Digitalisation and the Future of Education Work Group

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1. Institutional perspectives: opportunities and challenges of digital education

a) Strategies for learning and teaching approaches

i. More blended and hybrid approaches

The COVID-19 pandemic accelerated the adoption of blended and hybrid learning across U.S. higher education. According to the survey of college presidents by the American Council on Education (ACE) in Fall 2021, 59 percent of college presidents reported offering predominantly in-person instruction with some online components, while 50 percent said they had more virtual instruction compared to pre-pandemic levels (ACE Pulse Point Survey 2021).

ii. Online learning provision – who is the target?

According to the U.S. National Center for Education Statistics (NCES, 2021), distance education courses and programs provide students with flexible learning opportunities. In fall 2021, 9.4 million students (61 percent of all undergraduate students) were enrolled in at least one distance education course, and 4.4 million students (28 percent of all undergraduate students) took distance education courses exclusively.

iii. LLL – also through non-degree education (certificates, microcredentials)

Non-degree online credentials are growing rapidly, with more than one million secondary and postsecondary credentials from academic and non-academic providers (Credential Engine, 2022). American Council on Education (ACE) has long championed expanding access to postsecondary learning to non-traditional learners. Through the guide, ACE evaluates non-collegiate training and education programs, including online offerings, to determine their equivalency for college credit recommendations. By validating the quality and postsecondary-level learning of such programs, ACE helps to create flexible pathways for learners to earn postsecondary credits and open pathways for degrees and other credential in high-demand fields. Building on the National Guide, ACE is working to make credit recommendations for online training more discoverable and actionable for learners.

ACE works to increase the transparency and recognition of these credentials to support lifelong learner mobility and success. In December 2023, ACE announced a partnership with Credential Engine to integrate ACE's extensive database of college credit recommendations, the ACE National Guide, with Credential Engine's national Credential Registry. This integration will allow over 10,000 ACE-evaluated workplace and military courses to be represented as "transfer values" in the Registry's open data infrastructure. For learners, this will provide clear information about how non-degree credentials connect to further educational opportunities. For colleges and universities, it will provide a more efficient way to determine which non-degree credentials to recognize for academic credit toward certificates and degrees.

An earlier example of ACE's work in expanding flexible pathways to postsecondary credentials through non-degree learning is the Alternative Credit Project (ACP). From 2014-2018, ACP brought together 58 traditional and non-traditional education providers to increase acceptance of alternative credit (Steele, 2018). ACE reviewed and provided credit recommendations for 104 low-cost or no-cost general education online courses across 20+ subject areas through this project. This rigorous quality review process aimed to create more flexible degree pathways for students by facilitating transfer of alternative credit. As part of ACP, ACE also convened experts to advance frameworks for quality in non-degree, competency-based education. The resulting papers "Communicating the Value of Competencies" and "Quality Dimensions for Connected Credentials" represent foundational contributions to the growing field of innovative credentialing.

iv. AI in learning and teaching

While there are many discussions about AI that surround the U.S. postsecondary sector, much of them seem to revolve around AI research & computing capacities colleges & universities as the research enterprise or workforce & talent development for the future of work in the age of AI. These are critical conversations where the sector should be a part of; however, what is missing is discussions around implications of AI on higher education administration, both in terms of teaching & learning, as well as operations of colleges and universities. To that end, ACE recently held a briefing at the U.S. Capitol, Higher Education and Artificial Intelligence (AI): How AI Can (and Will) Support Campuses and Students.

There are some examples of institutional efforts. One is at the University of Michigan, an institution that is pioneering a suite of AI initiatives, from developing scientific foundation models to providing custom generative AI tools to its entire community. Aside from individual institutions, there are some multi-institutional efforts. For example, AAC&U has launched an institute on AI, pedagogy, and curriculum, and Ithaka S+R convened a taskforce on generative AI in higher education. ACE, on its part, announced earlier this year to explore the launch of the Global Data Consortium, as a critical data sharing infrastructure, as well as a convening body for postsecondary AI innovations – and facilitate collaborations, not competitions or arms races, across the sector.

b) How to ensure that students are able to learn in digital environments

i. Technical skills and literacy

As learning increasingly moves to online modalities, digital literacy has become a prerequisite for student success. However, many students enter higher education with uneven exposure to and comfort with technology. Low-income, first-generation, and underrepresented minority students are most likely to face barriers to digital access and skill development. To level the playing field, proactive, curricular approaches to cultivating digital competencies are needed, and here are some examples.

Frameworks like the ISTE Standards for Students provide a roadmap for the knowledge, skills, and mindsets needed to thrive in a connected world. A growing number of institutions are developing micro-credentials and badges to enable more granular recognition of digital competencies. For example, the New World of Work program, developed under the California Community Colleges system, offers a comprehensive suite of openly licensed, employer-validated 21st century skills curriculum, video content, and digital badges. The program's content is designed for direct delivery to students and can be adapted by instructors to meet learners' needs.

ii. Ability to assess information, distinguish reliable from unreliable information sources

The shift to digital learning elevates the urgency of information literacy—the ability to critically evaluate and ethically use online information. With misinformation and disinformation proliferating online, students need robust skills to navigate digital content with discernment. This has become even more crucial with the rise of generative AI tools like ChatGPT, which can create highly convincing but factually inconsistent content at scale. Across the US, institutions are rising to this challenge by launching comprehensive information literacy initiatives. A notable example is the I-Know program at Texas A&M University-Corpus Christi (TAMU-CC). I-Know is a campus-wide initiative to enhance undergraduate students' digital information literacy skills through a scaffolded approach across the curriculum. Developed as part of TAMU-CC's Quality Enhancement Plan for accreditation, I-Know identifies four key student learning objectives related to finding, evaluating, creating, and communicating knowledge using digital technologies, which are integrated into courses across all majors at three key points in a student's academic journey.

iii. Integrity, and general "code of conduct" in digital environments

Clear expectations for academic integrity are essential to building cultures of integrity online. The distributed nature of digital learning introduces new challenges for verifying student identity, authorship, and appropriate collaboration. US institutions are adopting a range of strategies to promote integrity in digital learning environments. For example, many institutions have Honor Codes, which require students to affirm their commitment to academic honesty at multiple points throughout the learning experience. Some individual colleges within Emory University require students to sign the Honor Pledge on examinations and major academic assessments.

c) How to assess student learning

i. Technical approaches (e-assessment)

The rapid shift to online and hybrid learning has accelerated US higher education's adoption of technology-enabled assessment solutions. Digital tools offer efficiency and scale for assessment but require intentional, equity-minded implementation. Effective e-assessments prioritize authenticity, validity, and security while minimizing bias (Virtual Learning Leadership Alliance & Quality Matters, 2019). ACE's 2017 report, The Data-Enabled Executive: Using Analytics for Student Success and Sustainability, highlights the vital role of data analytics in creating more personalized approaches to student learning assessment and support in digital environments. For example, some institutions are using predictive analytics to estimate student progress through courses and majors, while others are combining data with digitally mediated teaching and advising to prescribe interventions.

However, the report cautions that analytics use is not yet widespread among institutional leaders. Only 12 percent of college presidents surveyed ranked institutional research and data use among their top five priorities. Key barriers include data silos, privacy concerns, and the costs of modernizing infrastructure and training. ACE is working to equip leaders with the tools and mindsets to overcome these obstacles and realize the student success benefits of analytics.

ii. Learning outcomes – given the possible use of all kinds of aids, including the internet, AI such as ChatGpt etc.

The rise of AI-assisted tools like ChatGPT poses new challenges for assessing student learning outcomes. AI could easily provide answers to students in traditional assessments focused on recall and summarization. In response, institutions are exploring authentic, multimodal assessments that require original thought and complex performance.

d) Quality assurance

ACE's 2017 Data-Enabled Executive report emphasizes the need for updated quality assurance models that leverage granular learner analytics to define, measure, and incentivize student outcomes across digital learning contexts. The report cites emerging trends like virtual accreditation visits and data dashboards that can power outcomes-focused, equity-minded continuous improvement. As noted earlier, ACE also evaluates non-collegiate training and education programs, including online offerings, to determine their equivalency for college credit recommendations. ACE's National Guide and Military Guide serve as one of quality assurance mechanisms for prior learning assessment. ACE also collaborates with other actors in the U.S. postsecondary sector and is working to expand interoperability and mobility of learning.

e) Capacity building: How do institutions support their staff

i. Training

Faculty-centered, pedagogically-driven, and equity-minded professional development is critical to high-quality digital learning at scale. ACE has developed a beta faculty development center matrix in collaboration with experienced faculty developers. This tool provides a framework for teaching and learning centers to:

- Assess current status and program offerings
- Establish and communicate professional standards
- Set goals and priorities for improvement
- Advocate for funding and resources

The matrix is designed to support centers as catalysts for professional learning and teaching excellence in an increasingly digital education landscape.

ii. Technical support & equipment

Enabling faculty digital success requires robust, reliable, and intuitive technology infrastructure.

2. Implications for governance and campus development trends of digital education

a) Legal frameworks

The rapid shift to digital learning has outpaced legal and regulatory frameworks, creating compliance challenges for institutions. Key issues include inconsistent and burdensome state authorization rules for distance education, complex "regular and substantive interaction" requirements for online courses to maintain financial aid eligibility, and evolving copyright and fair use considerations for digital course materials and recordings. These challenges highlight the need for a more adaptive regulatory environment. ACE's research on information collection burdens highlights the need for more efficient and responsive legal frameworks in the digital age.

b) Quality assurance

The rapid shift to emergency remote teaching during the pandemic exposed gaps in quality assurance frameworks for digital learning. While the US has robust quality assurance structures for in-person instruction, including regional and programmatic accreditation, these systems have been slower to adapt to online and hybrid modalities. In recent years, a number of initiatives have emerged to address these challenges. For example, the National Council for State Authorization Reciprocity Agreements (NC-SARA) has helped to streamline state authorization processes and create common baseline standards for inter-state distance education activity. On the accreditation front, regional agencies like the WASC Senior College and University Commission (WSCUC) have increasingly integrated online learning into their regular institutional review criteria and processes.

At the same time, voluntary quality assurance frameworks have proliferated to fill gaps and provide more specific guidance for digital teaching and learning. One prominent example is the Quality Matters (QM) rubric, a research-based set of standards and processes used by over 1500 institutions to evaluate and improve online course design.
Despite progress, quality assurance remains an ongoing challenge and priority as digital learning continues to evolve. Many students and employers still view online education as inferior to face-to-face instruction, highlighting the need for clear and rigorous standards (Baum & McPherson, 2019).

c) Credentialing

Higher education's digital transformation intersects with a broader shift toward skills-based, stackable, and technology-enabled credentialing. For example, ACE's Education Blockchain Initiative (EBI) is exploring how blockchain-powered ecosystems can empower individuals with control over their learning records to promote mobility and opportunity. The EBI's Blockchain Innovation Challenge is piloting applications of self-sovereign identity and verifiable credentials to enable learner-controlled sharing of academic records across institutions and employers.

d) Infrastructure: shared protocols and tools

Most institutions now rely on cloud services and commercial learning platforms, raising lock-in and data control issues. Growing cybersecurity threats require coordinated investment and governance. The EBI initiative highlights ACE's interest in advancing standards for education blockchains and digital credentials to support interoperability and learner agencies. A key EBI workstream involves developing success metrics and draft standards for blockchain credential ecosystems. This work aligns with broader efforts in the field to establish open standards for digitally secured, machine-verifiable, and learner-controlled records, such as the W3C Verifiable Credentials and Decentralized Identifiers (DIDs) specifications.

e) Governmental support

Historically, HBCUs have faced decades of chronic underfunding compared to predominantly white institutions (PWIs), which has severely impacted their campus infrastructure, including their ability to invest in digital technologies. In 2018, of the $42 billion the federal government allocated for research and development in higher education, only 1 percent went to HBCUs, whereas PWIs benefited from substantial state funding to enhance their research infrastructure (Smith & Nellums, 2024). A report from ACE and the Carnegie Foundation for the Advancement of Teaching emphasizes how the Carnegie Classification system has contributed to ongoing funding disparities between PWIs and HBCUs (Commodore, 2024).

Recognizing these historical inequities, the Biden-Harris Administration has made significant investments in HBCUs to close digital equity gaps and advance racial equity in higher education access and attainment. In September 2024, the Administration announced an additional $1.3 billion in federal investments in HBCUs, bringing the total support to over $17 billion from FY 2021 through FY 2024. These investments include $188 million in competitive grants through the Department of Education to support R&D capacity building and $1.1 billion in direct support for HBCU students through need-based grants and other federal programs.

ACE has long advocated for increased and sustained federal and state investment in HBCU digital capacity as essential to leveling the playing field and ensuring all students have access to high-quality online learning opportunities. The Biden-Harris Administration's record funding for HBCUs, including targeted support for campus technology infrastructure and STEM education, represents a significant step toward realizing this vision. These investments not only help HBCUs catch up on long-overdue technology upgrades, but also position them as engines of innovation and equity in the rapidly evolving digital learning landscape.

f) Relations with the IT industry

Since the early days of learning management systems, higher education has been grappling with the double-edged sword of commercial IT solutions. On one hand, EdTech has acted as a force multiplier for scale and sophistication. Cloud adoption and open-source platforms have transformed the economics of spinning up new programs. Adaptive and mobile-first tools that personalize are boosting outcomes from advising to assessment. Virtual Reality, blockchain, and AI have birthed powerful new learning modalities. On the other hand, an over-reliance on proprietary systems has left institutions vulnerable to lock-in and risks to student agency. Profit-maximizing algorithms can entrench bias and limit student options. Aggressive data-mining could also fuel intrusive tracking.

As data becomes central to digital education, it is critical to have responsible public-private partnerships that empower learners and safeguard institutional autonomy. ACE has been at the forefront of efforts to craft ethical contracts, data governance, and accountability frameworks. As mentioned earlier, ACE is partnering with Credential Engine, a non-profit dedicated to bringing transparency and efficiency to the credentialing marketplace through open data standards.

g) Privacy and security

Remote proctoring and learning analytics raise student data privacy concerns. Institutions need robust data governance policies that prioritize transparency, consent, and ethical use. Blockchain-enabled digital credentialing solutions, such as those being piloted through ACE's EBI initiative, utilize advanced cryptography and decentralized data architectures to secure student records and enable learner-controlled sharing. However, realizing the promise of self-sovereign learner identity depends on thoughtful governance frameworks that prioritize student agency, privacy, and equity.

h) Equitable access, inclusion - digital divide / digital poverty

Even the most transformative digital innovation is only as impactful as it is inclusive. Many low-income and minority students still lack reliable connectivity and devices. ACE's Education Blockchain Initiative centers equity as a driving imperative. The EBI's Blockchain Innovation Challenge supports pilots focused on improving social and economic mobility for underserved populations, such as systems-involved youth, rural learners, and transfer students. Intentional, cross-sector collaboration around open standards and learner-centered design is key to ensuring emerging digital credentialing solutions expand rather than limit opportunity.

3. Prospects of international cooperation in higher education in the digital era

Digital tools can dramatically expand global learning access. Virtual exchange, collaborative online international learning (COIL), and global online degrees grew during COVID travel restrictions and are poised to enhance traditional mobility long-term. ACE pioneered efforts to advance the digital transformation of U.S. higher education teaching and learning through its VE/COIL Transformation Lab – an effort which has since transferred to the American Association of Colleges & Universities (AAC&U) as part of their portfolio of work in this space.

Key elements of the former VE/COIL Transformation Lab included:

- Parallel intensive online training for U.S. and global partner institutions, customized for faculty and senior international leaders
- Coaching from ACE experts to align VE/COIL with strategic goals around learner success, workforce readiness, and internationalization
- Support for faculty to develop innovative, inclusive online collaborative teaching and learning practices
- Emphasis on building sustainable global partnerships grounded in shared values and vision

Through this program, ACE helped institutions across the U.S. and worldwide build capacity to implement COIL as a cost-effective, accessible method for delivering global learning to diverse students, including the underserved. The program also integrated ACE's Model for Comprehensive Internationalization and Model for Learner Success to drive transformation. As a research-driven initiative, the program also enabled ACE to evaluate the impact of COIL on students, faculty and institutions and informed the continued evolution of ACE's future-oriented approach to the digital age.

4. AI – impacts for institutions and society

5. Examples for best practices at the institutional level and at the national or regional level

- UnBlockEd: University of Arizona-led alliance using blockchain and curricular analytics to enable transparent, efficient, and equitable transfer articulation[1].
- Teacher Wallet: Utah partnership empowering educators with verifiable digital credentials to broaden access to quality instruction[2].

1 The partners are RANDA Solutions, Utah Department of Education, Digital Promise, ETS, University of Colorado Colorado Springs, BlockFrame, Evernym, Fluree, IdRamp, Velocity Network Foundation, Crocus, IMS Global, IATC, and Credential Engine.
2 The partners are University of Arizona, in partnership with Georgia Institute of Technology, Fluree, the John N. Gardner Institute for Excellence in Undergraduate Education, and the Kentucky Council on Postsecondary Education.

- North Texas Collaborative: Texas Woman's University-led initiative using GreenLight Credentials blockchain platform to give students self-sovereign control of records to streamline pathways across high school, college, and employment[3].
- HBCU C2: A national teaching and learning initiative that empowers any HBCU to bring coding and creativity experiences and program opportunities to their home campus and community. HBCU C2 promotes innovation, educational equity, and aims to address community challenges using app design and Apple's Swift programming language.

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3 BIC-NT is a Texas Woman's University-led collaboration with Carrollton-Farmers Branch Independent School District, North Central Texas College, Texas A&M University-Commerce, The University of Texas at Arlington, and GreenLight Credentials.