

2022 EDUCAUSE Horizon Report[®]

Teaching and Learning Edition



2022 EDUCAUSE Horizon Report[®] Teaching and Learning Edition

THANK YOU TO OUR TEACHING AND LEARNING HORIZON REPORT SPONSORS



Kathe Pelletier, Mark McCormack, Jamie Reeves, Jenay Robert, and Nichole Arbino, with Maha Al-Freih, Camille Dickson-Deane, Carlos Guevara, Lisa Koster, Melchor Sánchez-Mendiola, Lee Skallerup Bessette, and Jake Stine, *2022 EDUCAUSE Horizon Report, Teaching and Learning Edition* (Boulder, CO: EDUCAUSE, 2022).

© 2022 EDUCAUSE

This report is licensed under the [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License](#).

ISBN: 978-1-933046-13-6

EDUCAUSE Horizon Report is a registered trademark of EDUCAUSE.

Learn More

Read additional materials on the 2021 Horizon Project research hub, <https://www.educause.edu/horizon-report-teaching-and-learning-2022>

EDUCAUSE

EDUCAUSE is a higher education technology association and the largest community of IT leaders and professionals committed to advancing higher education. Technology, IT roles and responsibilities, and higher education are dynamically changing. Formed in 1998, EDUCAUSE supports those who lead, manage, and use information technology to anticipate and adapt to these changes, advancing strategic IT decision-making at every level within higher education. EDUCAUSE is a global nonprofit organization whose members include US and international higher education institutions, corporations, not-for-profit organizations, and K-12 institutions. With a community of more than 100,000 individuals at member organizations located around the world, EDUCAUSE encourages diversity in perspective, opinion, and representation. For more information, please visit [educause.edu](https://www.educause.edu).

CONTENTS

Executive Summary	4
Trends: Scanning the Horizon	6
Social Trends	7
Technological Trends	9
Economic Trends	10
Environmental Trends	12
Political Trends	13
Key Technologies & Practices	15
AI for Learning Analytics	17
AI for Learning Tools	20
Hybrid Learning Spaces	23
Mainstreaming Hybrid/Remote Learning Modes	26
Microcredentials	29
Professional Development for Hybrid/Remote Teaching	32
Scenarios	35
Growth	36
Constraint	37
Collapse	38
Transformation	39
Implications: What Do We Do Now?	40
Australian Higher Education	41
Canadian Higher Education	43
Higher Education in Mexico	45
Higher Education in Saudi Arabia	47
U.S. Community Colleges	49
U.S. Research Institutions	51
Corporate Perspective on Higher Education Research and Innovation	53
Methodology	55
Expert Panel Roster	57

EXECUTIVE SUMMARY

Two years into the COVID-19 pandemic, much still feels the same, though in some important ways our thinking and behaviors may be shifting in anticipation of longer-term changes in the ways we structure our lives and our shared places and spaces. In higher education, these shifts may reflect an evolution from short-term “emergency” or “reactive” modes of offering education during extraordinary circumstances to making strategic and sustainable investments in a future that will be very much unlike our past. As this year’s teaching and Learning Horizon panelists gathered to reflect on current trends and the future of higher education, many of their discussions and nominations suggest that change may be here to stay and that there will be no return to “normal” for many institutions. This report summarizes the results of those discussions and nominations and serves as one vantage point on where our future may be headed. This project was grounded in a modified Delphi methodology that seeks to elevate the collective perspectives and knowledge of a diverse group of experts, and the panelists’ activities were facilitated using tools adapted from the Institute for the Future.

Trends

As a first activity, we asked the Horizon panelists to provide input on the macro trends they believe are going to shape the future of postsecondary teaching and learning and to provide observable evidence for those trends. To ensure an expansive view of the larger trends serving as context for institutions of higher education, panelists provided input across five trend categories: social, technological, economic, environmental, and political. After several rounds of voting, the panelists selected the following trends as the most important:

Social

- Hybrid and Online Learning
- Skills-Based Learning
- Remote Work

Technological

- Learning Analytics and Big Data
- (Re)Defining Instructional Modalities
- Cybersecurity

Economic

- Cost and Value of College Degrees
- Digital Economy
- Financial Deficits

Environmental

- Physical Campus Structures
- Increase in Sustainable Development Goals
- Planetary Health

Political

- Political Instability Driving Uncertainty in Higher Education
- Political Ideology Impacting Pedagogy
- Decrease in Public Funding

Key Technologies and Practices

Horizon panelists were asked to describe those key technologies and practices they believe will have a significant impact on the future of postsecondary teaching and learning, with a focus on those that are new or for which there appear to be substantial new developments. After several rounds of voting, the following six items rose to the top of a long list of potential technologies and practices:

- AI for Learning Analytics
- AI for Learning Tools
- Hybrid Learning Spaces
- Mainstreaming Hybrid/Remote Learning Modes
- Microcredentialing
- Professional Development for Hybrid/Remote Teaching

Having identified the most important technologies and practices, panelists were then asked to reflect on the impacts those technologies and practices would likely have at an institution. We asked panelists to consider those impacts along several dimensions important to higher education: equity and inclusion, learning outcomes, risks, learner and instructor receptiveness, cost, and new literacies required on the part of learners and instructors.

While this year's technologies and practices may seem similar to last year's, a year's distance between reports has provided panelists with additional experiences and insights that build on and evolve their previous discussions. In some areas, our panelists' focus has narrowed in on specific aspects of a technology or practice they discussed only in general terms last year, such as with their deeper exploration into hybrid learning to consider its implications for professional development and physical spaces. In other areas, the significance of a technology or practice may have shifted to address an emerging demand or need that did not feel as present last year, such as with the more explicit connection between microcredentialing and the demands and needs of professional industries and the workforce.

Scenarios

Scanning the trends section and the technologies and practices section, we can begin to gather and arrange the information we have into logical patterns that can help us envision a number of scenarios for the future, for which we could start to prepare today. In this report we paint brief but evocative portraits of four possible future scenarios for postsecondary teaching and learning:

- **Growth:** The pandemic has catapulted the world into a digital age of remote professional and social interactions and a thriving online economy. The normalization of hybrid and online learning models is well suited for a parallel growth in more personalized learning experiences and microcredentialing programs. It has also contributed to growth in digital data, which institutions can more effectively use through increasingly advanced and equitable AI technologies.
- **Constraint:** Institutional practices and decision-making are increasingly being organized around the central purposes of improving and sustaining planetary health. Institutions' physical footprints are shrinking, as many are choosing to invest in more online capabilities and design eco-friendly facilities in an effort to minimize resource consumption and waste. Institutions are feeling the financial implications of these constraints as well, as funding agencies increasingly include sustainability goals and impacts as project requirements and as industry partners navigate new government regulations and taxes tied to sustainability.

- **Collapse:** Political divisions around the world have continued to intensify, and the leaders of many institutions of higher education are in the position of having to choose one political affiliation or another with which to align institutional mission and practices. These political allegiances have important implications for institutions' business and programmatic decision-making, as well as for the restrictions they place around curriculum and pedagogy. In more volatile regions of the world, physical safety and cybersecurity concerns drive institutional investments in surveillance technologies and systems.
- **Transformation:** The form and function of higher education have been reimagined to better fit the demands of professional industries and the needs of the workforce of the future. The traditional four-year and graduate school models of degree attainment have been all but abandoned in favor of more practical, customizable, and lifelong models of cross-cutting skills attainment and credentialing. Both microcredentialing and online/hybrid education are well suited to fit these new models of education, offering students more personalized and flexible options for acquiring the knowledge and skills they need.

Implications Essays

In light of the trends and future scenarios presented throughout this report, what can we say about the implications for institutions now and about what institutions can begin to do today to start preparing for these possible futures? For this section of the report, we asked seven Horizon panelists to reflect on the report's findings and offer their thoughts on the most important implications for their own context. Representing institutions from around the world and one corporation, the seven perspectives represented in these essays illustrate the similarities across international higher education, even with our geographic and cultural differences.

Institutions of higher education, and the teaching and learning practices they adopt, are in many ways products of the larger environments of which they are a part. Education is always made up of people living at a particular point in history, residing together in particular communities, and sharing a particular mixture of cultural ideas, norms, and resources. Mapping the futures of these institutions and their practices, then, demands that we pay attention to the larger social, economic, and other shifts taking place across our global society that may be impacting higher education in diverse and profound ways.

To ensure our *Horizon Report* discussions provide an expansive view of this shifting global landscape, we asked panelists to identify trends across five categories: social, technological, economic, environmental, and political.

As it was in last year's discussions, the COVID-19 pandemic continued to be a constant feature of panelists' discussions of this year's trends. Now two years into our shared experiences, the pandemic appears to be shaping the potential futures of higher education in ways that cut across most of our categories of trends, from the learning tools and models institutions are adopting, to the changing needs and expectations of the current and future workforce, to our social, economic, and political preferences and behaviors. Higher education likely will never be the same again, for these and many other reasons that have emerged just within the past two years.

And yet not everything may be quite as directly attributable to the pandemic—panelists observed a number of trends that seem to have been in the making prior to or at least apart from COVID-19. Higher education's increasing reliance on "big data" and analytics capabilities has been on our collective radar for a number of years, and it appears to be only growing in its significance for institutional planning and decision-making. The changing physical climate, and our growing need and evolving standards for sustainability and environmental protection, will place increasing responsibility on colleges and universities to be good stewards of natural resources. Meanwhile, intensifying political divisions—made no better by, but still long preceding, the pandemic—are likely to find their way onto campuses and into classrooms in ways that could threaten both institutions' safety and even the very foundational ideals of higher education.

The summary of these trends in this section is grounded in the discussions and inputs provided by our expert panelists, in keeping with the tradition of the Delphi methodology. Each of the trends was identified and voted on by panelists without influence from the EDUCAUSE *Horizon Report* staff, aside from our work in organizing and synthesizing the panelists' inputs for presentation here.

Each of the trends encompasses far more complexity and variability across types of institutions and regions of the world than can be adequately captured in such a brief summary. Indeed, the expert panelists—many of whom represent communities outside the United States, including South America, Europe, Asia, Australia, and Africa—routinely reflected on the ways in which trends affect institutions differently across global settings. Where possible, we've tried to account for that variability, though the reader will certainly bring additional experiences and contexts that would further broaden those considerations.

Social

Hybrid and Online Learning

Skills-Based Learning

Remote Work

Technological

Learning Analytics and Big Data

(Re)Defining Instructional Modalities

Cybersecurity

Economic

Cost and Value of College Degrees

Digital Economy

Financial Deficits

Environmental

Physical Campus Structures

Increase in Sustainable Development Goals

Planetary Health

Political

Political Instability Driving Uncertainty in Higher Education

Political Ideology Impacting Pedagogy

Decrease in Public Funding

SOCIAL TRENDS

Higher education takes place within particular social contexts, and learning experiences are shaped and colored by the people interacting and building relationships through those experiences. Teaching and learning in higher education is a fundamentally social practice, then, one that is better understood by mapping the important social trends developing within and around it.

Hybrid and Online Learning

Impact: The COVID-19 pandemic has reshaped our lives around more online and remote modes for living, working, playing, and learning. We've discovered the benefits of being able to do things from "anywhere," and our appetite for online and remote options as consumers is likely to persist, at least to some degree. Across many institutions, the "emergency remote teaching" models adopted through the pandemic will give way to more sustainable and evidence-based models of hybrid and online teaching and learning to support these longer-term consumer preferences. As institutional leaders plan for enhanced resources and infrastructure in support of new hybrid and online programs and course offerings, they will need to focus on developing sound hybrid and online pedagogies and investing in additional staff and services in the areas of instructional design and faculty development. Institutions must also be prepared to train and support their students in effectively engaging with and making the most of these new learning environments, with a particular focus on the needs of nontraditional students and enabling easier access to education for "anyone anywhere."

Evidence: In the fall of 2022, [St. Mary's University School of Law](#) will become the first fully online J.D. program to be accredited by the American Bar Association, offering students a blend of synchronous and asynchronous learning experiences and minimal on-campus requirements. Eight European business schools from Italy to France to Switzerland have joined together to form the [European Common Online Learning \(Ecol\)](#) group, which focuses on offering students online international experiences and a common international curriculum, to be continued even after the pandemic dissipates and international travel resumes.

Skills-Based Learning

Impact: In an era when you can hop online anytime anywhere to learn comedy writing from Steve Martin, or to take a class on "successful negotiation" at the University of Michigan, or to consume any number of other online, one-off skills- and interest-based course offerings, expectations and demand for noncredit and nontraditional education and skills training are on the rise. Against this backdrop, students and lifelong learners will be paying closer attention to these more practical, personalized, and skills-based courses and microcredentials as potentially more attractive opportunities for advancing their careers than the traditional college degree program. Major technology companies are removing four-year-degree requirements from their job postings and choosing to focus instead on the actual skills and competencies job candidates are bringing with them to the work. These changes signal to institutions a need to realign education and business models to better fit these consumer and industry trends and to develop more attractive and flexible, skills-based course and credentialing options for educating, training, reskilling, and upskilling the current and future workforce.

Evidence: Amazon has launched a new [Surge2IT program](#), an upskilling program offering entry-level IT staff 40 hours of educational content to help them learn new and more advanced skills for moving into in-demand and higher-paying IT positions. Universities Australia released "[Guidance for the Portability of Australian Microcredentials](#)," intended to give institutions standardized and shared access to a network of microcredentialing programs.

Remote Work

Impact: Over the past two years many workers have been allowed (or, in some cases, required) to work from home. These flexible work arrangements have enabled many to find a healthier balance between professional and personal lives and to more easily tend to competing needs such as childcare and eldercare. With two years of work-from-home experience under our belts, such arrangements are becoming the norm across many industries and a nonnegotiable expectation among staff. Remote work is making its way into job descriptions and contracts on campus, and institutional leaders are having to rethink important aspects of their culture and operations, such as interpersonal staff and team communications, the use of facilities and on-campus office and desk spaces, and staff and faculty training and support for their device and connectivity needs. Institutions that embrace these flexible

work arrangements may gain an advantage in attracting and retaining talent over those institutions insisting on a full return to on-campus operations, though higher education in general risks losing swaths of its workforce to other industries that are more fully embracing remote modes of working.

Evidence: A recent [EDUCAUSE QuickPoll](#) found that IT staff were more likely to be looking outside higher education for job opportunities when their institution's workplace policies and practices were not aligned with staff preferences for more remote flexibility. [Airbnb](#) has noted a 128% increase this year in guests' use of phrases like "relocation," "relocate," "remote work," and "trying a new neighborhood" in their reviews, signaling an increasing demand for "working vacations" and a desire among workers to take advantage of remote arrangements as opportunities to uproot and move.

FURTHER READING

Inside Higher Ed
"Reimagining Higher Education for
the Age of Flexible Work"

CUPA-HR
"What's Next for the Higher Education
Workforce? A Look at the Challenges
and Opportunities That Lie Ahead"

Inside Higher Ed
"Employers as Educators"

TECHNOLOGICAL TRENDS

Two years into the COVID-19 pandemic, institutions are shifting from “emergency” to “long-term” planning for new technologies that enable more adaptive decision-making and more flexible teaching and learning experiences. What those technologies are, how they are deployed across the institution, and the ways in which they themselves continue to evolve will be one of the defining stories of higher education in the years ahead.

Learning Analytics and Big Data

Impact: The promise of harnessing big data to improve student outcomes and increase automation of services such as the LMS has been enticing to many institutional leaders over the past five years. However, the implementation of big-data systems has not resulted in much change for campuses. Large amounts of data are collected but rarely harnessed to effect meaningful change in outcomes or even systems. Mature, institution-wide data mining strategies are needed to see progress on learning analytics and big data. Some barriers to success include student privacy and equity concerns, lack of buy-in from faculty, and investment in staff and resources for data reporting. A path forward needs to rely heavily on collaboration with all the key stakeholders at the table, including faculty, and starts with a clear vision of what big questions need to be answered.

Evidence: Seeking to prepare future professionals for “the age of AI,” Monash University recently launched [the first national center for learning analytics in Australia](#). Further evidence of the growth in this field can be seen as higher education institutions such as [The University of Texas at Arlington](#) and the [University of Wisconsin–Madison](#) are offering new master’s degrees in learning analytics.

(Re)Defining Instructional Modalities

Impact: As instructional modalities evolve to meet the needs of our changing world, higher education institutions are building new course models. A budding challenge in this time of change is the variety of vocabulary related to these models. HyFlex, blended, hybrid, flipped, synchronous, hybrid online, and virtual learning, to name a few, are all examples of terms used differently in different departments and at different institutions. Confusion about these terms ultimately leads to additional roadblocks for instructors and students who rely on effective

communication about daily operations. Further, compliance with federal and state regulations related to distance learning requires rigorous commitment to shared definitions.

Evidence: Portland State University (PSU) is in the early stages of experimenting with an [“Attend Anywhere” model](#), inspired by recent remote teaching experiences. Part of the pilot program for PSU is understanding what a “hybrid university” might look like. Education researcher Tanya Joosten has put forward a new framework, [“four dialecticals of blended learning,”](#) to help stakeholders reimagine the future of instructional modalities.

Cybersecurity

Impact: The constant and looming threat of an institutional cybersecurity attack is on the minds of campus leaders all over the world. Legacy systems that are still in use were often designed with security as an afterthought, and new cybersecurity threats are constantly turning up. Lack of funding in higher education has resulted in insufficient funding for personnel and other resources needed to prevent an attack. The pandemic has increased the vulnerability of organizations by permeating the confines of the campus and creating borderless networks. As security breaches at higher education institutions are publicized in the media, the trust that students and other stakeholders have in their institutions is waning.

Evidence: Analysts report that [education is one of the industries most affected by cybersecurity threats](#). In 2021 alone, [88 education organizations were impacted by ransomware](#) (including 26 colleges and universities). [The COVID-19 pandemic has yielded new opportunities for cyberattacks](#), including the increased use of third-party tools and new mechanisms for collecting personal data such as vaccination status.

FURTHER READING

EDUCAUSE

[2021 EDUCAUSE Horizon Report: Information Security Edition](#)

EDUCAUSE Review

[“Big Data Science: Establishing Data-Driven Institutions through Advanced Analytics”](#)

EDUCAUSE Review

[“The Landscape of Merging Modalities”](#)

ECONOMIC TRENDS

While many institutions have received infusions of new funds over the past several years, this short-term relief has not resolved the deeper fiscal challenges still plaguing higher education. Institutional leaders will need to anticipate further declines in funding and adopt new ways of thinking about and planning their institutional business.

Cost and Value of College Degrees

Impact: With many students and families around the world experiencing financial hardships either caused or exacerbated by the COVID-19 pandemic, the return on investment of the traditional college degree is and will continue to come under closer scrutiny. Some students will simply conclude that they cannot afford the cost of a degree, particularly in regions and at institutions where rises in tuition and other related expenses simply seem unmanageable. Other students will conclude that the traditional college degree no longer meets their personal and professional needs, or they will seek alternative opportunities for acquiring the knowledge, skills, and credentials they need for successful job placement and career advancement. Institutional education and business models will be pressed to evolve in ways that lower the cost burdens placed on students and their families; that offer more flexible, modular, and personalized learning experiences and credentials that keep pace with trends in the larger professional development marketplace; or that reflect some combination of these changes. Institutions' reputations and the promise of a "college experience" will no longer be enough to attract sustainable enrollments and funding, and clearer ties to the demands of the larger economy and workforce will be their new meal ticket.

Evidence: A recent survey conducted by the Association of American Colleges and Universities and Bipartisan Policy Center found that many Americans are questioning the value of a college degree, particularly among certain political parties and among certain age and income levels. According to a recent report from the National Student Clearinghouse, U.S. postsecondary enrollment has declined by nearly 1 million students since the beginning of the COVID-19 pandemic.

Digital Economy

Impact: The emergence of global online networks and economies has led to, among other things, the formation and maintenance of individual and organizational digital identities, the exponential growth of digital data and analytics, and the emergence of cryptocurrency. As students, faculty, and staff manage their increasingly complex constellations of digital identities and connections, institutions will be faced with growing challenges in the areas of cybersecurity and endpoint detection and response, as well as in combating the potentially negative effects of social media and misinformation. These digital identities and connections, along with exponential growth in online and cloud-based systems and solutions used at the institution, will widen higher education's data footprint, increasing the need for investments in data and analytics staff and capabilities. And the growing adoption of cryptocurrencies and NFTs as legitimate market assets will force institutions to reconsider their business models and practices and to align with evolving consumer preferences.

Evidence: The Wharton School of the University of Pennsylvania has announced that students can now pay their tuition using Bitcoin, Ethereum, and USD Coin. The US House of Representatives recently passed the College Transparency Act requiring institutions to collect and submit data to the Department of Education on student enrollment, persistence, and program/degree completion.

Financial Deficits

Impact: Institutions continue to face perennial challenges that threaten their financial stability—fluctuations and downward trends in student enrollments, inflation, and rising costs of living and tuition. These challenges have been with us for some time and will likely be with us for the foreseeable future. Institutions received some temporary relief in critical areas of need over the past several years as the pandemic unleashed an unprecedented amount of public money into the economy. Colleges and universities alone received an infusion of \$14 billion through the Higher Education Emergency Relief Fund

(HEERF), but these dollars are tagged and intended specifically for minimizing the costs and impacts of the pandemic. Institutions using those funds to bring on new staff or to make longer-term investments in technology and infrastructure might find themselves standing at a budgetary cliff in the years ahead as those funds begin to drop off and aren't replaced by infusions of new funds.

Evidence: In the year prior to the pandemic, higher education was already experiencing dramatic shifts in funding, [with state funding for two- and four-year colleges and universities having declined](#) more than \$6 billion over the previous 20 years.

FURTHER READING

Pew Trusts

[“Two Decades of Change in Federal and State Higher Education Funding”](#)

BBC

[“‘Degree Inflation’: How the Four-Year Degree Became Required”](#)

VoxEU

[“Value of Data: There’s No Such Thing as a Free Lunch in the Digital Economy”](#)

ENVIRONMENTAL TRENDS

Institutions of higher education draw on finite local and global materials and resources to fuel their operations, and their facilities leave sizable imprints on the environments around them. The need to adopt sustainable practices across the board, far too often overlooked in higher education planning and decision-making, will be inescapable in a future more concerned with climate stability and environmental sustainability.

Physical Campus Structures

Impact: The recent period of “emergency remote teaching,” followed by institutions returning to campuses under challenging health and safety conditions, necessitated changes in physical campus structures. Initial changes to physical environments include the addition of new hardware and room layouts for remote teaching, improvement of air quality and space for social distancing, and reduction in tangible objects such as paper handouts. As the focus on physical learning environments continues, the campus of the future will need to be designed to meet more needs than ever before. Campus leaders will need to account for new challenges such as accommodating remote learners and workers, integrating foundational accessibility needs for all, and addressing new green initiatives for a sustainable campus.

Evidence: Florida State University’s [Campus Reimagined](#) initiative, and the University of New South Wales both leverage Microsoft Teams to reengineer what a classroom could be on a digital platform. Emory University has implemented a [Streaming and Recording Studio](#) outfitted with all of the audio, video, and lighting tools needed to stream or record content for synchronous or asynchronous learning activities.

Increase in Sustainable Development Goals

Impact: The United Nations’ [Sustainability Development Goals](#) (SDGs), adopted in 2015, have impacted how the world’s colleges and universities strategically plan for the campus of the future in 17 distinct ways. Higher education contributes to the success of the SDGs in two areas. First, integration of SDGs into instruction prepares students to contribute to sustainability, in both their personal and professional lives. Second, a wide variety of research carried out by faculty and students at higher education institutions directly informs SDGs and their practical applications. The SDGs call for more open

and collaborative sciences to more quickly research and solve the next generation of environmental and humanitarian crises.

Evidence: The University of Bergen formed a partnership with UNESCO through a [Global Independent Expert Group](#) to inform the ways universities can contribute to the SDGs. The University of California, Davis is supporting faculty and students through [Grants for Advancing Sustainable Development Goals](#).

Planetary Health

Impact: Climate change is becoming a central concern at many higher education institutions and professional organizations. In recent years, severe weather events have disrupted daily institutional operations with increasing frequency. This has necessitated new approaches to mitigating the impacts of weather events on students’ lives and learning, as well as the development of new systems that can better endure unexpected weather events. On a larger scale, the higher education community is aware of its responsibility to leverage research and teaching to impact the global climate. Institutions are launching media campaigns to educate local communities about the science of climate change, including actionable advice for halting it. Degree programs are beginning to include explicit instruction for students to learn more about the ecological, social, and cultural impacts of climate change. Professional organizations and funding agencies are issuing recommendations and even requirements for researchers and educators to adhere to green practices and include climate change in outreach plans and curricula.

Evidence: The Royal Institute of British Architects (RIBA) has issued a [2030 Climate Challenge](#) for both professional architects and higher education architecture programs. The Climate Leadership Network has issued [The Presidents’ Climate Leadership Commitments](#), signed by presidents and chancellors from a diverse array of higher education institutions.

FURTHER READING

[Planetary Health Alliance](#)
[The Planetary Health Education Framework](#)

[EDUCAUSE](#)
[Learning Space Rating System](#)

[Times Higher Education](#)
[“Impact Rankings 2021: Methodology”](#)

POLITICAL TRENDS

Higher education, for better and for worse, is always entangled in and concerned with the political climate and events of the present moment. In addition to determining overall higher education funding, politics is interwoven with higher education as an object of research and study and as subject matter for courses. Because of this long-standing entanglement, political trends are both resources for higher education as well as forces shaping its contours.

Political Instability Driving Uncertainty in Higher Education

Impact: The rise of nationalism in certain regions of the world, and the emergence of populist leaders espousing views in opposition to the values of democracy, science, and education, have contributed to a global political climate characterized by division and conflict. Layered on top of this volatile political foundation, the pandemic has wrought further disruption to our social and economic lives, leaving many of us unsettled and uncertain, not just about the future of higher education but also about the future of our global society. For some, one solution to this disruption and uncertainty will be to turn against institutions of higher education and the values of scientific inquiry, free thought, and education they represent. In these instances, institutional leaders will be faced with the decision of whether to recommit to these long-held values, as well as with the challenges of engaging with and speaking to (and, in some instances, persuading) stakeholders and community members and groups representing a range of political views and demands. For others, the solution might be to turn away from higher education, no longer able to afford or see the value of pursuing an education amid so many other social, economic, and political demands and uncertainties. In these instances, institutions must be prepared to offer compelling evidence of the benefits of the education and training they provide, as well as to accommodate the needs of increasingly strained and distracted students and families.

Evidence: Pew Research asked a panel of social, economic, and political experts what they anticipated the “new normal” would look like in the year 2025, with 47% of those experts responding that life would be mostly worse for most people. Mexico’s attorney general recently brought charges against a group of 31 scientists and researchers, what some view as reflective of populist President Andrés Manuel López’s antagonism toward the academic community.

Political Ideology Impacting Pedagogy

Impact: The gap between political differences is widening and intensifying, particularly between the poles of conservative and progressive affiliations. As individual and institutional identities become more and more entangled with these political affiliations, so too will institutions’ missions, funding, curricula, and pedagogies. At those institutions with stated political allegiances, the idyllic vision of a university classroom alive with free thought and open debate will give way to classrooms with constrained discussions and narrow definitions of what counts as legitimate knowledge and truth. Moreover, faculty course design, materials, and instruction will be brought in line with the institution’s values and standards for student competency and success.

Evidence: Recent Pew Research on political typologies highlights the stark differences between conservative and progressive Americans on values ranging from racial justice to economics to domestic and international policy. A think tank has been established at UT Austin that is “dedicated to the study and teaching of individual liberty, limited government, private enterprise and free markets.”

Decrease in Public Funding

Impact: As various public sectors vie for increased government funding now and in the wake of the COVID-19 pandemic, education budgets around the globe may experience significant cuts as those funds are siphoned off to other public needs and/or as public institutions struggle to provide compelling evidence that supports their continued funding. The effects of these cuts would be felt across public institutions, from reductions in faculty and staff to fewer course offerings and declines in financial aid and student enrollments. Many of those institutions most pressed by budgetary downturns will

seek alternative sources of funding, including private sources that could potentially exert influence on institutional policies, decision-making, and academic offerings.

Evidence: U.S. state budget shortfalls during the COVID-19 pandemic **far exceeded** shortfalls during both the 2001 Recession and the Great Recession. Two-thirds of poorer countries are **cutting their education budgets** at a time when they can least afford it.

FURTHER READING

World Bank
[The Impact of the COVID-19
Pandemic on Education Financing](#)

EdSurge
[“When Technical Education
Is a Lifeline”](#)

Chronicle of Higher Education
[“The Red State Disadvantage”](#)

KEY TECHNOLOGIES & PRACTICES

While this year's technologies and practices may seem remarkably similar to last year's—particularly with their focus on hybrid learning, microcredentials, and analytics—a year's distance between reports has provided panelists with additional experiences and insights that build on and evolve our previous discussions. In some areas, our panelists' focus has narrowed in on specific aspects of a technology or practice they discussed only in general terms last year. In other areas, the significance of a technology or practice may have shifted to address an emerging demand or need that may not have felt as present last year.

In their discussions and ratings of online and hybrid learning this year, for example, panelists brought “faculty development” and “learning spaces” much more to the fore as leading technologies and practices in their own right, rather than as subsets of a broader interest in hybrid learning. With two years of **accelerated digital transformation** under their belts, and an evolving understanding of **what our students need** in these new types of learning environments, institutional leaders and decision makers are perhaps better positioned now than even just a year ago to identify the specific areas where development and investment will be needed to help “mainstream” hybrid learning and ensure long-term sustainability and success.

Moreover, in their discussions this year on the importance of microcredentials (and student learning more generally), panelists made more explicit the connections between the goals and work of higher education and the demands and needs of professional industries and the workforce. This may partly be due to the recent trend of the “Great Resignation” and the new expectations employees have concerning **workplace flexibility**, in addition to the continued growth of data- and analytics-based jobs and functions that will demand reskilling and upskilling across vast swaths of the existing workforce.

As in previous years, we also provide a dimensional analysis of these six technologies and practices. We asked panelists to assess the challenges and benefits institutions might encounter if they move forward with any of these six. Panelists evaluated each technology or practice across several dimensions using a five-point scale (0 = none, 4 = highest). The dimensions for this year's report are:

- Will it require new kinds of literacies on the part of learners and instructors?
- What level of institutional funding will be needed to adopt it?
- How receptive will learners and instructors be to adopting it?
- What is its risk of failure?
- What is its potential to have a significant and positive impact on learning outcomes?
- How useful will it be in addressing issues of equity and inclusion?

In this way, we asked the panelists not simply to identify what might be impactful but to anticipate just what that impact might be. These results are presented in the charts that accompany the discussions of each technology and practice.

AI for Learning Analytics

AI for Learning Tools

Hybrid Learning Spaces

Mainstreaming Hybrid/ Remote Learning Modes

Microcredentials

Professional Development for Hybrid/Remote Teaching

AI-Powered Technologies and Practices

In the selection of this year's key technologies and practices, Horizon panelists identified two items that share a common grounding in AI-based technologies: AI for learning analytics, and AI for learning tools.

While these two picks may at first glance appear interchangeable, a closer inspection reveals that they highlight very different applications of artificial intelligence in higher education. With AI for learning analytics, the focus is on institutions' use of AI to organize, analyze, and understand data for decision-making and for supporting student success. AI used this way is a tool harnessed by the institution to better and more easily use the vast amounts of data collected across its many systems and platforms.

With AI for learning tools, we focus on how the students themselves directly interact with AI-powered tools and technologies through their learning experiences and environments. AI used this way is a student's close companion and aide on the journey of learning and moving through college experiences. It guides the student through tasks, helps shape behaviors and thinking, and offers automation and efficiency as a benefit to the institution's interactions with its students.

Across both of these areas of use, applications of AI may yet still be in their infancy, but the potential for growth and impact offers higher education and teaching and learning professionals reasons for both optimism and caution in the near and long terms.

AI FOR LEARNING ANALYTICS

Overview

The emergence of “big data”—and more specifically AI-enabled practices—in higher education has been facilitated by several important recent shifts. First, AI technologies and capabilities have changed significantly and will continue to evolve and improve. Tomorrow’s capabilities for AI in higher education will have evolved far beyond yesterday’s. Where first-generation AI applications relied heavily on human-produced models for harvesting and analyzing data, through advancements like “deep learning” these applications can now harvest data and generate their own models and can learn from and improve on those models over time. These advancements promise to help institutions more easily handle and generate insights from the large amounts of institutional, learning, and student data they collect and store.

Second, the “great pivot” during the COVID-19 pandemic to online modes of learning and working has introduced many institutions to new online and cloud-based applications and platforms that harness their own machine and deep learning tools to analyze and generate insights from the data they collect. As institutions’ digital transformation journeys continue to accelerate now and in the years ahead, and as more institutional functions and services shift to online and cloud-based platforms, institutions’ storehouses of digitized data will expand. These expansions in data will demand a parallel expansion in institutions’ AI technologies and capabilities for organizing and making sense of these data, with the potential for helping drive decision-making and creating adaptive and personalized education experiences.

Relevance for Teaching and Learning

Our Horizon panelists highlighted several challenges that risk frustrating institutions’ efforts to implement meaningful AI analytics, challenges that practitioners will likely need to focus on during the journey ahead:

Institutional Systems and Culture. “Data silos” are a common feature of the higher education landscape, with many institutions made up of a patchwork of departments and functional units each with its own systems and practices for collecting, storing, and using data. This data siloing often results in operational inefficiencies, gaps between data systems that don’t “talk” to one another, and ultimately missed opportunities for institutional officials to make effective use of their collective data to help formulate the best decisions possible for their institutions and their students. With greater integration of data systems and analytics solutions that offer users faster and easier access to the data insights and reports they need, institutions can, at a minimum, realize substantial operational efficiencies and develop more holistic data profiles of their students.

AI for Learning Analytics in Practice

Radiography Procedure Simulation & AI Evaluation

By blending artificial intelligence and virtual reality simulation learning, the Radiography Program at Montgomery County Community College explores new opportunities within teaching and student success. Within a virtual examination room students secure supplemental hands-on practice with anatomical content knowledge, patient interaction, and X-ray equipment. Simultaneously, learners are evaluated by an AI tool that enables individualized instructor-led intervention from their demonstrated gaps in content knowledge and safe practices recorded during the session.

Application of Predictive Analytics to Proactively Identify and Support At-Risk Students to Drive Persistence

Using learning analytics, Online Education Services developed a web-based application to proactively support at-risk learners. Underpinned by an AI machine learning model, the application identifies risk factors impacting student success and delivers those factors in real time to teaching and support staff. Learners can be contacted by phone, SMS, or email from within the LMS or via a CRM. Learners who received support through the tool had saw an increase in pass rates and progression.

Even with data integrated across systems and made easily accessible, engrained institutional cultures and behaviors around the use of those data can still hamper institution-wide engagement. As the IT and IR teams at [Drake University](#) recently discovered, maturing their data-informed decision-making capabilities required much more than simply providing more access to data. Far more important, maturing those capabilities required reeducating staff and leaders on the potential of those data to address real problems and decision-making needs core to the institution's mission. It required building new relationships across units, listening to stakeholders, and getting buy-in and support from both institutional leadership and frontline staff. It required, in other words, an awareness that analytics is a deeply human activity driven by real people with real needs and interests that must be integrated into institutions' data and analytics planning.

Ethics and Equity. Important ethical considerations lurk behind any effort to collect, analyze, and use individuals' data. The learning management system, as just one of a number of data sources at the institution, collects a sizable amount of data on its users. Some of those users may balk, though, at the idea of certain types of data being collected and used for purposes they may not fully be aware of or understand. As [previous EDUCAUSE research has found](#), for example, students may be more or less comfortable with their institution collecting and using their data depending on the type of data being collected and used. And many students may not fully understand why or how their data are being collected and used, eroding their trust and confidence in the institution's use and protection of their data and subsequently eroding their trust in their institution overall.

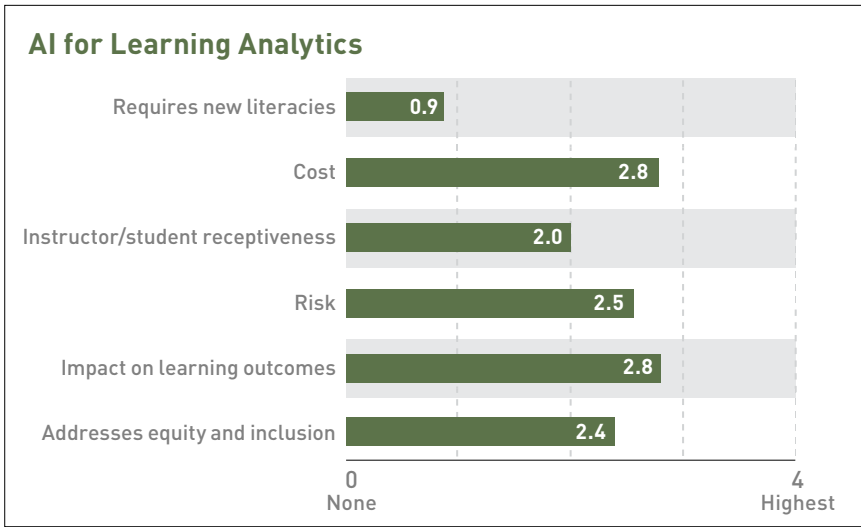
Other concerns persist around the algorithmic biases that may undergird AI technologies and models, as advanced as these technologies and models may be. These biases tend to favor certain types of students over others, serving to perpetuate and even worsen inequities already existing among students. Indeed, when asked to reflect on the potential of all the technologies and practices to improve equity and inclusion at the institution, panelists gave AI for learning analytics one of the lowest scores relative to the other items in this year's report (see chart below). Clearly, though the potential of AI for enriching higher education can and does capture our imaginations and compel us toward innovation in our data and analytics capabilities, much work remains to be done to ensure those innovations don't leave anyone behind but instead help foster student thriving and success without qualification or bias.

Exploring Natural Language Processing to Inform Student Success Decision-Making

Research conducted during the pandemic demonstrated early indications that equity gaps were intensifying. With massive amounts of available data, even sophisticated analytical models struggle to cut through the variables and the noise that might be obscuring clear signals of students' needs. Using natural language processing (NLP) analyses applied to first-person voices from students enrolled in first-year seminars at two institutions, the system compared open-ended response results for their usefulness in informing just-in-time interventions to decrease academic achievement gaps.

Resource Recommender

Academic support resources such as tutor help and peer mentoring have shown potential to improve learner success. Using AI targeting models integrated with the learning management platform, Southern New Hampshire University is reaching out to learners who will benefit the most from these resources, guiding them to the appropriate free-of-cost help based on their performance, engagement behavior, and needs, with timely nudges.



Retention Analytics Dashboard

Student support staff typically rely on lagging indicators of when students are disengaged or struggling. The University of Washington’s Retention Analytics Dashboard (RAD) web app combines AI prediction of adverse student outcomes with weekly LMS and IDP (login) data, helping staff manage their caseloads and focus on high-priority students early in the quarter. Together these data help staff proactively connect students with services and support.

Course Insights: Applied Learning Analytics for Instructors

Course Insights is a Canvas LTI application developed by Penn State’s Teaching and Learning with Technology to support instructors with data on the demographics and prior enrollments of students in their courses. The application leverages artificial intelligence and advanced analytics on top of institutional and Unizin data sources to help instructors monitor online course activity, reflect on course outcomes, and understand patterns of student engagement in real time in their courses.

FURTHER READING

International Journal of Educational Technology in Higher Education
 “Prerequisites for Artificial Intelligence in Further Education: Identification of Drivers, Barriers, and Business Models of Educational Technology Companies”

Journal of Learning Analytics
 “Intelligent Learning Analytics Dashboards: Automated Drill-Down Recommendations to Support Teacher Data Exploration”

My Data Global Organization
 MyData

AI FOR LEARNING TOOLS

Overview

Artificial intelligence is much more than just a way to analyze and understand data. It's an increasingly ubiquitous feature of our homes and workplaces and social spaces, helping shape our everyday lived experiences, entertain us, connect us with one another, and in many cases nudge our behaviors and thinking this way or that. Social media platforms learn our behaviors and preferences to populate our content feeds, suggest friends and products, and otherwise provide us with a personalized experience that feels tailored to our unique identities. Our phones recognize our faces and monitor and analyze our daily routines. Siri, Alexa, and other voice assistants listen to us, respond to inquiries, tell us jokes, and engage with us in conversational exchanges. Powered by advances in areas including machine learning and natural language processing, these and so many other AI-powered elements of our lives are rapidly becoming a natural part of the experience of simply being human.

It's little wonder, then, that AI is carving out a similarly ubiquitous presence across our campuses and in our classrooms. Of the AI-powered experiences students are having at their institutions, many are rooted in the devices and technologies they've brought with them as a normal part of their living and being, as described above. A student studying in a dorm room might ask Alexa for help on a history question or might make connections with other students on campus based on social media feeds. In other areas of institutional life, though, AI may be leveraged in ways uniquely and specifically designed for the experience of being a student. More and more of the technologies and tools students encounter in their classrooms will be powered by the institutions' maturing AI capabilities, elevating the position of AI within higher education beyond merely being a data tool to also being a constant companion and aide to students on the journey of learning and growing.

Relevance for Teaching and Learning

AI is already working its way into students' experiences on campus and in the classroom, and our Horizon panelists and exemplars have highlighted several key areas where institutions may need to focus their attention:

Improving Student Performance. AI offers potential benefits through tools that provide automated and responsive feedback to students as they study and complete course assignments and tasks. Virtual writing assistants, for example, can provide students with real-time feedback on the quality of their writing and offer comments and suggestions based on the instructor's guidelines and/or the goals of the course. These tools might also provide customized learning experiences and pathways for students, adjusting curricula, materials, and assessments based on each student's academic performance, needs, and preferences. As these and other functions become increasingly automated and less dependent on faculty time and effort, instructors might experience benefits as well in the form of more time to focus on higher-order tasks and devote attention to individual students in need of additional support or tutoring.

AI for Learning Tools in Practice

Immersive Learning: Extended Reality Learning Experiences for Military Leaders

Immersive Learning for Leader Development Squadron Officer School aims to develop leaders who can operate successfully in volatile, uncertain, complex, and ambiguous environments. Using extended reality technologies, applications are designed and integrated into curricula and teaching practices to support authentic learning experiences. Faculty can use the shared experiences to guide effective learning outcomes by way of a concrete experience, reflection, analysis, and active experimentation.

Automated Feedback: AI-Powered Writing Coach

Automated Feedback harnesses the power of AI to enhance students' performance and deeper learning while offering teachers more time to provide higher-order feedback. This LMS plugin gives formative feedback (straightforward corrections, actionable inline comments, suggestions, and compliments) on students' academic writing based on teacher-defined criteria to help improve their assignments. This project is co-created by FeedbackFruits, Erasmus University Rotterdam, and Rotterdam University of Applied Sciences following the Dutch DoTank project.

Improving Student Learning Experiences. AI can also be leveraged to improve and build on existing learning tools and experiences, particularly where learning technologies and tools already in use are in need of further enhancement. As extended reality technologies—virtual, augmented, and mixed reality—continue to evolve, for example, the integration of AI capabilities within those technologies can help create more realistic environments and experiences and lead to improved learning outcomes. Medical students learning in virtual environments can benefit from more authentic interactions with virtual patients powered by AI technology. Students training to work in high-stress or volatile settings (e.g., emergency response, aviation, military) can benefit from more intelligent and responsive simulations that more closely resemble real-world scenarios. As AI enables these and other learning technologies to mature and produce better student outcomes, more institutions and faculty may be compelled to make investments in these technologies down the road.

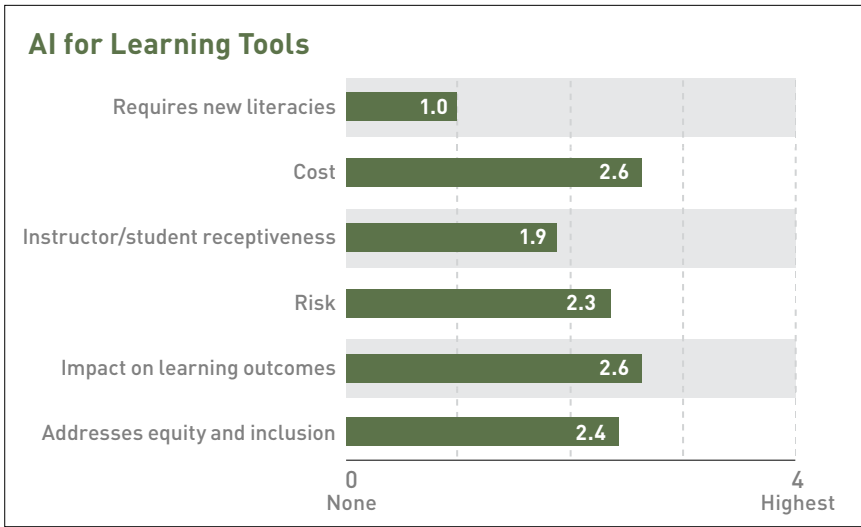
Are We Ready Yet? Many higher education leaders, faculty, and students may simply not be ready yet to embrace AI-powered learning experiences and tools. In their discussion on this area of practice, Horizon panelists reflected on whether AI-driven tools would truly lead to more student-centered learning experiences or if they would instead exert undue influence on those experiences—as one panelist put it, “Are we giving the learner control to program the machine, or are we designing machines to program learners?” As with AI for learning analytics, these and other related concerns might explain why panelists scored this area of practice lowest in terms of “instructor and student receptiveness” to adopting the practice (see chart below). Clearly, stakeholder buy-in and support may be a significant challenge and even a barrier for practitioners seeking to integrate more AI-powered tools and technologies into their institution’s learning strategy. There may be much still to do, then, in exploring ethical questions and working together to arrive at solutions that help assuage these concerns and help create learning experiences that are safe, beneficial, and truly student centered.

FazBoard: An AI-Education Hybrid Teaching & Learning System

Indiana University–Purdue University Indianapolis’s human–AI hybrid system uses an infinite digital space canvas with an embedded AI assistant to simulate the teacher’s, individual, and collaborative teaching/learning spaces. It integrates teaching/learning materials and provide 24/7 instant responses and access to a virtual Teacher Assistant automating the collection of students’ inquiries and learning analytics. Results will be used to help adjust the curriculum in terms of substance, difficulty, or clarity levels or the methods and style of delivery.

Artificial Intelligence in Virtual Reality for Patient Interviewing in a Graduate Nursing Program

Virtual reality provides a method for nursing learners to provide care in a realistic environment with a realistic-looking patient. When adding artificial intelligence to the patient character, the responses become more realistic to human conversations. Purdue University Global has integrated AI patients into its Primary Mental Health Nurse Practitioner graduate program. The learners will interact with two patients per course throughout the program.



FEATuring You

FEATuring You is a digital assessment and badging suite of tools from Southern New Hampshire University offering workforce-aligned educational pathways. Today, more than 2,000 assessments have been completed. Funded by Google.org, this work includes the development of AI products to teach and assess soft skills at scale. Recent efforts focus on developing an interactive digital graphic novel to assess persuasive oral communication skills leveraging a cloud-based machine learning pipeline.

AcaWriter: 24/7 Instant Formative Feedback on Academic Writing

Critical, reflective academic writing makes the author’s thinking visible so that readers can follow the line of argument or reflection. Such writing takes practice, however, and good feedback is expensive to give. The University of Technology Sydney has developed the open-source AcaWriter web application since 2015 and has evaluated it in diverse disciplines, with close attention paid to the quality of student and staff experience.

FURTHER READING

Complexity
 “A Review of Artificial Intelligence (AI) in Education from 2010 to 2020”

Extended Abstracts of the 2021 CHI Conference on Human Factors in Computing Systems
 “Designing Adaptive Argumentation Learning Systems Based on Artificial Intelligence”

Houghton Mifflin Harcourt
 Research Foundations: Evidence Base (Amira Learning)

HYBRID LEARNING SPACES

Overview

Of the three hybrid learning techs and practices identified by our panel this year, this practice may be the most concrete, the most technology dependent, and therefore the costliest for the institution to undertake (see panelist ratings of “Cost” in the chart below). In many cases, hybrid learning spaces demand significant investments in redesigned or completely new facilities, as well as the outfitting of existing classrooms with more advanced audio and video technologies capable of supporting both on-premises and remote learners. Whereas the practice of mainstreaming hybrid learning challenges the institution with headier questions around institutional culture and educational and pedagogical models, this practice challenges the institution’s bottom line and the appetite for investing in and making real, concrete changes to the places and spaces that make up their campus.

Here’s where the institution’s hybrid and online planning and implementation gets down into the weeds, into the finer details of educational practice, and where the institution’s best thinking and best intentions can be thwarted by technologies that won’t work or spaces that aren’t conducive to the institution’s loftiest ideas of what hybrid education could look like. It’s where hybrid education can fail if the remote students can’t hear the students who are in the classroom. It’s where learning suffers when the instructor can’t figure out how to make a complicated piece of technology work as intended. It’s where our aspirations for hybrid education meet the sometimes challenging realities of the places and spaces and people we depend on to help realize those aspirations.

Relevance for Teaching and Learning

In our Horizon panelists’ discussions on this area of practice, they highlighted several key areas where institutions should focus their efforts on the road ahead:

Technology. As banal and obvious as this observation may seem, in practice it’s much harder than we may give due credit to procure, deploy, and use the basic elements of technology needed to facilitate successful and meaningful hybrid learning experiences. Classrooms across the campus need to be outfitted with microphones and speakers positioned in such a way that students both remote and on-premises are able to hear and interact with their instructor and with one another. Two-way cameras and video screens are needed so that remote students can see the people in the classroom and be seen by them. Poor deployment or use of any of these or many other elements of hybrid learning technology can quickly derail the best hybrid learning plans and contribute to suboptimal student experiences and outcomes.

Hybrid Learning Spaces in Practice

Hybrid Learning Spaces for Faculty Professional Development

To address the challenges of synchronous hybrid teaching, staff at the Centre for the Enhancement of Teaching and Learning (CETL) at The University of Hong Kong have redesigned their professional development space with a focus on interactional affordances for seamless physical–virtual group collaboration and improved teacher facilitation. Enabling technologies in the physical space will place virtual/online group members at the center rather than the periphery of breakout and whole-group discussions.

The ALCOVE: Active Learning Classroom of Valuable Experience

In response to the pandemic, Indiana University launched the ALCOVE classroom to test innovative technologies focused on solving timely issues related to HyFlex design. Priorities of this classroom include untethering the instructor, improving student collaboration, and enhancing classroom audio and video. A second version of this classroom, with a focus on student mobile devices to address the digital divide, will be launched in fall 2022.

As important as it is to get the technology itself right, institutions must also take into consideration the people facilitating the use of that technology. The best videoconferencing system an institution can buy in the hands of instructors who don't know how to use it is a failed deployment of technology. An overreliance on IT support staff to help faculty start and use the technologies they need will result in gaps in support, an overworked IT staff, and diminished faculty confidence in using those technologies. As one of our Horizon panelists put it, "Professors need to be independent of the AV team. They should be able to walk into a classroom, connect the technology, and start teaching."

Learning Space Design. To describe this practice as more "concrete" and "technology dependent" than others is perhaps to do it a disservice, as in its best expressions it is no less dependent on deep theoretical and pedagogical thinking and planning than any of the other practices that the panel highlighted. Indeed, in their reflections on hybrid spaces, panelists discussed the importance of designing those spaces to align with what we know from decades of research and theory about how people learn and to lean on established best practices for designing spaces most conducive to effective pedagogical approaches and most nurturing of positive student experiences and outcomes.

Effectively designing spaces for hybrid education, in other words, will require much more of institutions than simply purchasing the right technologies or showing faculty and students how to use those technologies. It will require practitioners to invest the time to get out of the weeds and connect back up to higher notions of pedagogy, to understand why certain spaces and designs might work better than others for their particular educational goals and for the students they serve. Even the best hybrid learning technologies in the hands of capable faculty who know how to use them ultimately fail if they aren't deployed for clear purposes, in ways that fit with what we know about how students learn, and with inclusivity top of mind.

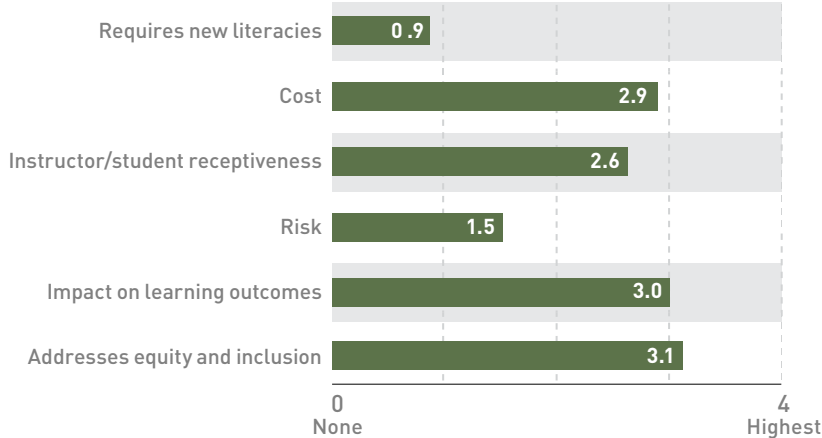
AV Technology to Support Hybrid Learning at JMU X-Labs

Before the pandemic, James Madison University X-Labs developed an approach to transdisciplinary courses that required hybrid collaborations with the capacity to reach global stakeholders and partners. Rather than taking a one-size-fits-all approach, staff focused on supporting faculty with various tools, software, hardware, and pedagogy, which required the group to prototype, scaffold, be nimble, develop trust, and accept an element of risk. It doesn't always work, but when it does, it's transformative for the students, faculty, and the institution.

UTSA Phase 1 Classroom Upgrades for Flexible Learning Spaces

The Academic Innovation division of the University of Texas at San Antonio (UTSA) transformed 28 learning spaces to increase accessibility, provide in-class and digital collaboration opportunities, and enable quicker faculty adoption of instructional changes. The physical and technological upgrades, rooted in universal design, provided 30 faculty and 4,200 students with a consistent online/in-person/HyFlex experience. Meanwhile, RowdyFlex, a dedicated support program, provides faculty with training, resources, and incentives to leverage the reimagined classrooms to develop high-quality learning experiences.

Hybrid Learning Spaces



Flexible Learning at the Carlson School

To cultivate a learning environment that can handle disruptions, the University of Minnesota Carlson School of Management accelerated development of HyFlex models. With six displays, two tracking cameras, and integrated audio in classrooms, in-person students can clearly see and hear their remote counterparts, who can participate as if they were in the classroom. The technology fades into the background, allowing students to focus on the class and giving instructors the confidence to present in a more engaging way across a variety of media.

ASU Sync

ASU Sync offers technology-enhanced, fully interactive learning where students can attend live classes from any location, including in-person or remote. This approach to a more hybrid learning modality is designed to better accommodate learners in various circumstances while offering faculty the benefits of face-to-face instruction and collaborative sharing. With ASU Sync, students attend classes in-person at the same time as classmates who are participating remotely to engage in active learning together.

FURTHER READING

Flexible Learning Environments Exchange
[FLEXspace](#)

Jisc
[“Designing Spaces for Effective Learning: A Guide to 21st Century Learning Space Design”](#)

Architectural Digest
[“How Higher Learning Spaces Are Changing in the COVID-19 Era”](#)

MAINSTREAMING HYBRID/ REMOTE LEARNING MODES

Overview

Of the three technologies and practices related to hybrid/remote learning identified by the Horizon panelists this year, the practice of “mainstreaming” these learning modes at the institution is arguably the most complex and challenging for institutions to undertake. While the development of hybrid spaces and the offering of professional training in hybrid education both comprise relatively concrete actions and defined outcomes, mainstreaming deals with the more nebulous challenges of changing hearts and minds, shifting the institution’s culture, and rethinking the practice of education itself.

In the early days of the COVID-19 pandemic, higher education and technology leaders shifted to online modes of teaching and learning that many came to describe as “**emergency remote teaching**,” as opposed to a thoughtfully planned online education program. Faculty were teaching online as they would in an in-person classroom, out of necessity rather than in an effort to venture into a new educational paradigm. It soon became evident that educators and students—and administrators, for that matter—would need to get more comfortable with online modes of learning as a longer-term capability. Over the summer of 2020, most colleges and universities invested in **online instructional design and faculty development** and created a more robust online education program in the fall than they had been able to offer in the spring. In 2021, new questions emerged around the long-term sustainability of online learning and whether faculty and students would eventually revert to the traditional educational models they were accustomed to pre-pandemic. The cost and enormity of the challenges of fully committing to online and hybrid modes of education were clear, and the appetite for a “new normal” of online and hybrid education seemed to wane. In some respects, we’re still in this uncertain place in 2022. The pandemic is still very much with us as of this writing, and the jury is still out on whether institutions will adopt sustainable, effective, meaningful online and hybrid programs and pedagogies.

Relevance for Teaching and Learning

As they reflected on the road ahead of us, Horizon panelists identified several key areas of focus for practitioners seeking to mainstream online and hybrid education at their institutions for the long term.

Student and Faculty Buy-In. Students and faculty must believe in and commit to online and hybrid modalities for them to effectively take hold as a mainstream practice. Our panelists posited that students would be more amenable to these long-term changes and that some students may even prefer online and hybrid modalities over traditional face-to-face modalities. Faculty, on the other hand, may be more resistant to long-term changes in their teaching modalities. The pandemic has left many faculty with a poor impression of online modalities, and long-term shifts in the ways faculty engage in their practice will surely require time engaging in professional development. Certainly, some faculty are championing an accelerated evolution in teaching modalities, and these early adopters might eventually be seen as trailblazers.

Mainstreaming Hybrid/Remote Learning Modes in Practice

Hybrid Classroom Project

With experience in delivering graduate courses in the hybrid format for more than 15 years, combined with design thinking and innovative solutions, Bentley University successfully scaled up its technology to 69 classrooms and offered hybrid modality for all courses. This was made possible by the transformation of classroom A/V and collaboration between diverse teams who focused their efforts on reducing class start-up time, faculty readiness, and an ingenious support model.

Tech Tutors and Tech Teaching Assistants

Adapting from its launch to support faculty, staff, and students through transitions to online teaching and learning, Penn State’s Tech Tutors and Tech Teaching Assistants program has expanded to offer online office hours and scheduled appointments. This branched program is also expanding to Tech Coaches, where students will support Penn State campus libraries and specialize in pedagogical best practices for using technology tools in teaching and learning.

Institutional leaders are still evaluating which modalities work best for different programs, courses, students, and faculty. They are also considering how these modalities align with the institution's larger mission and objectives. Students and faculty must be invited to give meaningful input into institutions' decisions, knowing that their needs and concerns are being heard and understood.

A Richer Blend of Blended Modalities. Prior to the pandemic, online learning modalities and face-to-face modalities, though sometimes coexisting side-by-side in the same courses, perhaps stood apart from one another theoretically as distinct frameworks and approaches to teaching. But as we've learned through our pandemic experiences, different modalities can be blended together in much richer, theoretically grounded ways that challenge and expand those frameworks and approaches to teaching.

Here, the mainstreaming of online and hybrid education bumps up against larger questions around pedagogy and institutions' goals, involving beliefs about how people learn and what purposes education should serve. There may not be easy answers to these questions, and each institution must explore and implement these new educational models for itself. Given this complexity, institutions might go back to the way things were rather than rethink the foundations of the ways in which they educate their students.

Equitable Education. At institutions committed to mainstreaming online and hybrid education, faculty and other officials must consider the implications of that mainstreaming for equitable access to education. On one hand, these changes present institutions with the opportunity to provide educational experiences better fitted to the needs of students for whom traditional classroom experiences and access have been challenging or even impossible. Institutions can focus on this opportunity as a driving purpose behind making modifications that lead to substantive change. Indeed, when asked about the potential impacts of this area of practice, panelists scored it highest in its potential to address equity and inclusion (see chart). On the other hand, online and remote models of education continue to be a challenge for some students (e.g., those with limited access to devices or internet connectivity). As the adoption of online and hybrid education expands, so too must the supports and resources institutions provide to their students to help ensure that all students have access and are able to fully and meaningfully participate.

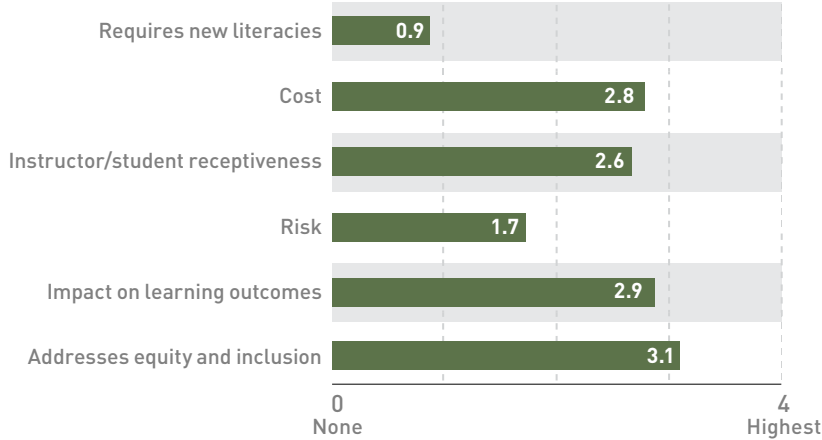
Associate Instructional Designer Training Academy: An Upskill/Reskill Solution for the Shortage of Instructional Designers

In response to COVID-19 and the shortage of instructional designers needed to support the transitional efforts of putting educational content online, Pima Community College, PimaOnline, created an Associate Instructional Designer Training Academy as a solution. The academy provides applicants an opportunity to participate in selective trainings, receive mentorship from experienced instructional designers on staff in PimaOnline, and take part in multi-modality instructional design projects over the course of a year.

Attend Anywhere Classes

Central New Mexico Community College is upgrading 74 classrooms across 5 campuses with technology that allows students to attend synchronously, either in-person or online, or asynchronously at any time. This approach provides flexibility for students whose schedules are irregular or unpredictable, and it increases student engagement, course retention, and student success. Faculty training for these classrooms covers both the technology and the pedagogy of teaching in different modalities.

Mainstreaming Hybrid/Remote Learning Modes



CHARM-EU European University Alliance

An alliance of five European universities has developed a virtual, interinstitutional campus to deliver a master's pilot course on Global Challenges for Sustainability implementing hybrid teaching and learning. Knowledge Creating Teams, together with educationalists, are the content and pedagogical experts of this innovative concept. The course design is based on a set of educational principles including transdisciplinarity, challenge-based and technology enhanced learning, and inclusiveness.

University of Pittsburgh's Open Lab

The Open Lab makerspace team at the University of Pittsburgh's Center for Teaching and Learning traditionally offered hands-on training on emerging technologies. In response to the pandemic, the team designed asynchronous online training modules, incorporating online training and remote learning into the makerspace's hands-on culture. The team has now integrated these resources into an evolving hybrid training strategy, allowing individuals to choose how, where, and when to learn, hopefully making the concepts and transferable skills feel more attainable and inclusive.

FURTHER READING

EDUCAUSE Review

"One Year Later . . . and Counting: Reflections on Emergency Remote Teaching and Online Learning"

Harvard Business Review

"Imagining the Hybrid College Campus"

McKinsey & Company

Setting a New Bar for Online Higher Education

MICROCREDENTIALS

Overview

The concept underlying microcredentials—obtaining nondegree certification or competency in a specific area of skill or knowledge, often in smaller and shorter segments than the typical college degree—is certainly nothing new or groundbreaking. As Arthur Levine and Scott Van Pelt observed in *The Great Upheaval: Higher Education's Past, Present, and Uncertain Future*, “Non-degree certifications aren’t new to higher education.... Yale established the first certificate program more than two centuries ago in 1799.” What is new, however, and becoming increasingly more plausible with the expansion of online and hybrid learning capabilities and emerging shifts in the workforce, is that microcredentials and other forms of skills-based certifications may be positioned to overtake the traditional college degree as the most common and even most preferred form of postsecondary education and training.

In some respects, the value of the traditional college degree has been on the decline for a number of years. Public opinion of the value of higher education has been trending downward, with more and more students and adults questioning both the inherent value of a degree and its importance for getting good jobs. Major corporations, including Google, Apple, and Tesla, have grabbed news headlines over the past several years announcing that they will no longer require college degrees in their hiring. And with the rising costs of attending college, and with students and industries increasingly placing more value on skills attainment and competency than on degree attainment, it isn’t hard to see why many potential students are making the choice to forgo the traditional postsecondary pathway in favor of other increasingly more attractive options.

As we observe these declines in the value of the traditional degree, we can also observe trends that suggest a rise in the value and appeal of microcredentials and other more bite-sized certification and competency-based education and training models. Consumers in our online economy increasingly expect easy access to services and content at their fingertips whenever and wherever they need it, and popular just-in-time and as-needed education platforms such as Masterclass have demonstrated learners’ appetite for purchasing smaller and even noninstitutional learning experiences tailored to their interests and needs. And with the tectonic shifts in the workforce spurred by the COVID-19 pandemic—chiefly the “great resignation” signaling workers’ desire to rethink and alter their professional journeys—the demand for certifications and training to help workers reskill and upskill may only expand from here.

Microcredentials in Practice

Innovation, Design, and Entrepreneurship Academy (i.d.e.a.) Badge Pathways

i.d.e.a. embeds the innovation process into the student experience through experiential learning pathways organized around research, design, and entrepreneurship. The pilot will allow students to stack experiences with badge pathways, developing innovation-specific skill sets. Badge criteria will include student reflections connecting their learning to doing as thinkers and learners. Rutgers University’s evaluation of microcredentials enables i.d.e.a. to innovate ways to increase visibility of experiential learning opportunities during the student’s college journey.

HEaRT: Higher Education and Real-World Training

HEaRT is a free experiential learning opportunity for Southern New Hampshire University online learners to develop 21st-century workforce skills. Global learners work in diverse teams to address real-world issues presented by employer partners and industry leaders. Successful participants earn a digital badge after each challenge completion and mastery of competencies. There are six challenges within the stackable credential, with the ability to earn prior learning assessment credit.

Relevance for Teaching and Learning

Whether institutions can find their footing within these larger shifts and carve out new possibilities for higher education in the future is yet to be seen, though there are a few areas of opportunity that institutions may be able to seize now and build on in the years ahead to help ensure successful microcredentialing programs in the future:

Online and Hybrid Capabilities. As institutions develop online and hybrid formats, they are becoming well positioned for success in offering microcredentialing programs. Coupling online and remote modes with microcredentialing will yield the agility and flexibility institutions need to serve learners with modular, just-in-time training and reskilling opportunities. This combination will also provide familiar learning environments for lifelong learners who have recently turned to commercial learning platforms.

Connections to Industry and the Workforce. Microcredentialing programs—with their practical focus on skills and competencies—can help instructors, students, and advisors establish clearer linkages between students’ curricular goals and the skills needed for job placement and success in the workforce of the future. With real workforce needs and opportunities in mind, students can better customize their educational journey to prepare themselves to meet those needs and seize those opportunities, and learning objectives and outcomes can more closely align with expected professional competencies and industry standards. Indeed, when our panelists were asked to reflect on this area of practice, they rated it most favorably in its potential to impact students’ learning outcomes (see chart below).

Institutional leaders might be surprised to find willing and even enthusiastic partners in industries with an interest in helping educate and train the future leaders that will one day constitute their own workforce. HP, for example, has established an **HBCU Business Challenge** that invites HBCU students to submit ideas for solving real-world business problems, with the opportunity to win technology prizes and gain professional exposure and connections on a national level. And Microsoft recently served as a technology partner in the **Indy Autonomous Challenge**, an event held at the Indianapolis Motor Speedway where teams of college students were challenged to build and test new autonomous driving technologies while also participating in mentoring discussions with Microsoft’s top scientists.

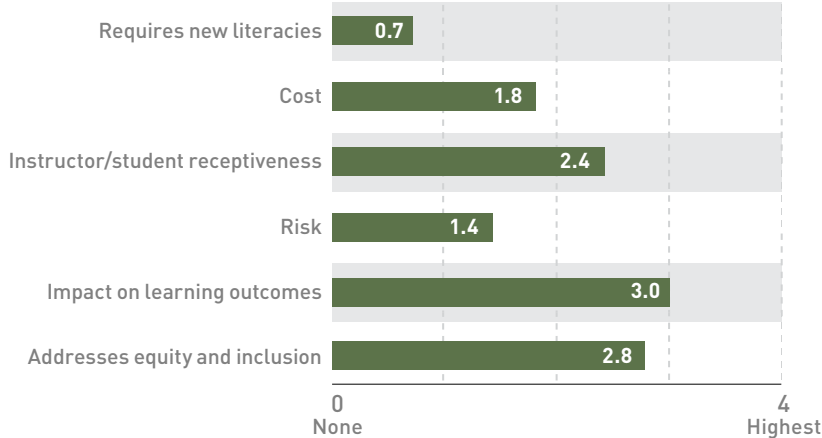
SUNY Microcredential Program

SUNY’s microcredential program grew significantly in 2021—385 microcredentials, 60 disciplinary areas, on 29 of 64 campuses. This growth, built on the foundation of SUNY’s groundbreaking microcredential policy, was in part driven by the potential of microcredentials to motivate existing students, support those impacted by the pandemic, and meet emerging state needs. SUNY microcredentials provide career-ready skills and can stack to initial or advanced certificates or degrees.

edubadges: Issuing Digital Certificates to Students

SURF is offering an infrastructure that allows Dutch educational institutions to issue edubadges, digital credentials for both curricular and extracurricular activities. The need to make knowledge and skills transparent, to support lifelong learning, and to facilitate a process that makes higher education more flexible (microcredentialing) were the major drivers to developing edubadges for and with higher education in the Netherlands.

Microcredentials



Lab Tools

Offered as asynchronous and self-instructional short-term activities, Lab Tools allow undergraduate students at UNISINOS to diversify their academic and professional education according to their interests and professional skills. Co-created with partner organizations and organized into trails of certifications, Lab Tools focus on what is highly valued in contemporary professional contexts.

University of Maine System Micro-Credential Initiative

The University of Maine System (UMS) is leading an effort to build an aligned, statewide microcredential ecosystem with key partners to aid in economic recovery and the future of work. A quality-assured, three-leveled microcredential framework unifies this effort, taking learners from foundational learning to the application of skills in a work-based setting. UMS also partners with the Education Design Lab to offer its suite of eight 21st-Century Skills Badges.

FURTHER READING

Journal of Learning for Development
“The Global Micro-Credential Landscape: Charting a New Credential Ecology for Lifelong Learning”

OECD Education Policy Perspectives

“Micro-Credential Innovations in Higher Education: Who, What and Why?”

Modern Campus/UPCEA

“Shifting Paradigms: Understanding Institutional Perspectives on Microcredentialing”

PROFESSIONAL DEVELOPMENT FOR HYBRID/REMOTE TEACHING

Overview

In the early days of the COVID-19 pandemic, faculty were suddenly and without much preparation thrust into new hybrid and remote learning environments, asked to teach using new tools and abandon the familiar spaces and habits that had defined their previous teaching practices. These were early days not just for faculty but for many other professionals, learning new Zoom features in real time, accidentally applying cat filters to our faces in the middle of meetings, and committing any number of other egregious mistakes that under normal circumstances would be considered unprofessional and even unforgivable. We all had to learn more patience, with ourselves and with one another, and faculty were no different.

As the pandemic has worn on, though, and as colleges and universities have settled into longer-term planning for their hybrid and remote teaching and learning programs, expectations for faculty have evolved. Students who have grown more comfortable learning in remote environments have developed greater expectations of their faculty in delivering hybrid and remote learning experiences thoughtfully and effectively. Accreditation bodies and funding agencies have taken steps to standardize and develop guidelines for remote teaching practices. The demand for and longer-term importance of faculty development for hybrid teaching, in other words, have become more evident as institutions invest more time and resources into those learning modalities.

Relevance for Teaching and Learning

As the Horizon panel discussed this area of practice for the institution, several key areas emerged that may warrant focused attention at the institution:

Faculty Enthusiasm for Learning. Characterizing all faculty as resistant to change and/or technologically illiterate would be unfair. Indeed, in QuickPoll survey after QuickPoll survey over the past several years, EDUCAUSE has consistently heard stories from technology professionals and teaching and learning leaders about faculty who are enthusiastically embracing the use of new tools and pedagogical approaches and who are partnering more closely with instructional designers and learning technology staff than ever before. Theirs are stories of light bulbs going off, faculty eyes being opened for the first time to the possibilities of new tools and models for education, real change in faculty practice that could far outlive the pandemic era, and faculty championing the adoption of new technology.

Professional Development for Hybrid/Remote Teaching in Practice

Walking the Talk of Inclusive Learning: Leveraging UDL to Teach UDL

Universal design for learning (UDL) is a neuroscience-based framework for providing learners with multiple means of engagement, representation, and action and expression. As part of Landmark College's professional learning certificate program, UDL serves as both message and medium. Through a variety of UDL-based flexible synchronous, asynchronous, and learning object-based instructional techniques and technologies, educators are provided an immersive opportunity to learn how to create inclusive learning opportunities for their students.

Teach Digi

Teach Digi is a series of digital educational training supports delivered in conjunction with the Irish Universities Association's (IUA) Enhancing Digital Teaching & Learning project. Informed by the project pillar of Students as Partners and the project strand In Conversation, this program offers a series of podcasts reflecting lived and shared experiences of staff and students during the pandemic. Training sessions, roundtable events, and cross-department collaborations run alongside the podcast series, ensuring reach and impact.

We may be tempted to focus on resistance and barriers, but there exist real bright spots and opportunities to continue investing time and energy in building bridges and seeing progress in faculty practice. One of the silver linings of the pandemic is that it has challenged everyone involved in the enterprise of higher education to learn and grow in exciting ways, and this is often especially true of some members of the faculty. Efforts to continue building on these successes and celebrate them across the institution may even have the effect of changing the hearts and minds of some of those resisters and complainers. Practitioners should nurture the bright spots when they find them, building on them and expanding them.

Impacts of Better Teaching. When we asked our Horizon panelists to reflect on the impacts of all the technologies and practices on student learning outcomes, faculty development for hybrid and remote teaching was the practice panelists viewed as being most impactful (see chart below). It was also viewed as the least risky practice and one of the lowest-cost practices. In other words, investing the time and resources to ensure faculty are trained and equipped to effectively engage in hybrid and remote learning environments may be one of the easiest and highest-reward decisions an institution can make, and it may produce the biggest returns in improved student experiences and learning.

But not all motivation for faculty improvement in hybrid and remote teaching comes from within the institution. As institutions build formal and longer-term plans for their hybrid education programs, external accreditation and funding bodies will demand that institutions evaluate and improve on faculty hybrid teaching as they do with traditional faculty classroom teaching. Evaluative standards for remote teaching may come into clearer focus and gain wider acceptance in the years ahead—as with the Council of Regional Accrediting Commissions (C-RAC) [21st Century Distance Education Guidelines](#), to cite just one example—providing institutions with consistent frameworks for equipping and evaluating their faculty.

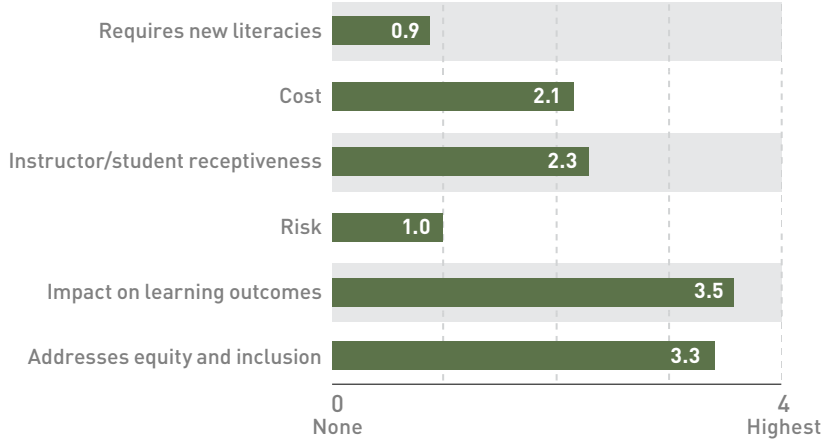
Monthly No-Cost Online Professional Development

Committed to educators around the world who toggle between physical and virtual learning, Moreland University offers no-cost professional development on the 15th of each month. These collaborative and task-based courses empower teachers and students to continue schooling wherever learning may take place by focusing on key topics in education: data-based instruction, assessment, student-centered learning, social and emotional learning (SEL), inclusive practice, educational technology, and more. Participants in this globally accessible coursework earn a one-CEU certificate of completion.

Modular Professional Learning Framework

The University of Sydney's Modular Professional Learning Framework allows instructors to choose their own adventure through 21 bite-sized two-hour modules on effective teaching practices. Built in collaboration with faculties, the modules model hybrid and blended teaching, promote reflection, and focus on evidence-based practical applications. Modular professional development instead of a one-size-fits-all approach enhances flexibility and relevance, with instructor engagement up 75% with 3,400+ module completions in two years, as well as uptake by two other institutions.

Professional Development for Hybrid/Remote Teaching



Course Success Self-Review

The Course Success Self-Review was developed at the University of Wisconsin–Madison to help instructors support their learners, improve their teaching, and update their course design. This unique survey tool leads instructors through a self-directed course analysis. The self-review provides targeted feedback, based on a research-based framework of high-impact recommendations. The corresponding Course Success website offers instructors detailed explanations, rationale, and links to relevant resources that support instruction in different modalities.

Flexible Teaching Initiative

Duke Learning Innovation’s Flexible Teaching initiative helps faculty create flexible, resilient courses that can withstand changes in modality. The initiative provides a comprehensive, scalable approach to faculty development via tiers of direct and indirect support, including a public CC-licensed website, a weekly email newsletter sent to all faculty, department and large-group workshops, virtual office hours, 1:1 and group consulting, and a self-paced course design planner.

FURTHER READING

The EvoLLLution

“How to Create Access to Professional Development for Your Adjunct Faculty”

Language and Literacy

“Reimagining Professional Development for Digital Literacies: Old, New and Pandemic”

Online Learning

“Faculty Perceptions on Accessibility in Online Learning: Knowledge, Practice and Professional Development”

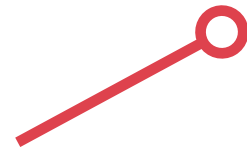
Given the trends we're observing, and the technologies and practices we see taking shape, where might higher education and teaching and learning wind up in 10 years' time? How might the people and institutions and practices of tomorrow look different from those of today? And how might the circumstances we find ourselves in today have evolved, expanded, or vanished altogether?

In this section we use a forecasting framework from the Institute for the Future (IFF) to envision not just one definitive future but a collection of alternative futures that each take different angles on how today might lead into tomorrow. By envisioning several different types of futures, we can be expansive and flexible in our thinking and planning and be better prepared to anticipate and adjust to whatever future does eventually occur. This section of the *Horizon Report* is a creative exercise, then, that pushes us to imaginatively consider what might be possible. But it's also a grounded exercise, rooted as it is in the concrete trends, technologies, and practices we're observing around us today.

As we have in the past few years of *Horizon Reports*, we focus here on four scenarios for the future, each imagining the course of higher education through the decade beginning in 2022. The first scenario we consider is that of "growth," a scenario that sees current trajectories continue to expand into a future in which higher education largely flourishes but leaves some of its issues inadequately addressed. The second is "constraint," a scenario in which higher education is governed by a core guiding value that animates our important decisions and daily practices. Third is "collapse," a scenario in which higher education is beset by rapid breakdowns and forces of change outside its control and that ultimately leave higher education decimated. Finally, in the "transformation" scenario, a new paradigm is established for higher education that allows it to successfully evolve and thrive into the future.

This year's *Horizon Report* finds our panelists continuing to reflect on the global impacts of COVID-19, social unrest, and climate instability, all of which are certain to transform higher education and teaching and learning for many years to come. Now two years into the pandemic, many "emergency remote teaching" programs are evolving into well-designed online and hybrid learning programs, as colleges and universities embrace and plan for online education, not just as a stopgap but as a long-term strategic capability. Beyond the walls of the institution, political divisions are intensifying and social unrest is pervading our communities and homes, and the effects of climate change and extreme weather events seem to be making international headlines more and more frequently. Higher education will need to contend with these larger shifts in our global ecosystem and society in order to survive, while also adapting and evolving the classroom to offer students learning experiences that will still be considered valuable and relevant.

These and other features of our present and future may ultimately blend together in ways that will seem terrifying, exciting, or some combination of both, and it feels impossible in 2022 to say with any degree of certainty where things will settle out by 2032. But by focusing our attention on the horizon now, we may begin to take a proactive orientation to the future, and plan and act now to try to bring about the future we want and to **build the higher education future generations deserve.**



Growth



Constraint



Collapse



Transformation

The events of the early 2020s catapulted the world into a digital age where remote work and interactions and a data-rich online economy are foundational to daily life. These broad social and economic shifts motivated higher education leaders to normalize hybrid and online learning and expand the use of learning analytics and “big data” to help educators make data-informed decisions about the design and implementation of those online and hybrid learning experiences. Institutions have also partnered with government agencies and community groups to invest in both digital infrastructure and student access to devices and internet service, ensuring that students’ opportunities to thrive are no longer dependent on their own technology resources or physical location.

Higher education leaders and stakeholders now maintain the goal of establishing access to education as a basic right, removing barriers that have historically contributed to and perpetuated a system reserved for those with specific identities and privileges. Students of all ages and life stages now prefer and have access to educational paths that they can construct with their own unique needs and interests in mind. While some students still enjoy the classic single-institution general education experience followed by specialization, many students prefer to tailor their experiences to their professional or personal goals. To this end, microcredentialing through multiple institutions has become the standard for everything from professional and technical degrees to lifelong learning, and most institutions now have the technologies and systems in place to enable that flexibility and modularity in program goals and pathways.

These expanded online and individualized learning modalities have generated storehouses of new types of data to help inform both institution-wide and personalized decisions, leading institutions to make substantial investments in their data and analytics capabilities. Artificial intelligence (AI) technologies are now a common feature for institutional assessments and instructional tools. AI has been leveraged to engage in institutional self-examination of systems and tools, shifting from a focus on student deficits to a focus on systemic responsibility and reform. Further, students, instructors, staff, and administrators now have access to personalized data about their own learning and work, generating insights based primarily on their own individual performance goals rather than on manufactured norms of “success” laden with human bias. This more equitable approach to leveraging AI is informed by developers’ improved capabilities for identifying and correcting the human biases that have historically been

baked in to AI products. Equity and accessibility are no longer features that take a back seat to generating the minimum viable product. Instead, equitable, high-quality access is ubiquitously understood to be foundational to all steps of product development and support.

The mainstreaming of hybrid and online environments for work, school, and daily life has not been kind to everyone. Institutions that traditionally relied on brick-and-mortar operations are struggling to find their place, and those resisting the adoption of remote and hybrid learning are experiencing record-low enrollments. Meanwhile, virtually all institutions operate with a significantly reduced physical presence, reflecting the shrinking need for dorms, classrooms, and other facilities for residential students who have largely moved online. Inspired by the growth and evolution of the online economy over the past 10 years, students have adopted an online consumer mindset in their higher education experiences. Further, students’ expectations for online education are bolstered by their robust online education experiences in primary and secondary school. Fierce competition rages between institutions to provide students with high-quality online experiences, independent of physical location. Those who have not invested in online capabilities and pedagogical models are quickly being left behind.

Higher education today embodies a comprehensive embrace of digital technologies for teaching and learning, along with an evolution in pairing formal education and credentials with the skills needed for new jobs in new industries. Colleges and universities have largely been able to redesign courses and learning structures in response to the shifting expectations of students and employers and in service to a globally supported mission of providing equitable access to education for anyone anywhere.

With the continued increases in severe weather events and catastrophic wildfires over the past 10 years, as well as ongoing shortages in important natural resources, new social and political movements have emerged to help organize and spur global efforts to improve planetary health. College and university leaders have had to align institutional goals, practices, and cultures with these efforts and offer educational experiences explicitly in service to global well-being. It's an era of renewed global awareness and sacrifice, as institutions learn to operate more efficiently, to embrace their own responsibility for being good stewards of our natural resources, and to educate their students and equip them to be global leaders committed to and capable of addressing the world's ecological challenges.

At the level of institutional operations, the most prominent area of ecological focus is in the mainstreaming of hybrid and remote learning and the reduction of the campus's physical footprint. The widespread use of hybrid and remote modalities has led to a significant decrease in the use of physical resources to build and maintain institutional structures, as well as reductions in the natural resources required for—and the environmental pollution caused by—daily travel. This shift away from relying on traditional brick-and-mortar learning spaces as the primary place for learning subsequently resulted in a reimagining of learning environments and experiences. Those physical classrooms that remain in use have been redesigned and rebuilt with sustainable materials and methods. Clean air, green decor, and plentiful natural light are requirements rather than luxuries.

The fields of faculty development and instructional design have evolved to focus on the design of hybrid learning spaces that support primarily remote instruction and face-to-face instruction only when necessary and feasible. “Emergency remote teaching” is now just a memory, and practitioners are focused on the routine implementation of high-quality remote and hybrid learning. Instructors are intentional about designing and facilitating learning experiences for remote and hybrid modalities. Even though this intentionality cultivates increased confidence and flexibility among the faculty and improved learning outcomes among students, those benefits are uneven. Learners and instructors with certain disabilities, students in fields that require hands-on practice, and students learning in a language that they don't speak at home are among those for whom this model of education presents new challenges.

Institutions' increasing focus on ecological concerns has been propelled not just by catastrophic events or their growing sense of global responsibility but also by increasingly stringent sustainability standards required for securing external funding for research and education. As both public and private financing for higher education have declined, other funding sources have become more influential than ever and are wielding that influence to require, among other things, the inclusion of sustainable development goals in education and research proposals. Further, evidence of positive ecological influence and impact are now common requirements for ongoing project reviews and extensions. As a result, collaborative research built on interdisciplinary knowledge and open-source data sharing is now the default across institutions.

In their equipment and systems procurements, institutions rarely invest in single-use products, items sourced from nonrenewable resources, or goods and services provided by companies that do not follow ecologically sound protocols. Those companies that have continued with business as usual and resisted global efforts to implement sustainable practices have found themselves unable to maintain a reliable consumer base in the higher education marketplace. As a further hardship for these companies, government entities and world coalitions have implemented strict regulations and substantial taxes for products that rely on fossil fuels, plastic, and even some minerals and metals. In this way, global dedication to planetary health has significantly impacted the world's economy, limiting campuses' choices in the solutions marketplace but increasing their confidence in and satisfaction with the choices that remain.

Intensifying political divisions around the world have forced higher education institutions to declare their allegiances to national and global political movements. These declarations serve to solidify institutions' identities and missions, align institutions with important sources of funding, and attract sustainable enrollments of students who share political and ideological leanings, both with other students and with the faculty and administrators. Initial waves of protest in opposition to institutions' political declarations have subsided, and a widespread migration of students, faculty, and staff across institutional lines has settled into clearly demarcated choices between institutions. Most institutions fall along a conservative–progressive bifurcation, though small numbers of institutions group around fringe or apolitical values. Political groups routinely bombard institutions with negative press and social media misinformation campaigns, and bad actors driven by political interests wage increasingly sophisticated cyberattacks against institutions' defenses.

Funding from both the public and private sectors has become tied to political alliances and alignment with education lobbyists, and so too have institutions' marketplace choices and behaviors. Courseware and technology solution providers espousing certain worldviews through their corporate values and products are boycotted and lose considerable market share among institutions aligned with opposing views. New solution providers emerge, tailored to fit the values of particular groups of institutions, leading to considerable regression in technology and infrastructure, where procurement favors a solution's ideological alignment more than its quality. These backslides in quality have placed considerable strain on institutions' technology and on IT leadership and staff and have stunted higher education's technological maturity and growth. Technology and IT professionals become increasingly frustrated with the impact of political division on their work. The pipeline of higher education technology and IT leadership has split along ideological lines, and individuals increasingly find themselves unable to realistically pursue jobs at certain institutions on the "other side."

These realignments are felt within the classroom as well, as pedagogy at most institutions becomes infused with political ideology. Efforts to expose students to a wide range of perspectives and ideas have been completely abandoned as educators are only allowed to use pedagogies and course materials that align with their institution's political profile. Where this politicized model of education has constrained

students' choices of brick-and-mortar institutions, particularly in regions defined by one ideology or another, expanded investments in hybrid and online education have opened up broader avenues for offering courses and degrees to students anywhere in the world, allowing students to seek programs that reinforce their beliefs rather than challenging them. With faculty development as a central focus of these investments in hybrid and online education, remote students by and large experience easy access to engaging and effective teaching and learning, further strengthening their connection to a worldwide echo chamber of ideas and further diminishing their opportunities and capacity for communication and cooperation across lines of difference.

Even as most institutions have effectively become insulated, almost dogmatic enclaves of people with shared, unquestioned values, colleges and universities remain vulnerable to the social and political conflicts unfolding around them locally, nationally, and globally. Physical campuses have become far less safe and are frequent targets of local protests and acts of political violence in more volatile regions, while virtual campus spaces are routinely hacked and infiltrated by political opposition groups. Most institutions have made substantial investments in both cybersecurity and campus surveillance technologies, measures that serve to reinforce students' and parents' convictions that choosing where to enroll in higher education is as much a declaration of one's political identity as it is a pursuit of knowledge and skills.



As the world's industrial needs and capabilities have grown and evolved, education leaders have reimagined the form and function of postsecondary schooling. There is no longer a clear delineation between the modern college degree program and continuing professional learning, as programs and curricula by and large reflect a more balanced integration of technical training and education in higher-order, cross-cutting skills and tasks that better fit the needs of the new, emerging workforce. Institutions have all but abandoned the traditional four-year and graduate-school models of degree attainment to instead focus on providing students with practical, customizable, and ongoing training and education in the knowledge and skills they need for the jobs they want.

Many disciplines of traditional education are dwindling, including programs in fields such as philosophy and Ancient Greek that are seen as indulgent and irrelevant to global shifts in the workforce and the need for expert workers. Artificial intelligence (AI) technologies are no longer “black box” mysteries, and many industries have advanced significantly in recent years in their AI capabilities. These advancements have freed workers to focus more on higher-order thinking tasks while also requiring them to reskill in new technical areas like machine learning and language processing. These shifts have presented institutions with fresh opportunities for educating and training the workers and leaders industries demand now and will need in the future, as well as with opportunities for direct collaboration with industry partners seeking to strengthen their future workforce and fill current or anticipated knowledge and skills gaps among their leaders and staff. These institution/industry partnerships have resulted in relevant and effective lifelong learning experiences, from curriculum and pedagogy to credentialing, as well as to more affordable, industry-funded education that is more valuable both for individuals' unique needs and for the industries they serve.

Higher education leaders have invested in the institutional capabilities needed to meet the demand for hybrid and online modes of education, and these modalities now represent the gold standard in effective, timely learning at most institutions. This ubiquity of remote learning and work has allowed individuals as consumers to pursue the training and jobs that are most suited to their goals. These increasingly available and valuable learning experiences have facilitated a shift away from traditional degree models, enabling learners to pursue the microcredentials that are appropriate for their immediate needs, whenever they need them and from wherever they are.

As the goals of institutions continue to align more closely with the needs of the workforce, so too do the demographics of the students they serve. Companies committed to advancing diversity, equity, and inclusion within their own workforce prioritize funding for institutional education and training programs that help build talent pipelines reflective of that diversity. Privileges in education, degree attainment, and job placement once enjoyed by those most able to afford the best opportunities have begun to dissipate as the learning outcomes and credentials of even the most prestigious institutions favor those students who are the most talented and capable of doing their work rather than those with the most impressive pedigrees. New studies evaluating workplace cultures, productivity, and effectiveness have converged on a clear and undeniable truth—the healthiest and most successful companies are those that support and recruit from institutions that have adopted these skills- and equity-based models. Those institutions resistant to change and clinging to more traditional models of education are rapidly shuttering their doors, unable to offer prospective students compelling reasons to pursue an education that won't guarantee them job placement and career success.

IMPLICATIONS: WHAT DO WE DO NOW?

Having painted in very broad strokes several abstract portraits of what the future of higher education teaching and learning might look like, we turn our attention now to considering what this year's trends and technologies and practices might mean more concretely for certain types of institutions and within certain types of institutional contexts.

For 2022, we solicited seven implications essays from our panelists to help us explore these more grounded perspectives. These essays focus on current higher education trends and issues in Australia (Dickson-Deane), Canada (Koster), Saudi Arabia (Al-Freih), Mexico (Sánchez-Mendiola), and several segments of U.S. higher education—associate's colleges (Guevara), doctoral institutions (Skallerup Bessette), and industry solution providers (Stine). Each of these panelists was asked to consider the results of the 2022 panel's work through their own unique lens and offer reflections on the following questions: What should we do now? What plans should we make?

The panelists approached these questions with their specific institution and industry contexts in mind, offering a view into the latest trends and current challenges and opportunities for higher education as observed from their particular vantage point. In the Kingdom of Saudi Arabia (KSA), for example, the transformation into a post-oil economy will demand a new vision for the types of education and training colleges and universities might provide for future generations of leaders. In Canada, meanwhile, a growing demand in the larger Canadian workforce for remote/hybrid workers will present colleges and universities with the opportunity to offer students valuable training and experience in new ways of working.

Though these and other institutional contexts certainly differ in some important ways, they also share foundational elements that may ultimately make them more similar than different. In most places and spaces of higher education around the world, there is a growing sense that online and hybrid modes of teaching and learning are going to be a "mainstream" part of the educational experience, requiring institutions to begin their planning now for how they're going to make these modes effective and sustainable long-term practices. There also seems to be a globally shared awareness that the onus is on higher education now more than ever to demonstrate its value in providing students with the practical knowledge and skills they will need to be successful in the workforce of the future. The traditional college degree may eventually be broken down into "micro" learning and training experiences that directly relate to what students need to know as professionals, and institutions everywhere, regardless of context, must be prepared to provide that type of learning and training.

Whatever your institutional context, then, the essays provided by these seven panelists will likely ring true in many ways because they emerge from our shared global experiences, even as they take root in local soil. They remind us that challenges and opportunities are not ours alone and that there is a larger community of institutions and practitioners out there with whom we can find common ground and with whom we can share and learn.

[Australian Higher Education](#)

[Canadian Higher Education](#)

[Mexican Higher Education](#)

[Saudi Arabian Higher Education](#)

[U.S. Community Colleges](#)

[U.S. Research Institutions](#)

[Corporate Perspective](#)

AUSTRALIAN HIGHER EDUCATION

Camille Dickson-Deane, Senior Lecturer, Higher Education, University of Technology Sydney

The Australian higher education landscape encompasses approximately 40 universities, the majority of which are public institutions. As with most education systems, Australia's includes a mix of national and international students, with most of the first-time national attendees having their tuition subsidized by the Australian Federal Government.

Additionally, Australian higher education was on summer break—with the semester to begin in February 2020—when the pandemic struck. This left many vacationing and international students unable to return to school due to border closures. With no way to provide education to these students, Australian universities immediately faced considerable financial difficulty, which differed from the challenges facing higher education in other parts of the world. Within the context of these characteristics and the trends that are highlighted in this year's *Horizon Report*, the Australian higher education sector faces two primary challenges:

1. A more responsive and flexible management of the higher education economy
2. Understanding how to future-proof the sector using both quantitative and qualitative measures

Managing the Sector for Flexibility and Responsivity

By describing all of the characteristics of the people, the knowledge, the behaviors, and the infrastructure of Australian higher education, we have an opportunity to produce and support new ways of gaining knowledge. Recognizing the current fragility and complexity of the economy—which is brittle, riddled with anxiety, nonlinear, and incomprehensible—huge benefits are possible for institutions that rethink traditional ways of structuring, planning, and delivering education. Flexible and hybrid models, which were once thought to be too hard to execute, are now commonplace in our education systems. Nurturing and implementing flexible skill sets as part of teaching and learning delivery can have a positive impact on the

Huge benefits are possible for institutions that rethink traditional ways of structuring, planning, and delivering education.

sector. This assumes that the pedagogical and technical infrastructure needed to support disparate groups of learners is also part of the consideration. We are recognizing that our current structures will fail us if our ways of educating society do not evolve to include retooling and reskilling everyone, our systems, and, most importantly, our minds. Reviewing the skills we use and produce in the sector, alongside the delivery systems

we propagate; incorporating and enhancing the flexibility of delivery modes; being innovative in how we use both the physical and digital space; and supporting these steps with the upskilling of all involved (maybe even via microcredentialing) will help us regain the varying losses we experienced in preparation for a more stabilizing future.

Combining the Methods of How We Measure Goals

As we look toward the future, we have an opportunity to strategically combine teaching and learning methods and measures that guide through the two lenses of quantitative and qualitative inquiry. The nexus of qualifying (i.e., continuing social sciences methods) and quantifying data (i.e., introducing data science methods via analytics and artificial intelligences) creates greater meaning where equity, diversity, and social justice prevail is a worthy goal for Australian higher education. As we increasingly understand how learning analytics and learning tools can be qualified to address the context in which we are situated, institutions of higher education will be in a continuous iterative cycle of being reinvented, reengineered, and of course reimagined for the 21st century and beyond. This means reviewing our own contextual needs/themes (e.g., OERs, students as partners, true understanding of indigenous knowledges) and positioning them within a worldly view, not to diminish our sense of being but to promote a vision toward who we aspire to be. This will open unmarked doors where institutions can harness the power that data science holds for what society aspires to have and our goals for the future.

Proposals for the Future

In reviewing the trends in the 2022 *Horizon Report* and how they relate to improving the management of the sector for the future, we can see that the first step should be to acknowledge and evaluate past events, both from a systematic and a systemic lens. The pandemic has created and reduced boundaries, forced institutions to be innovative with limited resources, and challenged all in the education sector to redefine what learning and teaching should look like. A conscientious next step for

all could be to contribute and share knowledge on all lessons learned so that the field has a database of unknown unknowns for institutions to draw from. Following this, the region needs to embrace shared knowledge and picture not only what the future of the field *could* look like but also what it *should* look like. The key is to strive for a stronger foothold as complexity and context are acknowledged in uncertain times. Therefore, how we use our skills and measure their outcomes today and tomorrow will need to reflect a future that is open to all.

Author Bio

Camille Dickson-Deane is a Senior Lecturer in Higher Education at the University of Technology Sydney in Australia. Her contribution to the field draws from having served in higher education institutions around the world in a variety of roles—including researcher, academic, designer, consultant, and editor—that have different meanings in different contexts, providing a complex lens through which to view higher education. These roles underpin her work, which focuses on understanding how differences (e.g., people, place, economies) contribute to the creation of a contextualized digital learning space. Find her on Twitter: [@camille_dd](https://twitter.com/camille_dd)

CANADIAN HIGHER EDUCATION

Lisa Koster, Professor, Conestoga College

In 2019, Tony Bates wrote that **Canadian postsecondary education needed to make a more meaningful move to digital learning**. In particular, he suggested that, within five years, almost all courses should either include a mix of digital and face-to-face learning or be fully online. Ten months later, COVID-19 accelerated this change as higher education pivoted to remote learning.

According to the Council of Ministers of Education, **Canada has 223 public/private universities and 213 public colleges and institutes**, which fall into three categories: university preparation, vocational, and polytechnics. Resources, teaching methods, and technology vary by institution, but they all face similar challenges, such as changing student demographics, economic conditions, and physical space issues.

Targeted Skills through Microcredentials

The pandemic has made the Canadian (and world) labor markets unpredictable. A World Economic Forum report from October 2020 **predicted that 85 million jobs could be lost due to technological change**. As a result, people need to adapt to the changing work environment by reskilling quickly, possibly while continuing to work. By creating stackable microcredentials, higher education institutions can allow students who otherwise would not be able to afford postsecondary learning to get the education they require in smaller chunks.

Microcredential programs vary across the country, from a few to over sixty. However, the number of programs is growing as provincial governments make funding available to higher education institutions. Some provinces, such as Ontario, are investing heavily to support the creation of such programs.

By creating stackable microcredentials, higher education institutions can allow students who otherwise would not be able to afford postsecondary learning to get the education they require in smaller chunks.

As popular as microcredentials are becoming, a common definition and framework are required for them to become widely accepted. Several provinces have developed their own frameworks. However, a universal definition will help ensure that employers accept microcredentials as valid evidence of skills acquisition. Colleges & Institutes Canada has created a **national framework for microcredentials** in an effort to increase awareness, and a report from the Higher Education Quality Council of Ontario notes that **59% of respondents were not familiar with the term microcredentials**. The HEQCO report also showed strong support for

microcredentials—70% felt they could facilitate employee retention.

Mainstreaming Hybrid/Remote Learning Modes

The demographic of the typical student in Canada is changing. While many students continue to come directly from high school, a growing number are older or are international students. Older learners are either **attending postsecondary for the first time or re-entering for retraining**. International students make up, on average, **17.3% of college and 19.1% of university students in Canada**. Students' lives are also more complicated than before. They are employees, parents, caregivers, etc. As a result, they value the flexibility that hybrid learning provides.

Prior to the pandemic, one in five Canadian students **took at least one online course and identified access and flexibility as primary motivators**. Remote learning provided many similar benefits. As we move past the pandemic, students will expect to be able to continue to learn in the way that suits them best, whether that is face-to-face, hybrid, or fully online.

A KPMG Canada Insights report states that **43% of Canadian CEOs expect to have most employees working remotely at least two days a week**, saying that “the workforce of the future is a connected and digital one.” Hybrid learning prepares students for this new reality, which makes it even more important for Canadian postsecondary schools to develop the hybrid campus.

As part of the Ontario government’s **Virtual Learning Strategy** funding, eCampus Ontario produced a report in September 2021 titled “**Building a Hybrid Campus.**” It was developed to support Ontario postsecondary schools as they navigate the challenges that may arise when building the “new” hybrid campus.

Professional Development for Hybrid Teaching

To ensure hybrid courses are developed effectively, schools need to continue to invest in professional development for their faculty. As we move back to campus, hybrid courses are being mandated by many schools.

A scan of Canadian schools shows that professional development is focused on effectively developing and teaching hybrid courses. Conestoga College has committed to supporting the ongoing needs of faculty through frequent and accessible remote workshops, weekly drop-in sessions, and the **Faculty Learning Hub** blog. To promote continuous learning, Conestoga **offers 12 teaching-focused microcredentials** and a Post-Secondary Teaching certificate, all centered around proven practices in teaching and learning. In

collaboration with the Online Learning Centre (OLC), Teaching and Learning has created a Hybrid Toolkit, built directly into the LMS, offering faculty real-time access to supports related to effectively modifying their classes for hybrid delivery.

Educational technology is an important component of being able to implement hybrid courses effectively. Not only do schools need to invest in the edtech that supports hybrid learning, but faculty also need proper training to use it to its potential. Many Ontario schools have adopted eCampus Ontario’s **Ontario Extend** program as part of faculty training. The goal of the program is to “empower educators to explore a range of emerging technologies and pedagogical practices for effective online and technology-enabled teaching and learning.”

While COVID-19 may have transformed teaching and learning, continuous professional development must become the norm rather than a pandemic response.

Final Thoughts

COVID-19 has forever changed the face of the Canadian postsecondary education system. Offering flexibility in how and when students learn is critical. Canadian universities and colleges must offer multiple learning modalities and different types of credentials to support the varied learners they now have on their campuses.

Author Bio

Lisa Koster is an experienced, Ontario-based postsecondary educator with a passion for blended and online learning. She actively employs new technologies and methods to engage her students. Koster is a professor in the School of Business at Conestoga College and is currently developing an open educational resource (OER) for Loyalist College. She is an active member of the ShapingEDU community of changemakers and co-leads the **Capturing the Evolving New Now in Learning** project. Koster holds a B.Ed. in adult education, B.Math in computer science, and an MBA, and she is an Ontario certified secondary teacher (OCT). Find her on Twitter: [@lkoster](#).

HIGHER EDUCATION IN MEXICO

Melchor Sánchez-Mendiola, Coordinator of Open University, Educational Innovation and Distance Education, National Autonomous University of Mexico (UNAM)

We live in a paradoxical era when, although the ability to cross borders and bridge people with technology and distance education has never been greater, the divisions between and within nations are as lively as ever. Mexico is a cultural melting pot full of potential, but inequities prevail. Meanwhile, the economic, health, and educational impacts of the pandemic have been profound.

Our country has a **large and complex higher education system**, with almost 6,000 higher education centers, institutes, and universities (40.5% public, 59.5% private). Almost five million students are enrolled in higher education (52.5% women, 47.5% men), and the system includes more than 400,000 instructors, the majority in public institutions. Of every 100 students that enter the Mexican basic education system, however, only 39 are admitted to higher education and just 26 obtain a degree. (More information is available from the Mexican National Association of Universities and Higher Education Institutions, which maintains a **large database with detailed statistical data** about higher education in Mexico.)

Mexican higher education faces many challenges: uneven national coverage, variable quality, regulatory issues, limited financial support, a need for teaching recognition, plus a large digital gap that increased during the pandemic. The move to mainstream implementation of hybrid and online learning in Mexican universities has the potential to fundamentally change the nature of education in the country. Emerging economies, such as Mexico's, are slow in the adoption of online modalities for a number of reasons, including the following:

We should leave behind the artificial separation between modalities and embrace a more holistic approach to education as a complex but unifying construct.

- The unfortunate categorization of online learning as being of lower quality and prestige than face-to-face (f2f) education
- A preponderance of traditional f2f education in universities
- Heterogeneous development of online and hybrid teaching abilities
- Insufficient technological infrastructure

The disruptive change to distance education created an opportunity to adopt online and hybrid learning modalities, train teachers, and acknowledge the potential contributions of these modalities.

Universities and their communities must work together with federal and local authorities, with the ultimate goal of improving the quality of higher education. The implementation of online and hybrid modalities requires changes and consolidation in several dimensions: culture, faculty development and reskilling, systems of incentives for teachers, technological infrastructure, legal and regulatory issues, as well as digital literacy. The digital gap that existed in Mexico before the pandemic has been exacerbated by the need for massive distance education, and all stakeholders should strive to decrease this gap and develop effective strategies for implementation of hybrid and online education. The situation at the National Autonomous University of Mexico (UNAM), the largest university in the country (more than 360,000 students and more than 40,000 faculty), illustrates the magnitude of the challenges and the variety of strategies to cope with them, as has been described in **several studies**. It is clear that perceptions vary among students and faculty about the quality and level of learning during "emergency

remote teaching,” and this variability underscores the need to transcend temporary solutions and create an integrated, pedagogically sound, educational change strategy. We should leave behind the artificial separation between modalities and embrace a more holistic approach to education as a complex but unifying construct. Involvement of all the participants is paramount, including student and instructor communities.

The progressive adoption of learning analytics (LA)—a trend identified recurrently in the *Horizon Report*—in Mexican higher education, has enormous potential for teaching, learning, assessment, and curricular planning and evaluation. LA has taken off as an interdisciplinary field with multiple methodologies to promote learning and create scenarios in which **the roles of students and teachers can be enhanced**. The adoption of LA in our country has been slow due to a lack of scholars trained in its methodological nuances; unfamiliarity of teachers, students, and institutions with the use of these tools; and the ethical and privacy implications of using personal information. As more researchers and leading institutions begin to use learning analytics tools and show evidence of their usefulness and impact on learning, a snowball effect will likely occur and more faculty will become familiar with its potential and limitations.

Training in learning analytics for faculty and IT personnel should be promoted by groups of LA champions and faculty passionate about teaching. Development and sharing of open-source materials in Spanish and resources related to LA will be fundamental for faculty training. A thoughtful LA dissemination plan is important, as is the creation of networks of scholars interested in this area. It is critical that institutional leaders, faculty, and students be convinced that LA is a worthwhile endeavor. We should incorporate the rich experiences of LA initiatives in Latin America—e.g., the **LALA project**—and create ambitious plans for using LA in the context of the new reality.

Higher education will never be the same after the pandemic experience, so it is in everybody’s best interest to internalize the lessons learned and support education at all levels. Instructors, students, and their families are hurting, and they want to be part of the solution. They need to be included in a more systemic, humane, and pedagogically grounded transformation effort, focusing on faculty development and well-being, providing technological and research infrastructure, to create a nurturing learning environment.

Author Bio

Melchor Sánchez-Mendiola is the Coordinator of Open University, Educational Innovation and Distance Education, at the National Autonomous University of Mexico (UNAM) in Mexico City, where he leads interdisciplinary teams in scholarly tasks related to online learning, educational assessment, faculty development, translational educational research, and innovation. He has been involved with higher education and online learning for more than 20 years and is a tenured professor of medical education at UNAM Faculty of Medicine, where he has published several papers and books related to medical informatics and health professions education.

HIGHER EDUCATION IN SAUDI ARABIA

Maha Al-Freih, Assistant Professor of Instructional Design & Technology, Princess Nourah Bint Abdulrahman University

Higher education in the Kingdom of Saudi Arabia (KSA) is delivered mainly through universities, colleges, and technical and vocational colleges and training institutes. The number of higher education institutions in KSA has grown tremendously in recent years. At this writing, there are **29 public** and **36 private universities and colleges**, as well as a **rapidly growing** number of technical and vocational training schools and institutes. According to recent data from **the World Bank**, gross enrollment in tertiary education has increased by 30% since 2011, with more than 1.62 million students currently enrolled in the sector.

Globally, the higher education sector is being challenged by shifts in the employment and labor markets due to what is being dubbed Industry 4.0. Within the KSA context, this is further exacerbated by several social and economic factors, including:

- **The Growing Saudi Youth Population.** According to a recent **report** from the Saudi General Authority of Statistics, youth and children represent more than two-thirds of the Saudi population, with the highest percentage of the total Saudi population (about 34 million) between the ages 15 and 34, which currently stands at 36.7%.
- **The Unemployment Rate.** Unemployment in Saudi Arabia is relatively high among youth and the well educated. According to reports from OECD, KSA has one of the **lowest employment rates** for **adults holding tertiary qualifications** among OECD and partner countries.
- **The Skills Gap.** Despite the country's impressive gains in enrollment and the exponential growth in the number of higher education institutions, these changes have not been translated into progress in student learning and skills achievement. KSA is already witnessing a **talent crunch**, and the widening gap between higher education outputs and industry needs and expectations has been noted as a root cause in a number of industry and government reports from **Misk Academy**, **Harvard Kennedy School**, and **City & Guilds Group**.

.....

Institutions need to develop their capacity to deliver—and, most importantly, assess—skills-based learning and training.

.....

These trends are at the heart of the Saudi **Vision 2030**, the country's official economic reform agenda for the coming decade. This vision aims to diversify the country's economy for a post-oil era. Given the speed and scale of this transformation, its success hinges on the country's ability to effectively develop its human capital and close the gap between higher education graduates and its labor market demands, placing extra pressure on institutions to respond and adapt within a shifting national context.

How can the higher education sector accommodate the influx of college-aged population, ensure employment returns to education, and upskill and reskill the country's workforce? This year's *Horizon Report* points to a couple of trends that, if addressed strategically, have the potential to mitigate some of these challenges facing higher education, namely skills-based learning and microcredentials. **Government agencies** and **corporations** are taking charge of the skills-gap conundrum. So, how can higher education institutions remain relevant in this competitive space?

First and foremost, institutions need to develop their capacity to deliver—and, most importantly, assess—skills-based learning and training. While there has been a push toward skills-based education in KSA, actual university teaching remains largely test-driven. The unemployment rate among graduates is the backdrop of decades of major educational initiatives that are well funded and supported, highlighting a major need to reform postsecondary pedagogy. Additionally, institutions should identify high-demand job roles and skills and then conduct a systematic review of current degree programs and their relevance to industry. This approach can also aid in identifying segments in current programs that can be repackaged as stackable microcredentials to be delivered as part of degree programs for students or as stand-alone credentials for the wider population. Stronger partnerships with businesses are necessary to stay abreast of developments and engage industry partners in the design, development, and delivery of just-in-time microcredentials.

The value and impact of microcredentials for skills development will remain limited without government support. Given the varying definitions and structures of microcredentials, integrating and aligning microcredentials with the **National Qualifications Framework-KSA** is a necessary step to ensure common language among stakeholders and provide bases for quality assurance, governance, career pathways, and cross-border recognition. Funding private–public research on microcredentials and their efficacy is another critical area worthy of investment and support.

Final Thoughts

Microcredentials that are well designed and developed have the potential to support the needs of a complex web of stakeholders, including higher education institutions,

employers, students and professional learners, and the wider population. The short, focused, and flexible nature of microcredentials can expand the reach of higher education and its capacity to serve nontraditional learners and is more in tune with the move toward **skills-based hiring** because it provides employers with a regulated and verifiable means to recruit and retain employees with proven skill sets to remain competitive. As for professional learners, microcredentials offer a flexible and inclusive alternative to traditional degrees that is more reflective of, and responsive to, the evolution in the education-career continuum.

Author Bio

Maha Al-Freih is an Assistant Professor of Instructional Design & Technology at Princess Nourah Bint Abdulrahman University (PNU), Saudi Arabia. She earned her PhD in learning technologies design research from George Mason University, an MA in interdisciplinary education from Santa Clara University, and a BS in computer science from King Saud University. She has previously served as Vice Dean of Learning and Teaching at the College of Business Administration at PNU and as a consultant for a number of higher education and government organizations and research institutes. Her primary research interests include care ethics in online learning, MOOCs, self-regulated learning, and design-based research.

U.S. COMMUNITY COLLEGES

Carlos Guevara, Director, Educational Technology and Center for Teaching and Learning, Hostos Community College (CUNY)

The *2021 EDUCAUSE Horizon Report* reported on the need for flexible learning environments, and as we reflect on this recommendation a year later, it is even more evident that higher education institutions must streamline hybrid/remote learning modes to offer the flexibility students are asking for and to help recover from the enrollment crisis they face.

Early studies on student experiences with remote learning show that the digital divide, such as the lack of adequate technology and internet access, remains one of the biggest barriers that students face. A study by ACT on students' online learning experiences during the pandemic reported that two out of three students indicated having challenges learning online during the pandemic and mentioned technology, the internet, and deficient learning resources as the main barriers they encountered.

The impact of declining enrollment at community colleges limits their financial ability to function properly and invest in much-needed resources to support student success. Although undergraduate enrollment declined during the decade before the pandemic—as reported in IPEDS from the National Center for Education Statistics—there has been a larger decline since 2019, showing a 5.8% drop overall, and an even larger 15% decline for community colleges, according to the latest report from the National Student Clearinghouse Research Center in October 2021. Another important piece of information to consider is that as of 2020–21, there are 1,603 community colleges (public, private nonprofit, and for-profit), 700 fewer than in 2011–12, as reported in IPEDS. The data also show a 28% decrease in the number of people employed in community colleges over a similar interval between 2020 and 2012, further reducing the ability of these institutions to address barriers identified by students.

.....

The aftermath of a protracted pandemic has exposed many unsolved problems in higher education.

.....

The aftermath of a protracted pandemic has exposed many unsolved problems in higher education. Learning modes and how they are defined evolved slowly prior to the pandemic and have focused primarily on brick-and-mortar, hybrid, and online modes. The sudden transition to remote instruction has led all education systems to shift their attention to online/remote/hybrid learning modalities, and instructors did their best to adopt and adapt to these approaches,

which for most of them were new. Community colleges are no strangers to this phenomenon and face their own challenges in adapting and integrating these evolving hybrid/remote learning modes, challenges which have led to suboptimal learning environments.

As we reflect on the numbers and challenges shared by students before and during the pandemic, it will be important to take a holistic approach to address these challenges and implement changes that are “emergency proof” and become part of the DNA of the organizational culture of community colleges and of higher education institutions in general. Redefining instructional modalities goes far beyond changing current definitions; it requires a profound change in pedagogical approaches, and institutions should be able to answer these questions:

- How are instructors designing the learning experience of students in these emerging learning environments?
- How are instructors supported in this important task?
- How are instructors establishing continuous-improvement mechanisms?
- How are institutions supporting instructors in developing courses that are modality agnostic or multimodal?
- How are institutions rethinking their physical campus structures to address the need for hybrid learning spaces?
- How do institutions address technology and internet-access barriers for students and create optimal support systems?

Last year's *Horizon Report* identified microcredentials as an emerging technology and showed the important role they can play in how institutions will need to adapt to address industry needs. It also offered some advice on how professional development for instructors could benefit from this concept. The phrase "if you build it, they will come" is commonly used in professional development, especially in higher education, depicting the very challenge of establishing a culture of continuous improvement. Valid reasons for not taking advantage of offered professional development—such as lack of time, overworked instructors, lack of interest or motivation, or even fear—have been identified in various venues, including the 2016 report "Instructional Design in Higher Education" from Intentional Futures. Taking a holistic approach, community college leaders should institute professional development as part of policies and practices related to faculty and staff workload, as well as retention and promotion. The same report estimated that around 13,000 instructional designers are working in institutions of higher education. This shows an average of two instructional designers per institution,

given that around 6,000 institutions are reported in IPEDS for 2020–21. If we want adequate professional development to be implemented, investment must be made in instructional designers and support staff, to help instructors and students not only adapt to and navigate through these evolving hybrid/remote learning modes but also be included in the planning stages for technology adoption and transition to improve and innovate teaching and learning.

Final Thoughts

It's time to put the flexibility recommendation in last year's *Horizon Report* into action. Community college leaders must invest in establishing the appropriate policies and structures to implement the pedagogical approaches necessary to address the evolving learning modes that students increasingly demand. Institutionalizing professional development as an integrated practice, investing in instructional designers and support staff, and embracing flexibility by creating and strengthening a culture of continuous improvement are the first steps to take.

Author Bio

Carlos Guevara, book author, edtech strategist, altruist, and frequent speaker at national and international conferences, is Director of Educational Technology and of the Center for Teaching and Learning at Hostos Community College-CUNY, where he promotes a vision of organizational culture change through technological and pedagogical innovations. Guevara co-authored the book *Developing Educational Technology at an Urban Community College*, published in 2019, and contributed as an expert panelist for the 2021 and 2022 EDUCAUSE *Horizon Reports*. Born in Ecuador, Guevara holds bachelor's and master's degrees in computer science and is currently pursuing his EdD in instructional technology at Teachers College, Columbia University.

U.S. RESEARCH INSTITUTIONS

Lee Skallerup Bessette, Assistant Director for Digital Learning, Georgetown University

Kenneth W. Henderson, chancellor of Northeastern University, provided the perfect opening for this piece when in December 2021 he wrote to the Northeastern community that “in-person learning is the gold standard.” Henderson was writing this to justify returning to in-person learning despite a new COVID-19 variant that was running rampant. Never mind that his institution offers a robust selection of online courses and programs—offerings that the university isn’t shy about promoting on its site—his statement represents a core tension that has been exacerbated by the pandemic: on one hand, the appetite for online and hybrid forms of education, and on the other, the need for institutions, particularly public R1 institutions, to have tuition-paying students on campus.

Between the defunding of public R1 institutions and the general-amenities building sprees in the name of recruiting top students, most R1 campuses rely on students paying for room and board, not merely tuition, to maintain financial viability. This is not new. Neither is the growth in online learning that took place alongside the expansion of the physical campuses. But often at an R1 institution, these two areas developed separately, siloed in different areas of the university, and although they were living under the same university banner, the two “campuses”—one physical and one virtual—might as well have been two different institutions.

What happened to our campuses during the pandemic is that they became blended, blurring the differences between the modalities. Our ability to define and understand these various modalities, moving past the traditional binary between in-person and online, is essential to maintaining the financial viability of our institutions. But this also moves us into a larger conversation about what the “gold standard” of the overall

.....

The R1 institutions that will be the most successful at recruiting and retaining students are the ones that take the time and invest the resources in planning, articulating, and supporting a new gold standard in undergraduate education.

.....

university experience will be moving forward because, if we can’t articulate this new gold standard to the state, parents, and students, they will continue to ask, “Is this worth the money?”

This, of course, is going to take resources—a lot of them. Institutions need time to plan rather than just react to current pandemic realities, and faculty need time and support to adapt their programs and courses to this new reality. Although there must be support for the physical infrastructure necessary to support

blended forms of learning, each institution decides what is best for its institutional culture and student needs.

All of these things are in short supply these days.

Moving forward, the R1 institutions that will be the most successful at recruiting and retaining students are the ones that take the time and invest the resources in planning, articulating, and supporting a new gold standard in undergraduate education. Their success will also depend on their ability to break down the silos of the physical and virtual campuses and integrate them into a cohesive, comprehensive, and consistent experience for their undergraduate students.

R1 institutions are often an important economic driver for the local economy, employing thousands of staff who are essential to the day-to-day operations of the institution. There is no shortage these days of articles highlighting how faculty, administration, and staff burnout is real and is affecting the ability for institutions to recruit, hire, and retain quality faculty and staff. R1 institutions are small (and sometimes not-so-small) cities of their own, where each person provides a vital piece to the overall smooth functioning of the core functions of the institution, which include research.

Successful R1 institutions will need to address the shifting work modalities, as well as compensation and leave policies. Virtual work is not going away, and institutions that can effectively and equitably implement policies that support employees' work-life balance, as well as their mental and physical health, will be able to recruit, hire, and retain the best employees—faculty, staff, administrators—which will in turn help with the recruitment of graduate students and improve the overall student experience.

This will, again, require an investment of resources, and resources are admittedly limited. Nonetheless, long-term financial health will require strategic investment today. The gold standard is admittedly shifting, and R1 institutions need to address these two key areas in order to remain successful.

Author Bio

Lee Skallerup Bessette is the Assistant Director for Digital Learning at the Center for New Designs in Learning and Scholarship (CNDLS) at Georgetown University. She focuses on the intersection of technology and inclusive pedagogy, as well as staff issues in higher education. Her work has appeared, among other places, in *The Chronicle of Higher Education*, *Inside Higher Ed*, *EDUCAUSE Review*, and *Women in Higher Education*, and she recently assumed the role of editor for The National Teaching and Learning Forum. You can find more of her work at <https://readywriting.org/>.

CORPORATE PERSPECTIVE ON HIGHER EDUCATION RESEARCH AND INNOVATION

Jake Stine, General Manager of Strategy, Innovation, and Design, AT&T

In response to poor farming practices that led to food shortages and insect plagues in the 19th century, Abraham Lincoln signed the Morrill Land-Grant College Act into law in 1862. The act effectively created the research and innovation campus concept to solve societal issues and ushered in the philosophies of German Professor Wilhelm von Humboldt. Seen as a radical in his time, Humboldt theorized that higher education university research labs coupled with lecture halls would foster—in ideation and innovation—practices that would ultimately benefit society.

Was the 1862 act a success? Absolutely! After a U.S. farming and agriculture industry turnaround, the U.S. research and innovation campus era began. Today, the United States boasts a total of 112 land-grant research and innovation campuses, many of which have not only solved potential societal catastrophes but have also created life-altering inventions affecting global economies.

“Those who do not remember the past are condemned to repeat it.” As an advisor working with U.S. research and innovation universities and a citizen watching daily news feeds, I often find myself thinking of this famous quote by George Santayana and Abraham Lincoln’s foresight in creating a framework to address issues, no matter what century we are living in. Today, our nation is experiencing similar societal challenges, from daily headlines reporting a cyberattack on a public or private institution to articles and reports questioning the country’s competitive place in the global race. These challenges alone hold tremendous weight when it comes to the livelihood of citizens nationwide, including the economic impacts of cyber events or the growth of emerging industries to stay competitive in the technology marketplace.

The time is now for research universities to invest and create 5G and cyber research labs where both public- and private-sector participants can explore research to promote innovation, education, and training around future technologies.

Implications for U.S. Research and Innovation Universities

U.S. research and innovation universities are in a prime position to respond and act. The importance of good cybersecurity hygiene needs no illustration, and the potential for next-generation technologies such as 5G enables new and innovative research with endless possibilities. As we enter the era of 5G, we can expect a quantum leap in connectivity with experiences including augmented reality (AR), virtual reality (VR), self-driving cars, telemedicine, and smart cities.

Industries such as health care, defense, manufacturing, and transportation will be forever transformed.

With the unprecedented influx of funding from federal and state governments, due in large part to the COVID-19 pandemic, the time is now for research universities to invest and create 5G and cyber research labs where both public- and private-sector participants can explore research to promote innovation, education, and training around future technologies.

U.S. Research and Innovation Campus Spotlight: Texas A&M University System RELLIS Campus

Texas A&M University System’s RELLIS Campus (TAMUS RELLIS) serves as an excellent example of a new era of innovation in education. Located 10 miles from the main campus in College Station, on a 2,000-acre tract of land that was originally Bryan Army Air Field, today TAMUS RELLIS is a state-of-the-art research facility architected to support defense, public safety, transportation, energy, industry, and agriculture applications.

After receiving grant funding from the Texas Legislature, TAMUS RELIS worked with AT&T to develop a one-of-a-kind 5G Research Testbed. Set to open in early 2022, the testbed will comprise three outdoor private 5G network cores enabling the development of innovative 5G-powered applications and solutions. One of the network cores will be solely dedicated to cybersecurity, enabling both private and public researchers to bring their applications, plug in, and hack away to preemptively identify and test risks. Additional society-impacting use cases and economic-growth case studies include:

- **Autonomous Vehicles and Roadside**

Safety: Research will have direct impacts in a variety of fields, including ground and aviation transportation. Researchers can test the use of smart intersection grids allowing sensor and human inputs for decision-making on the road; navigation enabling a vehicle to be aware of its surroundings for safe operations; and precision agriculture to help farmers determine when and how to fertilize, plant, and harvest.

- **Augmented Reality and Virtual**

Reality: Research can focus on the defense and manufacturing fields. Within military training settings, researchers can test AR/VR for delivering timely and efficient information to soldiers in both training areas and real-time environments. In manufacturing, researchers can explore how a machine uses AR for efficient learning and problem diagnostics.

- **Robotics:** Robotics applications continue to grow in the consumer, manufacturing, and health care industries. Robotics use cases can focus on how robots function in daily life with physical barriers (such as doors and stairs) and in human interactions. Within health care, researchers can examine how robotics may help improve access to quality health care and surgery in remote areas or other countries.

Call to Action

U.S. higher education research and innovation institutes have the foundation and framework to solve present-day and future challenges facing our society at large. History has shown the power of transformation and problem-solving when government, higher education, and the private sector work closely together. Whether it's addressing technological, economic, or environmental trends, the key to success is open collaboration and communication among all stakeholders working together on a mutual path forward. Our country and society depend on us to lead the way.

Author Bio

Jake Stine is a Senior Director of Strategy, Innovation, and Design at AT&T, where he leads a cross-functional team focused on advanced, complex, and emerging wireless solutions. Stine and his team, comprising innovative change agents, work directly with key public-sector clients in providing thought leadership and best practice recommendations with the goal of achieving digital transformation through the adoption of wireless emerging technologies.

The *Horizon Report* methodology is grounded in the perspectives and knowledge of an expert panel of practitioners and thought leaders from around the world who represent the higher education, teaching and learning, and technology fields. This year's group included returning and first-time Horizon panelists, all sought out for their unique viewpoints, as well as for their contributions and leadership within their respective domains. The panel represents a balance of global contexts, with members contributing from North America, South America, Europe, Asia, Australia, and Africa. We also sought balances in gender, ethnicity, and institutional size and type. Dependent as the *Horizon Report* is on the voices of its panel, every effort was made to ensure those voices were diverse and that each could uniquely enrich the group's work.

Expert panel research followed a modified Delphi process, in addition to adapting important elements from the Institute for the Future (IFTF) foresight methodology. Following the Delphi process, our expert panelists were tasked with responding to and discussing a series of open-ended prompts, as well as participating in subsequent rounds of consensus voting (see sidebar "Panel Questions"), all focused on identifying the trends, technologies, and practices that will be most important for shaping the future of postsecondary teaching and learning. Ideas for important trends, technologies, and practices emerged directly from the expert panelists and were voted on by the panel. EDUCAUSE staff provided group facilitation and technical support but minimal influence on the content of the panel's inputs and discussions. This was done to protect the core intent of the Delphi process—that an organized group of experts themselves discuss and converge on a set of forecasts for the future, on the basis of their own expertise and knowledge.

The framing of the questions and voting across each round of panel input was adapted from IFTF's foresight methodology and drew upon the IFTF trends framework and process for collecting "signals" and "impacts" for trends. Ensuring an expansive view across all the many factors

influencing the future of higher education, the IFTF "STEEP" trends framework enabled our panel to focus on Social, Technological, Economic, Environmental, and Political trends. This effectively broadened the panel's input and discussions beyond the walls of higher education to more explicitly call attention to the larger contexts within which teaching and learning takes place. These larger trends—and the current evidence and anticipated impacts of these trends—served as the grounds on which the panel built its discussions on the emerging technologies and practices influencing postsecondary teaching and learning.

As they provided their inputs and engaged one another in discussion, panelists were encouraged to share news articles, research, and other materials that would help reinforce their inputs and provide evidence for their particular viewpoints on current and future trends. In addition to enriching the panel's discussions and supporting the panel's voting and consensus processes, these materials were collected by EDUCAUSE staff for use as evidence and further reading in the writing of this report. In the Delphi and IFTF methodologies, these collected materials also serve the purpose of ensuring that the panel's future forecasts are sufficiently grounded in "real" data and trends.

Panel Questions

STEEP Trends

Round 1 (for each STEEP trend category): Please use the discussion board below to propose trends. When proposing an original trend, copy and paste the titles below in your post. Do not make any changes.

[TREND]

[SIGNAL]

[IMPACT]

Next, enter the information about the trend, signal, and impact following the title and colon. Enter each trend in a separate discussion post. An example of this process can be found below in the discussion. Responses to others do not need to follow this format. We encourage you to engage with posts of your colleagues as well. Rich discussion helps improve the data we are able to collect for the next step of the process. Please note agreement or disagreement, and provide additional signals or counterfactuals that support your position.

Round 2 (for each STEEP trend category): The list below summarizes the trends provided by this year's Horizon panel. From this list, please select the top six (6) trends you believe will have the most influence on the future of higher education teaching and learning.

Key Technologies and Practices

Round 1: For this round of information gathering, we're interested in hearing from you about those key technologies and practices that you believe will have a significant impact on the future of teaching and learning in higher education. There are no right or wrong answers—use your imagination, be bold, and don't feel limited by what you think others on the Horizon panel may or may not have included in their responses. We want your voice reflected in these responses!

What do we mean by "key technologies and practices"? For the purposes of the *Horizon Report*, these are teaching and learning practices that are either new or for which there is substantial, perhaps transformative, new development.

An important dimension of these technologies and practices is that they have the potential to have significant impacts and effects on postsecondary teaching and learning (or are already having such impacts).

Each answer should include three elements: 1) the key tech or practice; 2) a brief explanation of why you believe this tech or practice will have a significant impact on the future of teaching and learning in higher education; and 3) an example of a program or institution that exemplifies this key tech or practice.

Round 2: The list below summarizes the key technologies and practices provided by this year's Horizon panel. From this list, please select the top twelve (12) items you believe will have the most influence on the future of higher education teaching and learning.

Round 3: Panelists were asked to respond to the following questions about each of the top six techs and practices, with these ratings used to consider important differences and similarities between each:

- Do you anticipate that <tech/practice> will require new kinds of literacies on the part of learners and instructors?
- How useful will <tech/practice> be in helping institutions address issues of equity and inclusion in teaching and learning practice?
- Thinking about the evidence currently available, how would you rate the potential of <tech/practice> to have a significant and positive impact on learning outcomes?
- Thinking about potential negative effects that could result from this tech or practice, how would you rate the risk involved in <tech/practice>?
- Overall, how receptive would you say learners and instructors would be to <tech/practice>?
- Relative to institution size and budget, how much institutional spending do you anticipate would be required for <tech/practice> across the curriculum?

EXPERT PANEL ROSTER

Kathe Pelletier

Director, Teaching and Learning Program
EDUCAUSE

Mark McCormack

Senior Director of Analytics and Research
EDUCAUSE

Jamie Reeves

Senior Product and Portfolio Manager, Communities and Research
EDUCAUSE

Jenay Robert

Researcher
EDUCAUSE

Nichole Arbino

Communities Program Manager
EDUCAUSE

Susan Grajek

Vice President for Partnerships, Communities, and Research
EDUCAUSE

Maha Al-Freih

Assistant Professor of Instructional Design & Technology
Princess Nourah Bint Abdulrahman University

Asim Ali

Executive Director, Biggio Center for the Enhancement of Teaching & Learning
Auburn University

Elisha Allen

Director, Online Strategies & Academic Technologies
The University of New Mexico

Veronica Armour

Associate Director, Innovation, Design, & Entrepreneurship Academy (IDEA)
Rutgers University

Maha Bali

Associate Professor of Practice
American University in Cairo

Helga Bechmann

Project Manager Campus Innovation
Multimedia Kontor Hamburg (MMKH)

Elif Bengu

Assistant Prof., Coordinator for Teaching & Learning Center and Global Initiative Courses
Abdullah Gul University

Jean-Pierre Berthet

Chief Digital Officer, Institute for Skills & Innovation
Sciences Po Paris

James Richard Birt

Associate Professor
Bond University

Luis Borges Gouveia

Full Professor
Universidade Fernando Pessoa

Kyle Bowen

Executive Director, Learning Experience
Arizona State University

Aras Bozkurt

Associate Professor of Distance Education
Anadolu University

Kirsten R. Butcher

Associate Professor, Instructional Design & Educational Technology
University of Utah

Aline Cadena Von Bahten

Head of Education & Innovation
Ocellaris Education (Brazil)

Christina Churchill

Senior Academic Technology Services Director, Cox School of Business
Southern Methodist University

Steven Crawford

District Director, Maricopa Center for Learning and Innovation
Maricopa Community Colleges

Rob Curtin

Director, Higher Education
Microsoft – Worldwide Education Industry

David Daza

Innovation Project Leader
ITESM

John T. Denny

Education Research Consultant
Asian Development Bank

Camille Dickson-Deane

Senior Lecturer, Higher Education
University of Technology Sydney

Douglas Dombrosky

Director, Learning Technologies
Saskatchewan Polytechnic

Beth DuPont

Director, Media Services & LEDS
Skidmore College

Martin Ebner

Head of Educational Technology
Graz University of Technology

Faby Gagne

Executive Director, SNHU Labs
Southern New Hampshire University (SNHU)

Brian Gall

Assistant Dean for Online and Digital Learning
Albright College

Chris Gamrat

Senior Instructional Designer
Penn State University

Carlos Guevara
Director, Educational Technology and
Center for Teaching and Learning
Hostos Community College–CUNY

Brooke Hessler
Director of Learning Resources
California College of the Arts

Charles B. Hodges
Professor of Instructional Technology
Georgia Southern University

Shakir S. Hussain
Manager of Teaching and Learning
Services
Northwestern University in Qatar

Avi Hyman
Director of Academic & Collaborative
Technologies and Institutional
Strategist for Academic Technology
University of Toronto

Jim Jorstad
Chief Information Officer
University of Wisconsin–La Crosse

Lisa Koster
Professor
Conestoga College

Shoji Kajita
Professor
Kyoto University

Reba-Anna Lee
Assistant Dean of Distance Learning,
School of Professional Studies
Northwestern University

Phillip Long
Senior Scholar
Georgetown University (CNDLS)

Brigitte Lundin
Director of Pedagogical Innovation
Support Center
L'université de Montpellier–MUSE

Heather McCullough
Associate Director of Faculty
Development, Center for Teaching and
Learning
UNC Charlotte

Kelly McVeigh
Vice President for Information and
Instructional Technology
Delaware Technical Community
College

Kate Miffitt
Director for Innovation
California State University Office of
the Chancellor

Jamie Nelson
Associate Director, Educational
Technologies
University of Illinois

Paul Prinsloo
Research Professor
University of South Africa (Unisa)

Jaime Alberto Reinoso Castillo
Director Centro de Servicios
Informaticos
Pontificia Universidad Javeriana Cali

Mohamad Ridwan Bin Othman
Head of Online Schools
XCL Education Pte Ltd

Melchor Sánchez-Mendiola
Coordinator of Open University,
Educational Innovation and Distance
Education
National Autonomous University of
Mexico (UNAM)

Lee Skallerup Bessette
Assistant Director for Digital Learning
Georgetown University

Jo Ann Smith
Faculty Developer/Instructional
Designer
Valencia College

Obiageli Sneed
Director of Course Design &
Development
Arizona College of Nursing

Jake Stine
General Manager, Strategy,
Innovation, and Design
AT&T

Tonya Thomas
Director, Systems Innovation/
Professor
TechTown Detroit/Wayne State
University

Cassandra Volpe Horii
Associate Vice Provost and Director of
the Center for Teaching and Learning
Stanford University

Peter Wallis
Principal Product Owner
Robots & Pencils

Sarah Wendorf
Senior Instructional Designer
Cambrian College

Audrey J. Williams
Vice President, Information Services/
CIO
Pellissippi State Community College

Greg Winslett
Deputy Director, Digital Learning
University of Queensland

Ted Witt
Teaching Learning and Technology
Consultant
University of Wisconsin–Whitewater

Qobiljon Yunusov
Senior Lecturer, Course Leader
Westminster International University
in Tashkent (WIUT)