

EVIDENCE SUMMARY

What Works in Online Learning in Higher Education

March 2022

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Brief Description

Online learning in higher education has grown rapidly over the past decade. The COVID-19 pandemic was an unplanned experiment that revealed both the importance of online education and the limited capacity for it at national, institutional, and individual levels in many countries. This brief summarizes critical conditions for online learning success, as well as evidence on the effectiveness of online education in improving access, engagement, and learning outcomes in higher education. It is intended as a programming resource for USAID, its partners, higher education institutions (HEIs), and higher education systems.

This document contains the following sections:

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SECTION I:

Importance of Online Learning in Higher Education

Online learning is an increasingly prevalent form of distance learning in higher education. Beyond pandemic-driven necessity, HEIs commonly pursue online learning in an effort to promote access and lower costs for both students and institutions. When implemented with consideration for principles of universal design for learning (UDL) and learner-centered pedagogy, online learning has the potential to enhance engagement and improve learning outcomes.¹

¹ Chen 2018; Rose et al. 2006

However, there are serious impediments to realizing higher education’s goals for online learning. Particularly in low and middle-income countries (LMICs), higher education systems and institutions may face inadequate information technology (IT) infrastructure and equipment, faculty inexperience with technology, and intermittent electricity supply that prohibits reliable online learning access.³ In addition, while the data is insufficient to draw firm conclusions, some evidence suggests that the required investment in technology, higher cost of developing online courses, and other online program costs may, at least in the near term, exceed the anticipated savings from the reduced need for physical classrooms, which in turn limits HEIs’ ability to reduce student tuition.⁴

RELATED USAID GOALS



Higher education capacity development is a key outcome targeted by [USAID’s Higher Education Program Framework](#).² One of the ten questions in USAID’s Higher Education Learning Agenda includes key considerations for online and distance learning features: “How can the viability and effectiveness of online and other forms of distance education be improved?”

USAID considers three primary domains when evaluating its distance learning programs: reach (or access), engagement, and outcomes.⁵ In this brief, we will explore research findings across those three domains to provide insight on critical conditions for success and evidence-based strategies to improve programming in the burgeoning field of online learning in higher education.

SPOTLIGHT: Online learning program prepared UFH for COVID-19



The [University of Fort Hare](#) (UFH) in South Africa is using Remote and Virtual Education Laboratory (ReVEL) technology to provide online instrumentation and interactive, simulated experiments for STEM learning and research to its students, as well as students at high schools that lack laboratory facilities.⁶ The lab is connected to universities in other countries so that students can conduct joint experimentation in STEM disciplines. During the COVID-19 lockdown in 2020, laboratory training at most universities worldwide was forced to stop. UFH students, however, were able to continue conducting laboratory experiments online from their homes using ReVEL.⁷

SECTION 2: What is Online Learning?

Online Learning in Higher Education is delivered through a spectrum of modalities. Higher education delivery modes vary in their use of the Internet (Exhibit 1).

² USAID 2021

³ Sife, Lwoga, and Sanga 2007

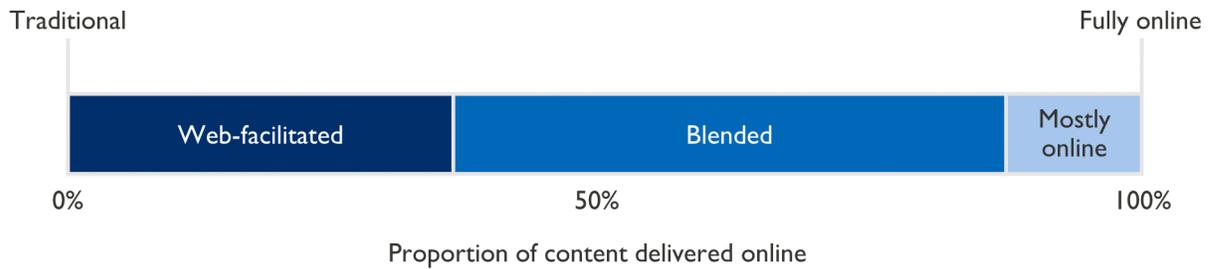
⁴ Xu and Xu 2021

⁵ Morris, Farrell and Venetis 2021

⁶ Linden 2019

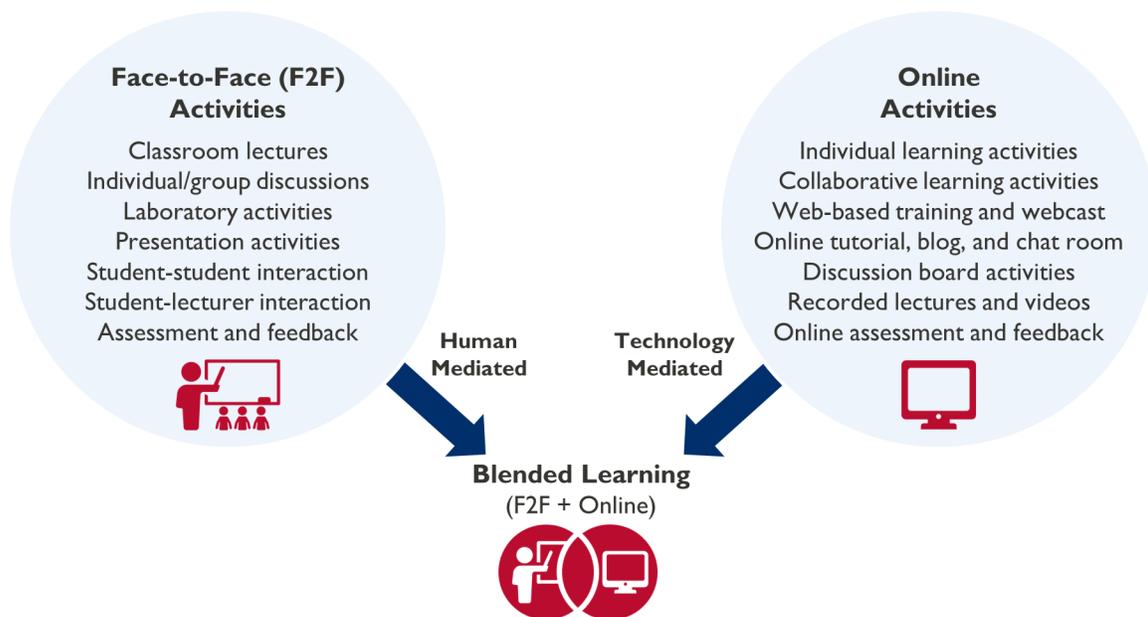
⁷ University of Fort Hare 2020

Exhibit 1: Continuum of educational delivery modes



- **Traditional courses** deliver content in writing or face-to-face (F2F), primarily through lecture, and make little or no use of the Internet.
- **Web-facilitated courses** retain the F2F lecture as the primary means of delivering content but use a learning management system or web pages to deliver the syllabus and assignments.⁸
- **Blended learning**⁹, also known as hybrid learning, uses both F2F and online delivery (Exhibit 2). The online component takes the form of video lectures and slide presentations, online discussion forums, chat rooms, wikis, blogs, educational simulations and games, online assessments, feedback to students, or other online activities, and typically has fewer F2F meetings. A common form of blended learning is the flipped classroom model, which will be discussed later in this brief.
- **Fully online courses** deliver content primarily online and typically have no F2F meetings.

Exhibit 2: Face-to-face, online, and blended learning activities



Based on a model by Anthony et al. 2020.

⁸ Allen and Seaman 2016

⁹ The [Online Learning Consortium](#), a collaborative community of higher education leaders and innovators, defines blended learning as having 30–79 percent of content delivered online, but there is no official or uniformly accepted standard.

SUMMARY OF KEY FINDINGS FOR ONLINE LEARNING IN HIGHER EDUCATION

Evaluate these conditions prior to undertaking online learning:

- **Within the region or country**, look at penetration, cost and speed of Internet, availability and cost of computer technology, supply of technical professionals, legal costs or barriers to sharing material online, reach of the electrical grid; ministry personnel's knowledge about online education, content repositories in the national language of instruction, and public perception of online learning.
- **Within the HEI**, evaluate senior leadership and faculty's knowledge of and experience with online education, existence of an online learning policy and strategy, IT infrastructure and equipment, staffing of IT and instructional design professionals, faculty perceptions of online learning, and available funding to address gaps in these critical components.
- **Within the potential student population**, consider digital literacy, preparation for active, student-centered learning, access to the Internet, and financial means.

Any findings that could present a barrier to success should weigh into a decision to proceed and be addressed in implementation plans.

Consider these evidence-based findings related to online learning:

Reach-related findings:

- Online learning lowers students' perception of the geographic, social, and economic barriers to higher education.
- It cannot be assumed that online learning reduces institutional costs and student tuition.
- Fully online delivery with larger class sizes may reduce costs, but comes with trade-offs in terms of engagement and learning outcomes.
- When principles of UDL are applied, online learning can improve access to higher education for all students.

Engagement-related findings:

- Engagement is influenced more by pedagogical methods than by the mode of delivery.
- Blended learning has the potential to achieve greater engagement than would be possible in either the F2F or fully online environments, which can lead to higher retention and completion rates.
- Teaching online, when done by willing and prepared educators, can induce a focus on engagement and a shift toward student-centered pedagogy.
- Interactive tools can increase student-educator and student-student engagement in an online learning environment.
- At-risk students, such as those with a lower grade point average and economic hardship, tend to fare worse in an online environment.

Outcome-related findings:

- Application of systematic instructional design and student-centered pedagogy improves online learning outcomes.

- Fully online and blended learning can produce learning outcomes equal to or greater than F2F learning, according to a large volume of research.

Apply these strategies to improve online learning implementation:

Course or program design:

- Guide program and course design using a framework such as the Analysis, Design, Development, Implementation and Evaluation (ADDIE) model.
- Ensure programs and courses apply a student-centered pedagogy and principles of UDL.
- Consider a blended-learning model, such as the flipped classroom, whenever possible.
- Limit class size according to the pedagogical goals of the course.

Faculty and student support:

- Adequately prepare faculty to teach online, including making use of video, interactive exercises, animations, and online communication tools to keep students engaged and provide frequent feedback.
- Provide online learning orientation sessions or modules before students take online classes and consider ongoing support for at-risk students.

Technology choice and usage:

- Utilize a learning management system (LMS) for managing, monitoring, and analyzing student engagement and progress, and continuously improving courses.
- Monitor online learning analytics, often included as a feature of an LMS, to identify at-risk students and provide online and person-to-person support services to those identified as needing assistance.

SECTION 3:

Findings on Critical Conditions for Online Learning in Higher Education

While a significant body of evidence shows that online learning can produce outcomes equal or greater to F2F learning¹⁰, certain conditions are critical to success, and the research shows that barriers to implementation may be substantial. Technological infrastructure and other systemic conditions within the region or country must be amenable. Higher education systems and HEIs must plan carefully and invest in the needed technology and training. Faculty and students must be persuaded of the merits of online learning, decide to adopt it, and learn to use it. Barriers must be addressed at the level of education ministries, HEIs, educators and their academic units, and students. This section will outline evidence-backed barriers at each level of the education system, as well as strategies for overcoming them.

¹⁰ Means et al. 2009

Level of the education system	Barriers to look for 	How to overcome 
National and System-level Conditions	<p>Possible national and system-level barriers include limited access to reliable electricity, Internet issues (low penetration, high cost, and low speed), technology issues (limited hardware options and high cost), human resource issues (limited supply of trained technicians and instructional designers), legal issues (taxation on computer equipment and intellectual property rights that hinder open sharing of online material), and limited online-education knowledge of ministry personnel. Other barriers include small government budgets for education and technology, limited educational repositories in the national language of instruction, and public perception that online education may be inferior.¹¹</p> <p> SPOTLIGHT: LMICs with lower digital capacity and few skilled providers develop online learning programs through partnership.</p> <p>A strategy that has enabled LMICs with limited digital capacity to offer fully online education is partnership with a country offering more advanced expertise and technology. For example, through the Pan-Africa e-Network Project, India set up a fiber-optic network to provide satellite connectivity, tele-medicine and tele-education to countries in Africa. As a part of the overall initiative, tele-learning centers were established at five African universities where students enroll in online courses taught by Indian universities.¹²</p>	<p>An online learning strategy and an accompanying action plan can help to address these broad infrastructure and resource barriers. In most countries, the relevant higher education ministry is the appropriate agency to develop these documents and to advocate with higher authorities (e.g., the prime minister’s office) for coordination among government ministries and private-sector organizations in carrying out the action plan.</p>
Institution-level Conditions	<p>Potential institutional barriers to online education in HEIs include senior leadership and faculty’s lack of online-education knowledge and experience, nonexistent or ineffective online learning policy and strategy, administrative structures and traditions that limit educators’ voices in decision-making, inadequate IT infrastructure and equipment, inadequate IT and instructional design support, and intermittent local electricity supply.¹³ Lack of funding to train educators in online and student-centered pedagogic approaches is an additional institutional barrier.</p>	<p>To succeed in online education, HEIs need to bring the full weight of top- and middle-level administration to bear in removing material and social barriers. In terms of hard inputs, an ample budget for infrastructure, training, and technical and pedagogical support is essential. In terms of management and communications, administrators must give voice and flexibility to educators who are on the front line of online learning implementation. It is especially important for administrators to pay attention to the social and psychological dimensions of online learning adoption and to understand and effectively address educators’ and students’ concerns and fears.¹⁴</p>

¹¹ Palvia et al. 2018

¹² Trines 2018

¹³ Sife, Lwoga, and Sanga 2007

¹⁴ Singh and Hardaker 2014

Level of the education system	Barriers to look for 	How to overcome 
	 <p>SPOTLIGHT: Facilitating Preparedness and Resiliency of HEIs through Online Learning</p> <p>The University of Jordan (UJ) began planning for online learning in 2003, made online learning a strategic objective reflected in its institutional vision statement, and created an e-Learning Office in 2012. The university developed a plan of action for deploying the necessary infrastructure, equipment, and software and for training students and administrative staff for online learning.¹⁵ In 2012, it started using an open-source LMS and actively promoted and supported its use. Initially, the LMS was used mainly in F2F courses to deliver course syllabi, assignments, and announcements and served as a portal for students to upload completed assignments. A 2014 study of student use and perceptions of the LMS at UJ found that most students were able to use it competently, though the level of use varied across faculties and departments.¹⁶ When the COVID-19 pandemic hit in 2020 and all teaching and learning shifted online, server capacity was inadequate to support UJ's 47,000 students. University officials sought the help of an external service provider to quickly move UJ's LMS software and content to a cloud-based hosting environment to accommodate a far larger number of users.¹⁷ The prior years of investment and experience with online learning at UJ had laid a foundation for resilience that allowed the university to pivot rapidly to fully online learning during the pandemic.</p>	
Educator-level Conditions	<p>Possible educator barriers to online education include technological knowledge and skill issues (lack of digital literacy and competence, lack of knowledge and skills for creating online content and for course management, and lack of time to prepare online materials and interact with students online), pedagogical issues (lack of knowledge about how online technology can be integrated with teaching, and resistance to shifting from teacher-centered to student-centered teaching methods), and psychological issues (fear of loss of control of the teaching process).¹⁸ A certain amount of educator resistance is inevitable since online delivery requires extra work initially to prepare materials and learn to use the technology. Educators who teach online unwillingly or unenthusiastically are likely to merely replicate traditional practices and content and ultimately become frustrated with poor learning outcomes and low teacher and student satisfaction.¹⁹</p>	<p>Providing educators with research-based evidence on benefits of online and blended learning for students and teachers can help reduce resistance.²⁰ Other strategies include training on online technology and how it can be integrated with teaching, training on student-centered pedagogy, support for use of an LMS and other technology, and an HEI newsletter or website that explains and provides examples of online learning activities.²¹ In many HEIs, these functions are centralized in a center for teaching that coordinates training and supports educators in innovative use of online technologies and sponsors and disseminates online learning research.²²</p>

¹⁵ Al-Shboul et al. 2013

¹⁶ Majdalawi, Almarabeh, and Mohammad 2014

¹⁷ Verdaguer 2021

¹⁸ Liu, Geertshuis, and Grainger 2020

¹⁹ Rasheed, Kamsin, and Abdullah 2020

²⁰ Agbonlahor 2006

²¹ Mtebe and Raphael 2017

²² Curran 2004

Level of the education system	Barriers to look for 	How to overcome 
	 <p>SPOTLIGHT: HEI administrative decisions affecting educator adoption of online learning Brigham Young University-Idaho (BYUI), a four-year U.S. university with 15,000 undergraduate students, successfully transitioned many courses to blended or fully online formats over a period of several years. Three vital components in adoption of online learning by BYUI educators were identified.²³ These components are:</p> <ul style="list-style-type: none"> ■ Strategy: definition and policies, forms of advocacy, scope of implementation, and purposes for implementation ■ Structure: decision-making and governance, identification of online learning models, and evaluation data on online learning effectiveness) ■ Support: technical support, pedagogical support, and faculty incentives <p>Educators at BYUI cited the availability of infrastructure that allowed them to quickly upload materials to the LMS on campus as the most important factor in their adoption decision. Following in importance were availability of technological support, availability of pedagogical support, and whether BYUI's reason for promoting online learning aligned with the educators' goals. They identified the removal of technological and pedagogical knowledge barriers as more important elements in the administration's advocacy of online instruction than financial incentives or promotion and tenure considerations.</p>	
Student-level Conditions	<p>Student barriers to online learning include technological knowledge and skill issues (lack of digital literacy and competence, poor preparation for active learning), Internet issues (residing in a locality without Internet or with low bandwidth), financial issues (insufficient means to purchase computers and Internet connection), and psychological issues (procrastination and feeling of isolation in the online environment).²⁴</p>	<p>Some of these barriers can be addressed through orientation to online learning before coursework begins, responsive educator interaction with students, provision of tutorials and other academic support for students, and establishment of trust and a sense of community in the online course.²⁵ Students on the autism spectrum or with other learning disabilities may struggle with online learning and may need special support and accommodations. Researchers have found that interaction with the instructor is particularly important for the success of such students.²⁶</p>

²³ Porter and Graham 2016

²⁴ Rasheed, Kamsin, and Abdullah 2020

²⁵ Lockman and Schirmer 2020

²⁶ Adams et al. 2019

SECTION 4:

Findings for Improving Online Learning Implementation in Higher Education

Providing access to higher education for a wider range and greater number of students is a high priority in many countries and, when actions have been taken to overcome the potential barriers described above, online learning can contribute to this goal. To produce online learning that is accessible, engaging, and effective the research shows that, among other things, it is critical to strive for a reduction in institutional and student costs, to choose an appropriate delivery mode, and to pay careful attention to course design and faculty preparation. Following the framework of the USAID Roadmap for Measuring Distance Learning²⁷ this section presents research findings related to improving the reach, engagement, and outcomes of online learning in higher education.



Findings Related to Improving Reach (Access)

Reach of higher education through online learning relates to the ability of the intended audience to access the learning.²⁸ To understand the breadth of online learning's reach, it is important to look at who is able to access distance learning from an economic, technological, and usability perspective, and who is left behind.

Online learning lowers students' perception of the geographic, social, and economic barriers to higher education. Fully online higher education is a potentially attractive option for students whose geographic, social, or economic circumstances make F2F class attendance difficult or impossible. One way it does this is by providing higher education options not fixed in time and place. This is especially beneficial for students who cannot physically attend class or prefer not to. Students can access materials on their own schedule and at their own pace, making higher education accessible to persons with work or family responsibilities that allow little schedule flexibility.²⁹ Being able to attend courses online may reduce transport and/or housing costs associated with attending university in-person; however, as will be discussed below, online learning may not necessarily result in lower tuition costs, and more research is needed on strategies to reach students in the lowest income levels who face additional barriers such as access to technology and the internet.

It cannot be assumed that online learning reduces institutional costs and student tuition.

Online delivery is often assumed to lower the cost of higher education. Unfortunately, there is little direct evidence on this issue because HEIs typically do not release program and course level costs. In principle, online learning has the potential to increase enrollment, reduce classroom congestion, and lower capital costs for buildings and classrooms. The net effect on capital costs is unclear at this time because online learning requires initial investment in information and communication technology (ICT) infrastructure and equipment, capacity development for faculty and staff, and development of online learning materials.

As no empirical studies on the complete cost structure of online higher education for institutions and students were available at the time of this publication, the best that can be done is to infer the cost structure by analyzing tuition rates—though such studies were found only for the United States. A study of online tuition in HEIs in the U.S. found that those with a higher share of online students charge lower

²⁷ Morris, Farrell and Venetis 2021

²⁸ Morris, Farrell and Venetis 2021

²⁹ Birbal, Ramdass, and Harripaul 2018

tuition, though the effect was small for public universities and no effect at all was found for private universities.³⁰ A 10 percent increase in the share of students taking all courses online in public universities was associated with a 1.4 percent decrease in tuition and fees. From 2006 to 2013, the authors also found that tuition for full time online learning fell by 34 percent on average. It is possible that as online technology and pedagogy improve, HEIs may be able to reduce costs and tuition may decline further. A report by the government of Florida found that out of the nine state public universities that offered both F2F and fully online undergraduate courses in 2014–2015, online tuition was higher in six universities, the same in one university, and less in two universities.³¹ No clear conclusion has yet emerged from the small body of evidence on whether online learning reduces online tuition or other institutional costs.

Fully online delivery with larger class sizes may improve access through a reduction in costs, but comes with trade-offs in terms of engagement and learning outcomes. For HEIs, fully online delivery is a way of expanding enrollment without requiring additional classrooms or other facilities.³² There is reason to question, however, whether online delivery can steeply reduce cost and tuition without diminishing quality.³³ Education is an inherently labor-intensive activity and there are limits to how much technology can change this. In both online and F2F classes, educators tend to lecture more, place less emphasis on active and collaborative learning, and have less interaction with individual students as class size increases. Many, though not all, studies find that learning outcomes, student satisfaction, and other outcome indicators decline as class size increases.³⁴ A recent article on class size in online higher education proposes that classes of 40 or more students are feasible in foundational courses that emphasize facts, whereas classes of 15 or fewer students are needed for online courses aimed at development of higher order thinking, complex knowledge, and student skills.³⁵ When online class size increases, educators' workload burden increases, especially for educator-student interaction, and educators are less likely to use active learning pedagogy.³⁶

An example of fully online learning that is prevalent in LMICs is the online distance learning university (ODLU).³⁷ ODLUs are primarily public, have no or few academic requirements, accept all students regardless of age, and offer instruction online or through print-based correspondence. They prioritize educational access and charge low tuition.³⁸ Most are large; for example, Indira Gandhi National Open University (IGNOU) in India and Open University of China each have more than three million students.³⁹ Their student-educator ratios tend to be very high, though supplemented in some institutions by teaching assistants. Quality and reputation are continuing challenges for ODLUs⁴⁰; therefore, while this model does offer some important insight into improved access, it should not be considered in isolation from other strategies for engagement and improved learning outcomes.

When principles of universal design for learning are applied, online learning can improve access to higher education for all students. Access to online learning can be improved through use of UDL principles for the design of instructional goals, methods, materials, and assessments.⁴¹ The aim of UDL is to give everyone equal educational opportunity by reducing learning barriers and providing the

³⁰ Deming et al. 2015

³¹ Florida Board of Governors 2016

³² Trines 2018

³³ Xu and Xu 2019

³⁴ Cuseo 2007

³⁵ Taft, Kesten, and El-Banna 2019

³⁶ Taft, Kesten, and El-Banna 2019

³⁷ See a [global list of 65 open universities worldwide](#).

³⁸ Prasad 2018

³⁹ Contact North 2021

⁴⁰ Daniel 2021; Trines 2018

⁴¹ Rose and Meyer 2002

accommodations and supports needed for high achievement for all students, including persons with physical or learning disabilities.⁴² UDL focuses on accommodating various learning styles and abilities by giving learners multiple ways of acquiring knowledge, giving learners alternative ways of demonstrating knowledge, and providing multiple means of engagement.



Findings Related to Improving Learner Engagement

Student engagement is defined as the extent to which students participate in the learning process as intended, affecting retention and completion.⁴³ Online programs tend to have lower retention and completion rates than F2F programs, and student-educator interaction and other forms of engagement are predictive factors.⁴⁴ The research points to a number of important instructional and tool choices to maximize engagement in online learning environments.

Engagement is influenced more by pedagogical methods than by mode of delivery.⁴⁶ A vast amount of research is available to help HEIs and educators improve engagement and retention.⁴⁷ For example, student-centered learning is an evidence-based pedagogical approach that prioritizes engagement.⁴⁸ It shifts the focal point of education from teacher to student with the aim of helping the student become an active gatherer and organizer of knowledge and become psychologically invested in the learning process. Compared to the traditional approach, student-centered approaches make less use of lectures and more use of learning activities in which students, under the guidance of the educator, cooperatively explore and construct knowledge and acquire skills. Through cooperative learning activities, they teach each other and themselves.

Blended learning has the potential to achieve greater engagement than would be possible in either the F2F or fully online environments, which can lead to higher retention and completion rates.

Retention and completion rates of blended programs have been found, in some cases, to be higher than for F2F programs.⁴⁹ It appears that blended learning's capacity to distribute course components across the two environments—F2F and online—can offer optimal engagement conditions. For example, online learning has been found to enhance some types of engagement, such as quantitative reasoning, while inhibiting other types, such as collaborative learning.⁵⁰ The

BLENDED LEARNING'S RELATIONSHIP TO LOCAL CAPACITY



In addition to its potential engagement advantages, blended learning may align well with local online teaching and technological capacity, HEIs may consider transitioning from traditional learning to blended learning before (or instead of) venturing into fully online learning.⁴⁵ Blended learning allows HEIs to gradually acquire technology and create support services for online learning and to provide training for educators and students to acquire the needed knowledge and skills. Educators can gradually enrich courses digitally by substituting online components for some of the F2F components.

⁴² Robinson and Wizer 2016

⁴³ Tight 2020; Singell and Waddell 2010; Reason 2009

⁴⁴ Delnoij et al. 2020

⁴⁵ Bailey et al. 2018; Brooks, Grajek, and Lang 2020

⁴⁶ Jensen, Kummer, and Godoy 2015

⁴⁷ Tight 2020

⁴⁸ Lee and Hannafin 2016; Misseyanni et al. 2020

⁴⁹ Dziuban et al. 2018

⁵⁰ Dumford and Miller 2018

authors suggest that online technology's ability to provide automatic feedback on quantitative reasoning activities may be a factor in greater student engagement. Employing a systematic method of instructional design, such as the ADDIE method, allows elements of the instruction to be appropriately allocated to each environment.⁵¹

Teaching online, when done by willing and prepared educators, can induce a focus on engagement and a shift toward student-centered pedagogy. When educators begin teaching online, they quickly realize that engagement cannot be taken for granted because of the lack of physical presence, eye contact, and body language. The obvious challenge of engaging students in the online environment motivates some educators to reflect anew on their teaching practice, adopt revised and innovative course planning and design, and allocate class time to interactive learning activities.⁵² Researchers have found that instructors, after gaining online teaching experience, tend to carry these student-centered pedagogical innovations over to their F2F instruction.⁵³

Interactive tools can increase student-educator and student-student engagement in an online learning environment. Online teaching and learning tools, many of which are not readily available in the F2F environment, can improve engagement in online learning. These tools, which are part of many LMSs, include discussion forums, chat rooms, polls, automatically graded quizzes, online simulations, instructional games, and other options. Educators can use the tools to directly engage with students and, if courses are structured accordingly, students can use the tools to collaborate on small group work, exchange ideas, and provide peer-to-peer feedback.⁵⁴ Online learning analytics, which collect and analyze students' online behavior, are behind-the-scenes tools for improving and fine-tuning engagement.⁵⁵ Metrics of engagement and predicted student success are derived from a log of student use and completion of quizzes, discussion forums, and other course components. From this information, at-risk students can be identified, messages can be sent automatically, and educators can be notified promptly that the student needs additional support.⁵⁶

At-risk students tend to fare worse in the online environment, necessitating enhanced support strategies. An important engagement-related finding is that at-risk students tend to fare worse in the online environment⁵⁷ and many need additional supports.⁵⁸ Various authors suggest that online education requires students to take greater responsibility for their own learning and students vary in their capacity to do this.⁵⁹ Researchers have found that the risk of lower course persistence and lower grades is related to gender, age, level of academic preparation, area of study, economic security, and other factors. For example, a large-scale study of community and technical college students in the U.S. found that males, younger students, minority students, and students with lower grade point averages were more likely to drop out and get lower grades in online courses than in F2F courses.⁶⁰ Some promise has been found in mitigating this risk through student support strategies (e.g., online learning orientation modules or sessions), course design strategies (e.g., building reflection on the learning process into the curriculum and course activities), social engagement strategies (e.g., providing opportunities for social interaction through blogs, chat rooms, wikis, and forums), emotional engagement strategies (e.g., managing expectations), and

⁵¹ Shibley, I., Amaral, Shank, Shibley, L., 2011

⁵² Kearns 2016

⁵³ Tondeur et al. 2017; Wong, Turkyay, and Lichtenstein 2020

⁵⁴ Vlachopoulos and Makri 2019

⁵⁵ Ma et al. 2015

⁵⁶ Gunn et al. 2017

⁵⁷ Heppen et al. 2017

⁵⁸ According to the [Online Glossary of Education Reform](#), "The term at-risk is often used to describe students or groups of students who are considered to have a higher probability of failing academically or dropping out of school."

⁵⁹ Yen and Liu 2009

⁶⁰ Xu and Jaggars 2014

comprehensive student integration (e.g., analyzing and addressing barriers faced by various student groups, especially those prone to dropping out).⁶¹



Findings Related to Improving Learning Outcomes

A large body of research on online learning looks at its impact on learning outcomes relative to traditional learning modalities. Findings depend heavily on the instructional methods and modalities employed.

Application of systematic instructional design and student-centered pedagogy improves online learning outcomes. Educators can improve learning outcomes in the online environment by applying instructional design principles that emphasize efficiency, effectiveness, and attractiveness of learning.⁶² One of the most widely used instructional design methods is the ADDIE model, focused on five course design principles: analysis, design, development, implementation, and evaluation. And as discussed earlier, when online learning is designed using a student-centered pedagogy it has been shown to improve engagement. This can, in turn, have a positive impact on learning outcomes. Studies on the effects of online activities on learning outcomes have found that use of video and interactive learning exercises and the quality and intensity of feedback from the educator can improve learning outcomes in online education.⁶³

Fully online and blended learning can produce learning outcomes equal to or greater than F2F learning, according to a large volume of research. An

influential meta-analysis of 176 experimental and quasi-experimental studies published 1996–2008 by the U.S. Department of Education found that student learning outcomes were greater in online learning than in F2F learning and greater in blended learning than fully online learning, though the differences were relatively small.⁶⁵ A second meta-analysis of 21 studies conducted during the period 2008–2019 found learning outcomes of blended learning and F2F lecture-based learning were equal, with blended learning being especially beneficial for adult learners.⁶⁶ It is important to note that these conclusions are based on studies conducted outside of conflict or crisis settings.⁶⁷

WHAT IS FLIPPED LEARNING?



Flipped learning is a widely adopted variant of blended learning in which new material is learned outside the classroom, through online video or other media, while F2F class time is used for practice in the form of active learning exercises, class or group discussion, and question-and-answer sessions.⁶⁴

A large recent meta-analysis of 114 higher education studies found that flipped learning, a form of blended learning, had a positive though relatively small effect on knowledge-based outcomes.⁶⁸ Flipped learning; which stimulates student cooperation, improves engagement, promotes self-learning, and maximizes feedback; also affects social-emotional learning outcomes. A meta-analysis of 317 flipped learning studies in 42 countries found that, compared to F2F learning, it produced better learning outcomes as well as better

⁶¹ Wandler and Imbriale 2017

⁶² Roblyer 2014; Chen 2018

⁶³ Cook, Levinson, and Garside 2010

⁶⁴ Karabulut-Ilgü, Jaramillo Cherrez, and Jahren 2018

⁶⁵ Means et al. 2009

⁶⁶ Müller and Mildnerberger 2021

⁶⁷ In contrast, during the COVID-19 pandemic when unprepared HEIs, educators, and students shifted abruptly to online learning, learning outcomes were often disappointing (Tsang et al. 2021).

⁶⁸ van Alten et al. 2019

intra- and inter-personal outcomes and greater student satisfaction.⁶⁹ The boost in learning outcomes was most notable in Asia and the Middle East. The authors attributed this gain to the active learning pedagogy inherent in the flipped model, which is not typically emphasized in these regions.

SPOTLIGHT: Embracing online learning leads to improved outcomes and more



The [University of Central Florida](#) (UCF) in the United States is an innovator in online education.⁷⁰ The 60,000 undergraduate students at the university get a third of their total credit hours through online and blended courses. Management and support services are centralized in the university's Center for Distributed Learning, which has a staff of 65 full-time and 25 part-time instructional designers, media support staff, faculty development staff, and quality assurance staff. To teach online, instructors must take 80 hours of professional development and training and work with instructional design staff to develop their courses. Full-time students who take between 40 and 60 percent of their courses online complete their degree faster than those who take only F2F courses. On average, grades of students in blended courses are slightly higher than in F2F courses. The university's costs for fully online courses are 20–30 percent lower per credit hour than F2F courses. Class size averages 45–55 students in online and blended classes and 30 students in F2F classes. To reach the current enrollment, the university would have had to spend an additional \$150 million for building construction if all classes were F2F.

SECTION 5: Additional Research and Learning Needs

Despite recent growth driven in part by the pandemic, online learning in higher education, particularly in an LMIC context, remains a nascent field. As such it would benefit from additional research and learning in all of the areas introduced in this brief. Specific topics of near-term need include:

- Strategies for identifying and overcoming national and system-level barriers to online higher education with a focus on national electrical grid access and reliability, Internet access and reliability, the national supply of IT technicians and instructional designers (and ways to increase the supply), the national legal framework for intellectual property, taxation of IT equipment, government funding and budgeting mechanisms for educational technology, and national online education planning.
- Strategies for online learning planning and implementation at the HEI level with a focus on strategic planning, financing, ICT infrastructure and equipment, training, support services, and quality assurance.
- HEI-level case studies on the introduction and expansion of online learning.
- Strategies to reach students who lack access to computers or the internet due to economic barriers.
- Long-term impact of online learning on the cost of higher education, including both capital and operating costs and resulting tuition changes.
- Pedagogical models for transitioning from teacher-centered F2F learning to student-centered online learning in an LMIC context.
- Instructional models and support services required for blended learning.

⁶⁹ Bredow et al. 2021

⁷⁰ Bailey et al. 2018

- Ways to identify and support at-risk students in online learning.
- Strategies to maximize student and instructor engagement in larger-sized classes and fully online environments where blended learning is impractical.
- Student retention rates, completion rates, and learning outcomes generated by various online learning approaches.



GLOSSARY OF TERMS

- **Access:** Availability of necessary equipment (computer or other device) and connectivity (electricity and Internet), ease of using content, and affordability.
- **Blended or hybrid learning:** Uses both F2F and online learning in the same course.
- **Digital literacy:** Defined by the American Library Association as “the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills.”⁷¹
- **Effect size:** A quantitative measure of the magnitude of the effect of a treatment (the mean difference between treatment and control effects divided by standard deviation). Cohen (1988) proposes that effects of 0.20, 0.50, and 0.80 be considered small, medium, and large, respectively. According to Hattie (2012), 0.40 is a “hinge-point” for evaluating whether or not educational interventions are effective.
- **Engagement:** “The extent to which users participate as intended in the programming, including the degree to which users perceive the content to be relevant, captivating, and high quality.”⁷²
- **Flipped learning** (also known as flipped classroom): A form of blended learning in which students learn new content outside the classroom from online videos or presentations prepared or curated by the teacher. Classroom time is devoted to active learning exercises that apply new knowledge or develop skills.
- **Learning management system:** A software application for the administration, documentation, tracking, reporting, automation and delivery of educational courses, training programs, or learning and development programs.
- **Learning outcomes:** “Changes in learning of content knowledge as well as social and emotional learning.”⁷³
- **Meta-analysis:** A method of pooling results of previous quantitative research to determine the joint statistical significance of a treatment across multiple studies.
- **Online learning** (also known as e-learning): Learning that takes place over the Internet.
- **Universal Design for Learning (UDL):** A set of principles for curriculum development that gives all students an equal opportunity to learn.

⁷¹ [ALA Literacy Clearinghouse: Digital literacy](#)

⁷² Morris, Farrell and Venetis 2021

⁷³ Morris, Farrell and Venetis 2021



TOOLS AND RESOURCES

- [Design Studio](#): An online self-paced course on creating blended or online courses for educators at the University of Cape Town, South Africa. Available by request for educators at other universities.
- [Free training for online teachers](#): Links to free training and tools provided by various universities and educational organizations in the United States and abroad.
- [Overview and example of active learning](#): Web resources on active learning prepared by Harvard University.
- [Google Classroom](#): Integrates multiple Google programs (Docs, Sheets, Slides, Gmail, and Calendar) into a digital platform for creating educational content and managing student and teacher communication.
- [UDL on Campus](#): Video and web pages that explain UDL in higher education.
- [Online and Distance Learning: Resources for Higher Education and Youth Programming](#): Resource for learners, educators, and administrators as well as anyone looking to transition and adapt to distance or online learning

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To request more information or technical assistance on programming, or to supply additional research or information of relevance to this brief, please contact helearning@usaid.gov. For further information please visit [Education Links](#).

Acknowledgements

Thank you to Samantha Alvis and Deborah Greebon of the Center for Education in USAID's Bureau for Development, Democracy, and Innovation for their guidance and support in developing this evidence summary. Thanks is also extended to Nitika Tolani and Angelique Mahal of USAID's Higher Education Working Group, Amy Mulcahy-Dunn of Encompass, LLC and Kristine Powers of Knowledge Partners, LLC for their review of this Evidence Brief.