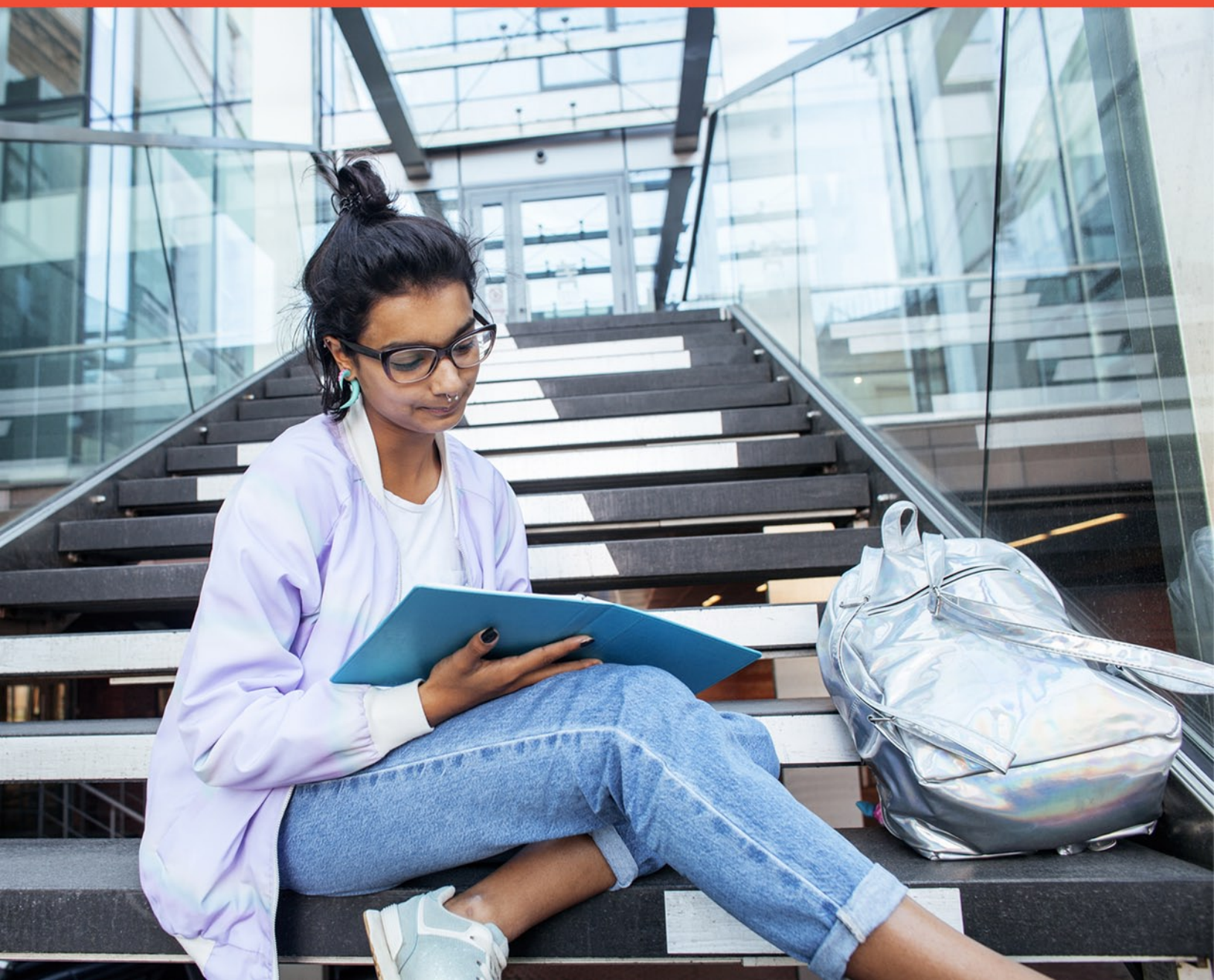
NMC Horizon Project

NMC Horizon Report Preview

2017 Higher Education Edition



NMC Horizon Report Preview > 2017 Higher Ed Edition

The NMC Horizon Report Preview provides summaries of each of the upcoming edition's trends, challenges, and important developments in educational technology, which were ranked most highly by the expert panel. This edition is a collaboration between the New Media Consortium (NMC) and the EDUCAUSE Learning Initiative (ELI). Learn more at www.nmc.org and www.educause.edu/eli.

I. Key Trends Accelerating Higher Ed Tech Adoption

II. Significant Challenges Impeding Higher Ed Tech Adoption

III. Important Developments in Educational Technology for Higher Ed

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Long-Term Trends: Driving Higher Ed Tech adoption for five or more years

Advancing Cultures of Innovation

As campuses have evolved into hotbeds for entrepreneurship and discovery, higher education has become widely regarded as a vehicle for driving innovation. The focus of this trend has shifted from understanding the value of fostering the exploration of new ideas to finding ways to replicate it across a span of diverse and unique learning institutions. Research has been conducted over the past year to better understand how institutions can nurture the types of culture that promotes experimentation. A significant element for progressing this movement is the call for higher education to alter its status quo to accept failure as an important part of the learning process. The act of integrating entrepreneurship into higher education further acknowledges that every big idea has to start somewhere, and students and faculty can be equipped with the tools needed to spark real progress. In order to keep pace, institutions must critically assess their curriculum and implement changes to their evaluation methods in order to remove barriers that limit the development of new ideas.

Deeper Learning Approaches

There is a growing emphasis in higher education on deeper learning approaches, defined by the William and Flora Hewlett Foundation as the mastery of content that engages students in critical thinking, problem-solving, collaboration, and self-directed learning. In order to remain motivated, students need to be able to make clear connections the real world, and how the new knowledge and skills will impact them. Project-based learning, challenge-based learning, inquiry-based learning, and similar methods foster more active learning experiences, both inside and outside the classroom. As the enabling role of technologies learning crystalizes, educators are leveraging these tools to connect the curriculum with real life applications. These approaches are decidedly more student-centered, allowing learners to take control of how they engage with a subject, even brainstorming solutions to pressing global problems and beginning to implement them in their communities.

Mid-Term Trends: Driving Higher Ed Tech adoption over the next three to five years

Growing Focus on Measuring Learning

The growing focus on measuring learning describes a renewed interest in assessment and the wide variety of methods and tools that educators use to evaluate, measure, and document the academic readiness, learning progress, skill acquisition, or educational needs of students. As societal and economic factors redefine what skills are necessary in today's workforce, educational institutions must rethink how to define, measure, and demonstrate mastery of subjects, skills, and competencies. The proliferation of data mining software and developments within online learning, mobile learning, and learning management systems are coalescing toward learning environments that leverage analytics and visualization software to portray learning data in a multidimensional and portable manner. In online and blended courses, data can reveal how student actions contribute to progress and learning gains. A recent development in measuring learning is learning analytics, which aims to track students' interactions with online environments and learning materials to instructors with an accurate snapshot of learner progress and challenges. This continuous data collection and analysis empowers students to take an active part in their learning, targets at-risk student populations, and assesses factors affecting completion and student success.

Redesigning Learning Spaces

Some thought leaders believe that new forms of teaching and learning require new spaces for teaching and learning. More universities are helping to facilitate these emerging models of education, such as the flipped classroom, by rearranging learning environments to accommodate more active learning. Educational settings are increasingly designed to facilitate project-based interactions with attention to mobility, flexibility, and multiple device usage. Wireless bandwidth is being upgraded in institutions to create "smart rooms" that support web conferencing and other methods of remote, collaborative communication. Large displays and screens are being installed to enable collaboration on digital projects and informal presentations. As higher education continues to move away from traditional lecture-based programming and to more hands-on scenarios, university classrooms will start to resemble real-world work and social environments that facilitate organic interactions and cross-disciplinary problem solving.

Short-Term Trends: Driving Higher Ed Tech adoption over the next one to two years

Blended Learning Designs

Over the past several years, perceptions of online learning have been shifting in its favor as more learners and educators see it as a viable alternative to some forms of face-to-face learning. Drawing from best practices in online and face-to-face methods, blended learning is on the rise at universities and colleges. The affordances of blended learning offers are now well understood, and its flexibility, ease of access, and the integration of sophisticated multimedia and technologies are high among the list of appeals. One notable form of blended learning is the flipped classroom, a model that rearranges how students spend their time. Rather than the instructor using class time for lectures, students access learning materials online at home, freeing up class time to allow student-teacher interactions that foster more active learning. Conversely, the recent rapid rise and burnout of other online offerings, such as massive open online courses (MOOCs), has led to skepticism in the field. However, progress in learning analytics; adaptive learning; and a combination of cutting-edge asynchronous and synchronous tools will continue to advance the state of blended learning and keep it compelling, though many of these methods are still the subjects of experiments and research by online learning providers and institutions.

Collaborative Learning Approaches

Collaborative learning, which refers to students or educators working together in peer-to-peer or group activities, is based on the perspective that learning is a social construct. The approach involves activities generally focused around four principles: placing the learner at the center, emphasizing interaction, working in groups, and developing solutions to real challenges. In addition to improving student engagement and achievement, collaborative learning is especially imperative for bolstering openness to diversity, exposing students to people from all different demographics. Educators also benefit through personal learning networks, or online communities of practice, where ideas and insights are regularly exchanged. While this trend is rooted in progressive pedagogy, technology plays an important role in the implementation of collaborative learning models; cloud-based services, apps, and other digital tools promote persistent connectivity, enabling students and educators to access and contribute to shared workspaces, anytime and anywhere.

Solvable Challenges: Those which we both understand and know how to solve

Improving Digital Literacy

With the proliferation of the Internet, mobile devices, and other technologies that are now pervasive in education, the traditional view of literacy as the ability to read and write has expanded to encompass understanding digital tools and information. This new category of competence is affecting how education institutions address literacy issues in their curriculum objectives and teacher development programs. Lack of consensus on what comprises digital literacy is impeding many colleges and universities from formulating adequate policies and programs that address this challenge. Discussions among educators have included the idea of digital literacy as equating to competence with a wide range of digital tools for varied educational purposes, or as an indicator of having the ability to critically evaluate resources available on the web. However, both definitions are broad and ambiguous. Compounding this issue is the notion that digital literacy encompasses skills that differ for educators and learners, as teaching with technology is inherently different from learning with it.

Integrating Formal and Informal Learning

Traditional approaches to teaching and learning with roots in the 18th century and earlier are still very common in many institutions, and often stifle learning as much as they foster it. As the internet has brought the ability to learn something about almost anything at the palm of one's hand, there is an increasing interest in the kinds of self-directed, curiosity-based learning that have long been common in museums, science centers, and personal learning networks. These, along with life experience and other more serendipitous forms of learning fall under the banner of informal learning, and serve to enhance student engagement by encouraging them to follow their own learning pathways and interests. Many experts believe that a blending of formal and informal methods of teaching and learning can create an education environment that fosters experimentation, curiosity, and above all, creativity. In this sense, an overarching goal is to cultivate the pursuit of lifelong learning in all students and educators. However, formally acknowledging and rewarding skills both educators and students master outside of the classroom is compounding this challenge.

Difficult Challenges: Those we understand but for which solutions are elusive

Achievement Gap

The achievement gap, also commonly referred to as the college completion gap, reflects a disparity in the enrollment and academic performance between student groups, especially as defined by socioeconomic status, race, ethnicity, or gender. While emerging technological developments such as digital courseware and mobiles apps have made it easier for people to engage with learning resources, significant issues of access and equity persist among students from low-income, minority, single-parent families, and other disadvantaged groups. The one-size-fits-all approach of traditional higher education paradigms is ineffective as it is in stark contrast with an increasingly diverse global student population. For example, the number of students with part- and full-time jobs is growing, which requires more flexible degree plans. The challenge facing higher education is to close the gap by catering to all learners' needs, aligning postsecondary programs with deeper learning outcomes and the acquisition of 21st century skills, enabled by adaptive and personalized learning strategies, that lead to goal achievement and gainful employment.

Advancing Digital Equity

Digital equity refers to unequal access to broadband internet and digital tools. UNESCO reports that while 3.2 billion people across the globe are using the internet, only 41% of those that live in developing countries are online. Further, 200 million fewer women than men are accessing the internet around the world. The United Nations has identified internet access as essential to meeting its sustainable development goals of alleviating poverty and hunger and improving health and education worldwide by 2030. This rampant social justice issue is not just impacting developing nations: The Center for Public Integrity has found that US families in neighborhoods with median incomes in the lowest 20% nationwide are five times more likely not to have broadband access than households in areas with median incomes in the top 20%. More than 30 million Americans lack access to high-speed internet. Efforts to improve these figures are necessary to promote full participation and communication within society. Another facet of digital equity involves technology's role in advancing access to higher education for underrepresented student populations. Online learning is enabled by high-speed internet access, while use of open educational resources (OER) available in repositories such as ISKME's OER Commons provide cost savings to students. Government and philanthropic initiatives are working to address connectivity gaps and increase use of OER.

Wicked Challenges: Those that are complex to even define, much less address

Managing Knowledge Obsolescence

Simply staying organized and current presents a challenge to academics in a world where information, software tools, and devices advance at a strenuous rate. New developments in technology are presenting exciting opportunities for higher education institutions, and their potential for improving the quality of operations and services is undeniable. However, it can be overwhelming for faculty and staff to keep up with the ever-changing landscape; just as they are able to master one technology, it seems a new version launches. An explosion of user-created content is also giving rise to ideas and opinions on a multitude of topics, but following the hundreds of available authorities means sifting through a mountain of information more frequently than most faculty and staff can manage. There is a need for effective tools and filters for finding, interpreting, organizing, and retrieving the data that is the most relevant and insightful. Additionally, societal changes and financial pressures are transforming the work of academics, requiring greater agility and a constant pursuit of absorbing new technologies and skills.

Rethinking the Roles of Educators

Educators are increasingly expected to be adept at a variety of technology-based and other approaches for content delivery, learner support, and assessment; to collaborate with other teachers both inside and outside their schools; to routinely use digital strategies in their work with students; to act as guides and mentors in to promote student-centered learning; and to organize their own work and comply with administrative documentation and reporting requirements. Students add to these expectations through their own use of technology to socialize, organize, and informally learn on a daily basis. The integration of technology into everyday life is causing many educational thought leaders to argue that institutions should be providing ways for students to continue to engage in learning activities, formal and informal, beyond the traditional school day. As this trend gathers steam, many institutions across the world are rethinking the primary responsibilities of educators. Related to these evolving expectations are changes in the ways educators engage in their own continuing professional development, much of which involves social media and online tools and resources.

Time-to-Adoption Horizon: One Year or Less

Adaptive Learning Technologies

Adaptive learning technologies refer to software and online platforms that adjust to individual students' needs as they learn. According to a paper commissioned by the Bill and Melinda Gates Foundation, adaptive learning is a "sophisticated, data-driven, and in some cases, nonlinear approach to instruction and remediation, adjusting to a learner's interactions and demonstrated performance level, and subsequently anticipating what types of content and resources learners need at a specific point in time to make progress." In this sense, contemporary educational tools are now capable of learning the way people learn; enabled by machine learning technologies, they can adapt to each student's progress and adjust content in real-time or provide customized exercises when they need it. In higher education, many faculty envision these adaptive platforms as new, patient tutors that can provide personalized instruction on a large scale. There are two levels to adaptive learning technologies — the first platform reacts to individual user data and adapts instructional material accordingly, while the second leverages aggregated data across a large sample of users for insights into the design and adaptation of curricula.

Mobile Learning

The pervasiveness of mobile devices is changing the way humans interact with information and their surroundings. Smart devices, including phones, tablets, and watches, are now capable of acting as miniaturized computers; their storage space and processing power has increased dramatically with each subsequent release. Mobile learning, or m-learning, leverages this technology to make learning portable, meaning a learner can have access to materials virtually anywhere. The first wave of m-learning came in the form of apps, which are small, low-cost software extensions to devices. Proving to be a hotbed of development, numerous educational apps have been created, including: language learning apps, math and science tutorials, and more. Since their release, mobile apps have become adopted into the mainstream, seemingly plateauing the trajectory of m-learning. Although recently educators have witnessed the revival of m-learning through a subsequent demand for more online learning opportunities and an increase in BYOD initiatives across institutions. Overtime, m-learning continues to gain traction in education because it is particularly useful for learning as it enables people to learn and experience new concepts wherever they are, often across multiple devices.

Time-to-Adoption Horizon: Two to Three Years

Internet of Things

The internet of things connects the physical world with the world of information through the web. They do so through TCP/IP, the set of standards that enables network connections and specifies how information finds its way to and from myriad connections it contains. TCP/IP was formulated in the 1970s by Vinton Cerf and Robert E. Kahn. The advent of TCP/IP v6, launched in 2006, added enormous new addressing capabilities to the internet, and enabled objects and the information they might carry in attached sensors or devices to be addressable and searchable across the web. This expanded address space is particularly useful for tracking objects that monitor sensitive equipment or materials, point-of-sale purchases, passport tracking, inventory management, identification, and similar applications. Embedded chips, sensors, or tiny processors attached to an object allow helpful information about the object, such as cost, age, temperature, color, pressure, or humidity to be transmitted over the internet. This simple connection allows remote management, status monitoring, tracking, and alerts if the objects they are attached to are in danger of being damaged or spoiled. Traditional web tools allow objects to be annotated with descriptions, photographs, and connections to other objects, and any other contextual information.

Next-Generation LMS

Learning management systems (LMS), also referred to as Virtual Learning Environments, comprise a category of software and web applications that enable the online delivery of course materials as well as the tracking and reporting of student participation. Viewed as a centralized location for the ephemera of learning experiences, LMS have long been adopted by colleges and universities worldwide to manage and administer online and blended courses. It is commonplace for students to access syllabi and readings, submit assignments, check grades, and contact peers and instructors through their institution's LMS, while faculty monitor student engagement and performance at individual and course levels. However, some thought leaders believe current LMS are limited in capacity, too narrowly focused on the administration of learning rather than the learning itself. Next-generation LMS, also called next-generation digital learning environments (NGDLE), refers to the development of more flexible spaces that support personalization, meet universal design standards, and play a larger role in formative learning assessment. Rather than existing as single applications, EDUCAUSE notes in a recent report in Next Generation Digital Learning Environments that they are a "confederation of IT systems and application components that adhere to common standards …that would enable diversity while fostering coherence."

Time-to-Adoption Horizon: Four to Five Years

Artificial Intelligence

In the field of artificial intelligence (AI), computer science is being leveraged to create intelligent machines that more closely resemble humans in their functions. The knowledge engineering that allows computers to simulate human perception, learning, and decision-making is based on access to categories, properties, and relationships between various information sets. Neural networks, a significant area of AI research, is currently proving to be valuable for more natural user interfaces through voice recognition and natural language processing, allowing humans to interact with machines similarly to how they interact with each other. By design, neural networks model the biological function of animal brains to interpret and react to specific inputs such as words and tone of voice. As the underlying technologies continue to develop, AI has the potential to enhance online learning, adaptive learning software, and simulations in ways that more intuitively respond to and engage with students.

Natural User Interfaces

A growing list of devices built with natural user interfaces (NUIs) accept input in the form of taps, swipes, and other ways of touching; hand and arm motions; body movement; and increasingly, natural language. Tablets and smartphones are the first in a growing array of devices that allow computers to recognize and interpret natural physical gestures as a means of control. These natural user interfaces allow users to engage in virtual activities with movements similar to what they would use in the real world, manipulating content intuitively. The idea of being able to have a completely natural interaction with your device is not new, but neither has its full potential been realized. What makes natural user interfaces especially interesting this year is the increasing high fidelity of systems that understand gestures, facial expressions, and their nuances, as well as the convergence of gesture-sensing technology with voice recognition. Users interact with their devices in an almost natural fashion, with gesture, expression, and voice communicating their intentions. The next wave of NUIs will likely be electrovibration, while involves the use of an electrostatic force to produce detailed tactile sensations that users can feel. Seen as the next evolution of touchscreen technology, it will allow users to not only provide touch-based input, but also tactile output via a wide variety of textures, topography, and other features as they interact with the screen.