the spring of 2020. That collaboration and messaging platform allowed for immediate feedback from the instructor and peers, allowing for the creation of strong peer relationships.

Fostering meaningful interpersonal relationships online increases motivation, engagement, and satisfaction and positively affects students' grades.[47] It makes courses "sticky" by connecting students to the content and their peers. The quality of interpersonal interactions has a significant impact on their grades and learning outcomes during the isolating experience of online learning.[48]

Policy Recommendations

Federal higher education policy has been historically indifferent to education quality, focusing instead on supporting academic research and reducing student costs. But the pandemic year underscored how that limited scope will be inadequate in the future. Students everywhere need learning opportunities that are both affordable and effective, and the use of technology will play a critical role. To help provide students the access and flexibility of high-quality distance education, the federal government should consider the following recommendations.

Support Access to Technology and Quality Broadband

One thing driven home by the pandemic is the fact that many college students live on the edge of not being able to do their school work with the technology at hand.

Prior to the pandemic, many students did not have reliable access to broadband. This was especially true for low-income students and rural students.[49] So when courses pivoted online, these students struggled to log into their classes and complete their coursework. Even those who did have internet at home did not always have quality broadband. In a survey conducted by New America and Third Way, 22 percent of college student respondents reported having major challenges accessing stable and high-speed internet. This could amount to approximately four million students enrolled in higher education who did not have reliable connectivity across the country.[50] Without their college's free Wi-Fi, students made do with what they had or did not log in at all.

The federal government should ensure access to affordable, quality, reliable broadband for all college students.[51] The shift to online showed that reliable broadband is an essential service and that access is unequal between demographic groups across the country.[52] The federal government should continue providing stipends for families through the Emergency Broadband Benefit Program and expand stipend amounts.[53] This would make strong, reliable, quality internet more affordable. It should also invest in increasing connectivity in rural areas that lack broadband infrastructure. This investment would create an environment where all students have access to the internet and can pursue their education online no matter where they live.

Many of these same students did not have the hardware to have a successful online experience during the pandemic. Without an adequate computer at home, students were left without a means to get their work done when campus computer labs and laptop loaner programs closed during the pandemic. For those

students whose households did have a computer, many had to share it with others who were also in school or were working from home. Often, the technology families did have was outdated and could not keep up with the household's digital needs.

The federal government should also create a grant program for colleges providing technology tools to students who need them. Across the country, 44 percent of college students reported having to purchase a computer for their studies during the pandemic.[54] Many colleges across the country used funds from several federal COVID response packages to provide students with tools like computers, webcams, and desks. We spoke with one college that had created a request form as part of registration that allowed students to flag if they needed any of these resources. The school plans to continue this after the pandemic. Had it not been for the availability of funds to help colleges provide students with technology tools, many students would have been left without the ability to continue their education during the pandemic.

The end of the pandemic will not bring the end for the need for technology tools to complete an education, even if many campuses go back in person. And without the proper technology, students will not be able to succeed in online education, regardless of how well faculty are trained or how a course is structured. The federal government should continue to provide institutions with funding to offer technology tools to students who need them and invest in broadband access so that digital learning has a strong environment to thrive in.

Improve the Collection of Data on Distance Education Programs

As the pandemic forced millions of students online overnight, one thing was glaringly apparent: our higher education data infrastructure could not keep up. Part of the challenge with ensuring quality in digital learning is a dearth of data on what is happening. Like much of federal higher education data, this lack of information leaves huge gaps in knowledge about what actually happens in online education. Without data, we cannot know how students are faring, where there are gaps, and how to support students and institutions to fill in these gaps. Data is key in knowing what needs work.

Most information on distance-education students is reported through the Integrated Postsecondary Education Data System (IPEDS), where data are reported in aggregate. Reporting happens long after the fact; the effects of the pandemic will appear in the IPEDS data roughly three years after the start of the national emergency. Federal administrative data sources lack information on distance education status, race and ethnicity, and other student characteristics that could have helped measure the effects of the pandemic on students and on Black and Latinx students almost in real time. Those data would have informed policymakers who were working to develop solutions for students as the

pandemic wore on. In fact, federal data did not even reflect the names or numbers of institutions that moved to remote learning in response to the pandemic, or when they reopened. Still, the effects of the pandemic will wear on for years to come, and it is not yet too late to improve those data.

One thing the Department of Education could do is add a flag in the National Student Loan Data System (NSLDS) that indicates whether a student conducted his or her education online and how many credits were online. Congress could also pass the College Transparency Act, which will help to plug many of the gaps in existing federal data that undermine the utility of those data.[55] The Education Department should take what steps it can in the meantime to improve the collection and use of data, including beginning to gather information about federally aided students' distance-education status and ultimately publishing information about those students' successes in higher education.

Establish and Fund a Federal Research Agenda

There is a lot of research about what works in online education, but much of this research is based on small sample sizes, case studies, theory-based frameworks, student and faculty surveys, and broad conclusions based on experience.[56] While that work is certainly valuable, there are still gaps in the literature, including empirical research on course modality, performance by student groups, and the effectiveness of quality online learning rubrics in practice. These would be well addressed by a federally funded research agenda.

A national research agenda could help shed light on student success within online course modalities, whether synchronous, asynchronous, or hybrid. Currently, the field can identify pros and cons to each modality based on practice and experience. While these practice and qualitative insights are valuable, there has yet to be empirical research on student success in synchronous, asynchronous, and hybrid online classes. In other words, students have yet to be randomly assigned to an online course modality and tracked to see their outcomes. We do not know how students fare in each of these modalities compared to in-person learning and compared to each other.

Similarly, we know from practice that certain modalities can work better for particular student groups, but there is also little to no empirical research proving this. A national research agenda could help identify which modalities work better for student subgroups, such as first-generation students, students with dependents, or students of color, and why. This is particularly important considering the equity implications of online learning that emerged from the pandemic.

The literature also shows that digital learning can be comparable to in-person learning, but students can struggle due to lack of some of the support structures

taken for granted in in-person learning. A national research agenda could tell us how structures and practices meant to support students in their online learning affect their success. In particular, this research should look at what practices and structures are most helpful to students of color, low-income students, first-generation students, students with dependents, and other vulnerable student groups.

Lastly, rubrics that purport to support quality in online learning should be empirically tested to see if they actually do support student success.[57] The quality indicators in these rubrics can vary across sources and be confusing for practitioners. Like much of the research on digital learning, these rubrics are based on years of practice, learning theory, and evaluation on a small scale. However, there is minimal research quantitatively evaluating the effectiveness of quality indicators in these rubrics. A national research agenda supporting the empirical validation of such rubrics could help show which quality indicators are proven effective.

Create a Federal Grant Program to Support Professional Development

Higher education has a notorious lack of training and professional development for faculty to learn to be teachers. Instead, most faculty are experts in their field and are left to learn (or not learn) about what works in teaching through trial and error. Despite knowing the importance of certain aspects of digital learning, such as creating community, faculty do not have the training to know how to do this in their classes.[58]

This lack of training became uncomfortably clear during the pandemic. Students in our focus groups, for example, expressed dissatisfaction with how many of their instructors taught classes, citing lack of engaging material, little interaction with peers, and sometimes even reading off of PowerPoint slides. While faculty did their best in managing the quick pivot online and various consequences of the pandemic, many poor teaching practices existed in pre-pandemic in-person learning. These were only exacerbated by the lack of in-person interactions and structures during the pandemic, which made it more challenging for students to learn in these classes.

The federal government should consider providing colleges with grants to incentivize professional development in online teaching and learning. This type of grant program would support institutions in investing in the quality of their online course offerings and would also improve teaching and learning in in-person classes. While certain federal grant programs, like the Strengthening Institutions Program, include professional development in them, it would be worthwhile to create a grant only for this purpose.

This funding could be tied to faculty financial compensation. If instructors can show that student outcomes improve after their training, they could receive a raise or financial award. The professional development offered through this grant program should be based on existing teaching and learning research, as well as on findings from new work that could result from a federal investment in a national research agenda. Investing in faculty teaching and learning professional development could be another strategy for closing completion equity gaps in higher education.

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