AN EDUCAUSE EXECUTIVE BRIEF

Foundations of Online Learning:

Where Digital Living and Education Meet

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EDUCAUSE

Introduction

The integration of IT with learning is widespread—including online courses, online tools, and digital resources—making "online" a priority for institutional leaders. Whether it is part of the curriculum or not, online learning occurs at all campuses (including residential ones) because students are avid do-it-yourself learners, using all available resources. Many colleges and universities offer online courses, and a growing number of other kinds of organizations offer e-learning that is becoming part of the student experience through transfer, testing, or certification.

Online learning is often thought of as the electronic delivery of information, such as text on a screen or a video lecture. It is much more. Digital tools help promote active learning. They can extend human capability and allow for new kinds of learning and discovery. The result can be learning that is integrative, personalized, engaging, and transformative. Learning can be tailored to individuals—to the format, time frame, and content most appropriate for their learning needs and goals. E-learning can occur any place and any time—online, on-campus, or through a blended alternative, individually or as part of a local or global collaboration.

One important strength of digital learning is engagement. Student engagement fosters learning that immerses students in problem solving, collaboration, and active exploration, allowing them to construct, share, and communicate knowledge. Many highly effective learning environments involve interactive technologies, such as collaboration tools, simulations, games, or scenario-based exercises. Digital learning experiences can help connect learners to the workplace and industry, to local communities, and to the real-world pursuits of researchers and others. Engagement is associated with gains in academic, personal, and social development. Immersive learning experiences (e.g., through augmented reality, simulations, and other tools) move beyond teaching information to helping students develop the valuable skill of transfer—the ability to take what they know and apply it to a new area. Online approaches can lead to greater student engagement and deeper learning outcomes. There are numerous approaches; below are a few examples.

- **Blended courses** combine face-to-face class sessions with online learning.
- **Flipping the classroom** means sharing background or lecture material online, then using face-to-face time for discussion and problem solving. Some institutions are using others' lectures, such as Khan Academy or MOOCs, as a part of flipped classrooms.

- **Massively open online courses** (MOOCs) are free and open to anyone, with essentially unlimited enrollment. In MOOCs, lectures are typically "canned," testing is automated, and student participation is voluntary. The delivery platforms combine the qualities of social networking sites with content-delivery, discussion, and analytics functions.[1]
- **Adaptive learning environments** customize the learner experience. Students are presented with tools, instruction, and assistance matched to their level of understanding. The systems use models drawn from cognitive science to predict the conceptual challenges students will face, and data generated by students allows the system to get "smarter" and more accurate.
- **Games** use elements such as feedback, rewards, badges, or competition to motivate students and accelerate learning. Games can catalyze intense concentration, effort, time on task, and achievement. Students can track their progress with scores and progress bars.
- **Simulations** are complex, computer-driven models of real phenomena or environments. They are abstractions of reality that allow students to manipulate variables to understand outcomes. Simulations range from highly immersive environments like flight simulators to simple interactive graphs. Many instructional games are based on simulations.
- **Remote instrumentation** provides students with access to learning experiences via the Internet that would otherwise be unavailable to them. For example, students might control devices such as astronomical instruments, spectrometers, or other electronic equipment from their computers, allowing them to run experiments or conduct research.
- **Intelligent tutoring systems** use software to simulate a human tutor. The system helps students study by posing questions, evaluating responses, and offering customized instruction and feedback. It uses analytics to improve the help offered.
- **Student as producer** models allow students to participate in broad communities to tackle real problems that are first presented as assignments. They may co-create assignments or the curriculum with instructors.
- **Telepresence** enables participation in courses taught at other institutions or in activities at other locations, such as archeological digs.

[1] "What Campus Leaders Need to Know about MOOCs," An EDUCAUSE Executive Briefing, 2012, http://www.educause.edu/library/resources/what-campus-leaders-need-know-about-moocs.

STRATEGIC IMPORTANCE

Online learning has shifted the field in terms of how students learn, how faculty teach, and how institutions support those endeavors. It has extended the boundaries of the learning experience beyond the campus, allowing students and faculty to access teaching and learning applications, resources, and communities from around the world, almost instantaneously. While these activities often take place at the level of the individual learner or faculty member, they raise strategic issues for the institution.

- **Digital presence in a digital world.** Students and faculty live in a digital world, and institutional strategies should define the desired "digital experience," ranging from routine transactions to immersive learning experiences. This digital presence can extend and enhance the institution's brand.
- **Online learning data feeding analytics systems.** Data collected and analyzed from online interactions allow institutions to provide feedback to students and feed them forward to the next opportunity. Such "student success" systems can improve retention and graduation rates.
- **Students served.** Online learning has altered the reach of the institution in terms of the learners it can serve, not just geographically but also by type. Demographic change drives new consumption patterns. With the majority of students now being "post-traditional," institutions may have increasingly differentiated responses to the question "Who do we serve?"
- **Alternative models.** IT is reshaping delivery systems, business models, and the economics of education. For example, competency-based education is growing as an alternative to the credit-hour model.
- **New competitors.** New entrants into the higher education marketplace—extra-institutional educational providers—are offering online courses. The credits may be transferred into accredited institutions through transfer agreements, equivalencies, or prior learning assessments.

Technology

A long list of technologies support online learning environments. These range from consumer technologies to sophisticated software systems.

Consumer technologies	Video
	Mobile apps
	Tablet computing
	E-books
	Telepresence
Learning technologies	Learning analytics
	Virtual and remote laboratories
	Personal learning environments
Social media technologies	Collaborative environments
	Crowdsourcing
	Social networks
Visualization technologies	3D printing/rapid prototyping
	Augmented reality
	Information visualization

Examples

The following examples illustrate some of the ways in which online learning plays a role in higher education.

Carnegie Mellon University: Open Learning Initiative

The Open Learning Initiative redesigns courses, starting with student-centered, observable learning objectives. Expository content is presented in the form of text, images, simulations, short (3–5 minutes) videos, and examples. Interactive tasks are interspersed so students practice the concepts and skills they are learning. Students are able to move through the material at their own pace, so those with background knowledge or who are quick learners can master learning objectives and move on. Students who need more time can move at a slower pace, with access to additional content—alternate explanations, more worked examples, and more practice activities. Students receive hints and feedback that reinforce correct responses and target common misconceptions. While students are working through the course, data are collected for analytics and feedback—for students, instructors, researchers, and course designers. The instructor dashboard, for example, gives a high-level overview of how students in a class are performing on the learning objectives for each module in the course, as well as each student's current knowledge state. As a result, instructors are able to spend less classroom time lecturing and more time interacting with students in ways that take advantage of the instructor's unique expertise and interests.[2]

Arizona State University: Remedial Mathematics

Arizona State University has used an adaptive technology platform to develop personalized instruction for students in remedial math courses. Students work through course content at their own pace and are given continuous feedback via a dashboard that tracks their understanding of the concepts required to progress. Likewise, a dashboard lets the instructor know where every student is in mastering course concepts. To supplement their self-paced learning activities, students participate in targeted small-group sessions. The instructor can continuously monitor students' progress and offer face-to-face remediation or targeted assistance as needed. They can also cluster students by proficiency or problem area to improve the effectiveness of the small-group sessions. Since its implementation of these adaptive-learning courses, pass rates have increased (from 66% to 75% in 2011, for example).

[2] Ross Strader and Candace Thille, "The Open Learning Initiative: Enacting Instruction Online," in *Game Changers: Education and Information Technologies,* Diana G. Oblinger, ed., http://www.educause.edu/library/resources/chapter-15-open-learning-initiative-enacting-instruction-online.

University of Nebraska–Lincoln: History Harvest

Students learn by doing research. Many of the tools of our disciplines are digital. One example that combines digital tools and learning through research is the History Harvest project. Students compile historic artifacts and share them with others in a "harvest." History Harvest brings value to learners as well as the community. At each harvest, community members share personal letters, photographs, objects, and stories, and they explore the significance and meaning of their materials. This collaborative, team-oriented effort connects student learners, scholars, and the community.[3]

University of Richmond: Visualizing Emancipation

The Digital Scholarship Lab has created a number of projects that serve as dynamic visual tools for researchers, teachers, and students at all levels. One such project, Visualizing Emancipation, is an interactive mapping tool allowing users "to explore the different places, times, and ways that slavery collapsed in the American South." Built on an archive of traditional sources, including military records, newspaper stories, letters, and diaries, the site documents various emancipation events that occurred between 1861 and 1865. Clickable dots on a U.S. map represent one of the thousands of individual stories that collectively recount the end of U.S. slavery. Behind the "dots" are details, such as video, animations, or original data. An animation feature on the map allows users to see the unique interplay and changing patterns. Additional patterns in the data can be explored as users filter events based on dates, keywords, or type of primary source. The site includes suggestions for how it can be used in courses. The site's creators encourage "generative scholarship" by allowing users to contribute their own information about other emancipation events that are not already included on the map.

Kentucky Technical and Community Colleges: Direct2Degree

Direct2Degree (D2D) leverages a competency-based, learn-on-demand course model. Students use a one-course-at-a time format coupled with the flexibility to move at their own pace under the guidance of an instructor. When students take one course at a time, full-time, in a block-style format, success and retention can increase. The program comprises discrete modules, each with its own pretest; knowledge, skills, and attitude learning activities; and posttest. D2D provides incentives for progress and rewards accelerated completion. The self-paced sequential delivery model uses a monthly subscription model versus traditional credit-hour tuition, which provides measurable financial incentives for students to move quickly through their academic degree.

[3] See The History Harvest, http://historyharvest.unl.edu/

Current Landscape

Interest in online learning is widespread. More than two-thirds (68%) of institutions report it to be a major interest for the institution, and at another 30% it is a major interest for some departments. EDUCAUSE research shows that 82% of institutions offer at least several courses online, and more than half (53%) offer a significant number of courses online (see figure 1).

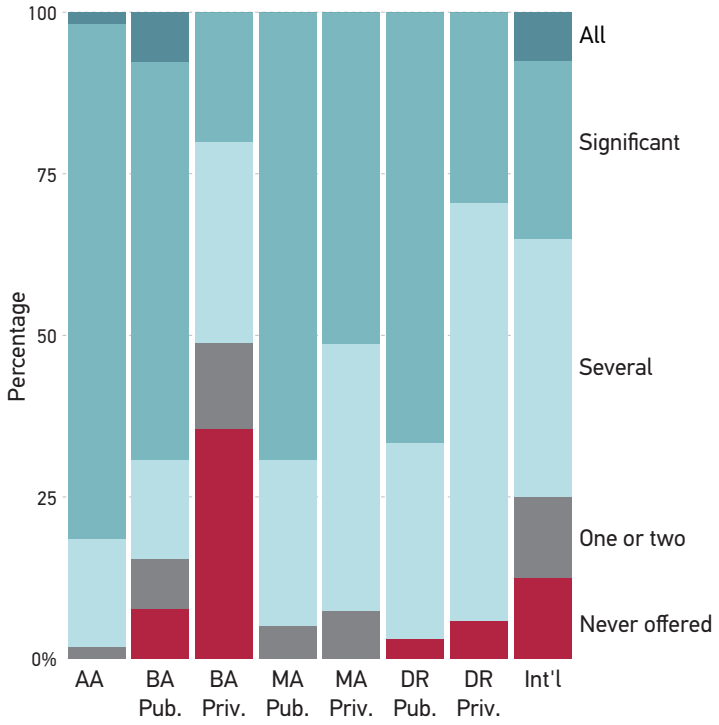

Figure 1. Number of Courses Offered Online, by Carnegie Class

The prevalence of online interest and offerings stems from the belief that e-learning has numerous benefits, including:

- Supporting enrollment growth
- Increasing revenues or providing additional revenue streams
- Enhancing institutional reputation
- Streamlining curricula by minimizing duplicative offerings, increasing consistency, and reducing the number of faculty required to teach a course
- Offering students increased flexibility in course offerings and in access to course resources
- Improving and revitalizing teaching
- Enhancing the learning experience
- Accelerating the time to degree

Faculty readiness is seen by many as the biggest barrier to adopting online learning, and the issue of assisting faculty with the integration of instructional technology is one of the 2014 EDUCAUSE Top-Ten IT Issues. Another concern is staffing—many colleges and universities believe they have less than half the staff needed to adequately support

e-learning at their institutions, particularly in roles such as instructional designers, app designers/programmers, graphic designers/animators, and data analysts.

EDUCAUSE has developed an e-learning maturity index that can be a starting point for institutional leaders to discuss strengths and weaknesses and to outline a plan of action to capitalize on assets and make progress in areas where they lag.[4] The maturity index is based on seven dimensions of e-learning maturity: priority placed on e-learning, synergy of e-learning systems, readiness for e-learning, ongoing technology evaluation and training, policies and governance, investment in faculty and staff, and outcomes assessment (see figure 2).

A wide range of e-learning technologies, tools, and models have been developed in recent years, and although most of them are not yet widespread in higher education, their adoption is growing.

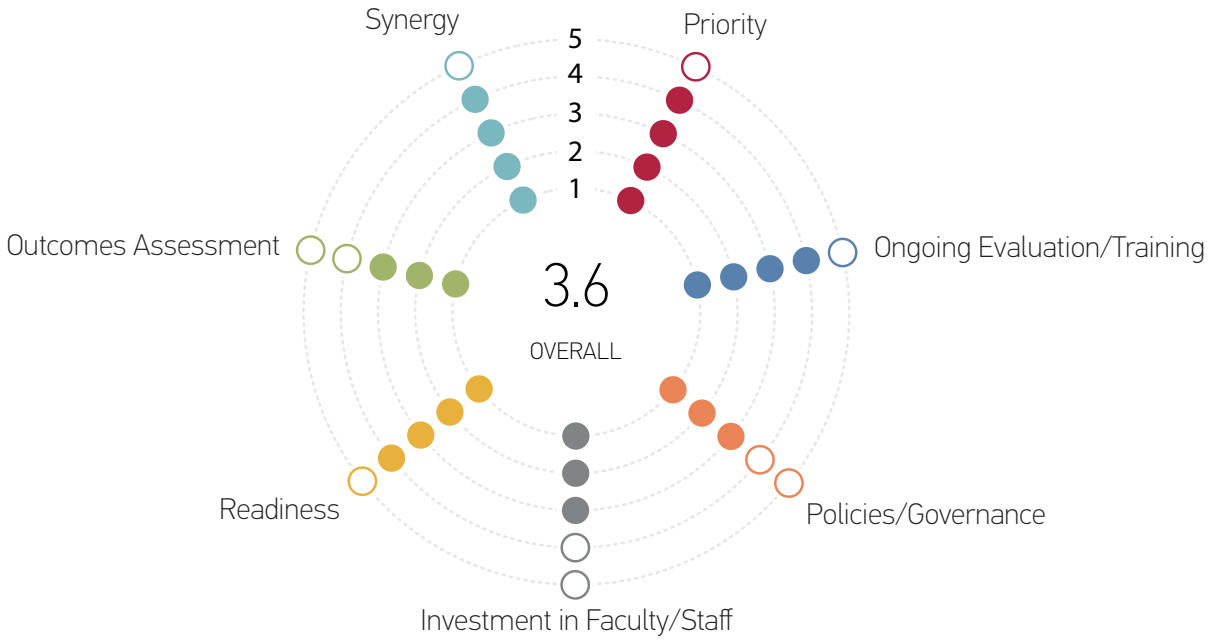

Figure 2. E-Learning Maturity Index

[4] To access the E-Learning Maturity Index and related report, go to http://www.educause.edu/library/resources/state-e-learning-higher-education-eye-toward-growth-and-increased-access.

For example, the number of institutions supporting blended/hybrid courses has increased 13% in two years, and this growth parallels student learning preferences: A majority of students prefer—and say they learn the most in—blended learning environments. This finding reflects students' desire to communicate with instructors face-to-face as well as having anytime, anywhere access to course materials. Moreover, about three-quarters (76%) of undergraduates believe that technology helps them achieve their academic outcomes and that technology better prepares them for future educational plans (transferring to another degree program, getting into graduate school, etc.).[5] A majority of students (61%) also agree that by the time they graduate, the technology they have used in their courses will have adequately prepared them for the workplace (see figure 3).

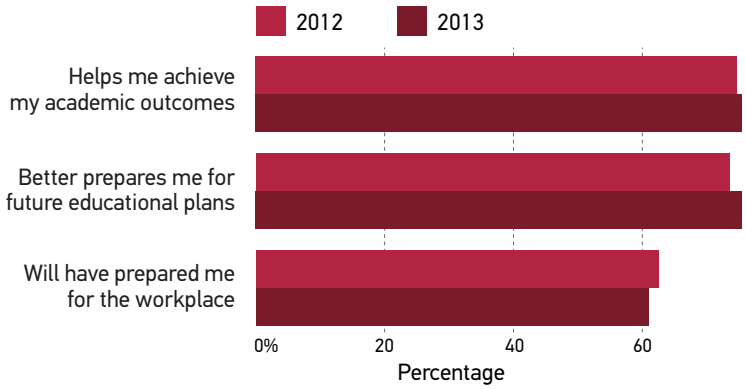

Figure 3. Students' Beliefs about Technology and Outcomes Achievement

MOOCs have garnered considerable attention in recent months, both in higher education circles and in mainstream media, and they represent an interesting model of online learning. Many fundamental questions about MOOCs remain unanswered, however, including such issues as business models and the quality of the learning, and their future is unclear. Nevertheless, the broader field of online learning is much more widespread and of greater interest (see figure 4).

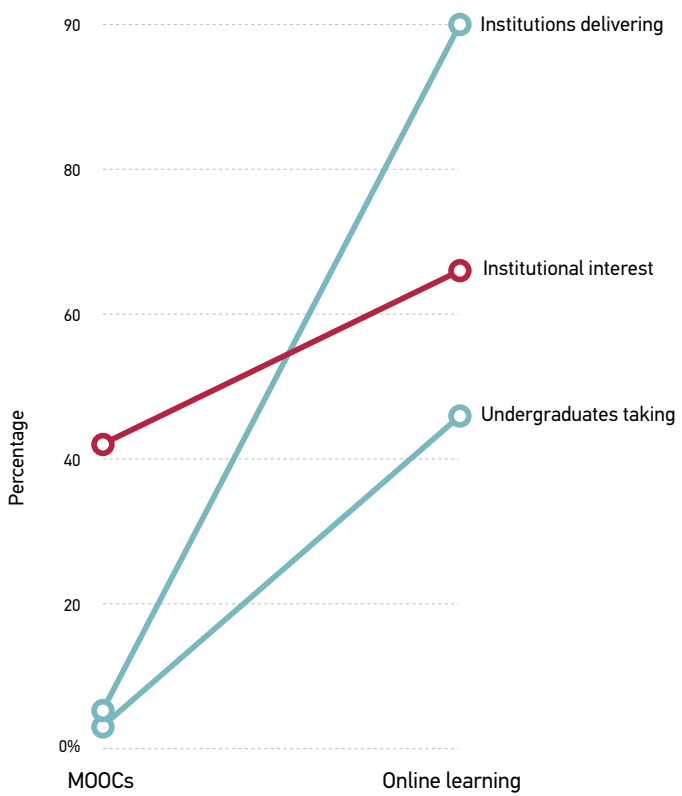

Figure 4. Relative Activity in MOOCs and Online Learning

[5] Eden Dahlstrom, J.D. Walker, and Charles Dziuban, with a foreword by Glenda Morgan, *ECAR Study of Undergraduate Students and Information Technology,* 2013 (Louisville, CO: EDUCAUSE Center for Analysis and Research, September 2013), available from http://www.educause.edu/ecar.

Risks and Rewards

- **Competitiveness.** Institutions that fail to capitalize on the ways in which online learning can advance their academic missions risk falling behind their peers and potential new competitors. Other institutions and nontraditional learning providers that offer interactive, engaging learning opportunities personalized to students' needs and learning preferences may become increasingly attractive. Such competition could heighten the fiscal consequences of missed opportunities to improve student retention and graduation, as institutions increasingly realize that increases in retention may return significant revenue to the institution's bottom line.
- **Quality of learning.** Institutions must consider the degree to which more active, personalized, and experiential learning approaches may heighten learning outcomes. Better outcomes better prepare students for academic and career success. As interest continues to grow among policy makers in using learning outcomes and student success measures as accountability (and funding) metrics, direct fiscal consequences of not using online learning to maximize learning outcomes may emerge.
- **Essential skill.** Institutions that do not make effective use of online learning may fail to develop in their students an essential skill for work, citizenship, and life. Digital fluency is necessary as society and the economy become more and more driven by digital technologies. Just because students use technology does not mean they understand its power or use it well. Facility with web-based applications and resources, and the learning they make possible, has never been more essential.

Strategies for Institutional Leaders

Develop a strategic direction for online learning or "digital engagement." This strategy might include strengthening learning goals, extending the institution's brand, or reducing time to degree. Colleges and universities have many potential options from which to choose; determining the right mix depends on academic program and culture, risk tolerance, and future vision. "Digital" may be as relevant for a residential institution as a campus with commuting students or online learners.

Use technology for engagement, not just automation. Technology can empower students, advisors, and faculty. Beyond automation, consider how technology can extend human capacity, enable better decision making, and track progress. Use technology-enabled strategies that promote higher-order learning, complex problem-solving skills, and integrative learning.

Don't assume you have to go it alone. Institutions may assume that making greater and more effective use of online learning will require expensive implementation of sophisticated technologies and applications that they can neither afford nor effectively maintain over time. However, open educational resources, cloud services, shared services, online communities, and other approaches may make it easier for institutions to expand into online learning.

About This Brief

This report is one of a series of executive briefs designed to help institutional leaders optimize the impact of IT in higher education. To read the other briefs and access related resources, go to Resources for Presidents and Senior Executives.

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