Delivering 21st Century Skills

Coalition of
Urban Serving Universities

ASSOCIATION OF
PUBLIC &
LAND-GRANT
UNIVERSITIES

COALITION OF URBAN SERVING UNIVERSITIES

The Coalition of Urban Serving Universities (USU) is a president-led organization committed to enhancing urban university engagement to increase prosperity and opportunity in the nation's cities and to tackling key urban challenges. The Coalition includes public urban research universities representing all U.S. geographic regions. The USU agenda focuses on creating a competitive workforce, building strong communities, and improving the health of a diverse population. The Coalition of Urban Universities (USU) has partnered with the Association of Public and Land-grant Universities (APLU) to establish an Office of Urban Initiatives, housed at APLU, to jointly lead an urban agenda for the nation's public universities.

ASSOCIATION OF PUBLIC AND LAND-GRANT UNIVERSITIES

The Association of Public and Land-grant Universities (APLU) is a research, policy and advocacy organization representing over 230 public research universities, land-grant institutions, state university systems, and affiliated organizations. Founded in 1887, APLU is North America's oldest higher education association with member institutions in all 50 U.S. states, the District of Columbia, four U.S. territories, Canada, and Mexico. Annually, member campuses enroll 4.7 million undergraduates and 1.3 million graduate students, award 1.1 million degrees, employ 1.3 million faculty and staff, and conduct $41 billion in university-based research.

June 2019

Contents

"If we want things to stay as they are, things will have to change."

**Giuseppe Tomasi di Lampedusa**
The Leopard

Introduction

T he role of higher education has always been to prepare learners to thrive in life and in a career in the world of today and into the future. Equally, higher education has provided a direct benefit to society and was the main engine for social and economic mobility. However, to continue to deliver on this core mission, the university has transformed over time in response to economic, social, and technological changes: It redefined itself as it moved through the industrial age and then embraced the hands-on professions (e.g., accounting and health) and then a more global and diverse society. Today, to maintain that mission, higher education must transform again to meet the economic and social needs of a digital world.

This paper sketches out a road map for higher education that outlines those broader socio-economic changes, extrapolates their implications for both learning and the structure of the university enterprise, and provides examples of how universities are innovating to meet these challenges.

RAWPIXEL/ISTOCKPHOTO.COM
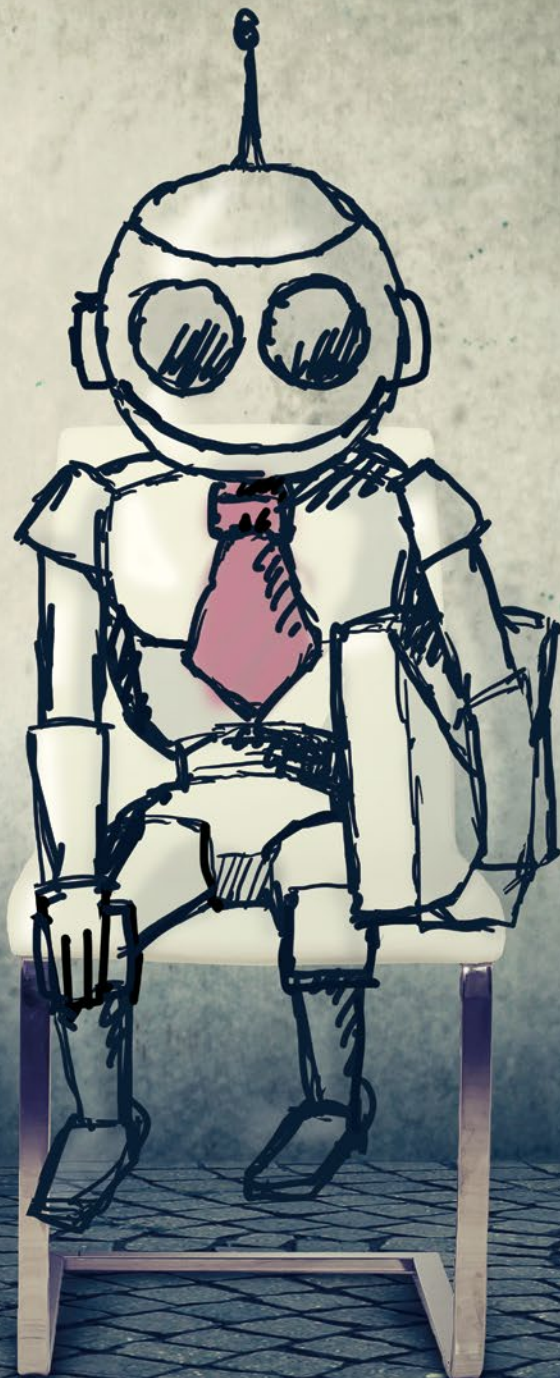
The Challenge:
THRIVING IN A VOLATILE AND UNPREDICTABLE DIGITAL FUTURE

The pressures for university change are increasing in size, speed, and intensity, and they intersect and overlap in unpredictable and highly complex ways. These pressures include accelerating technological advances, population changes across many dimensions, and the need for different skills.

Technology

- **ROBOTICS, AI, AND VIRTUAL REALITY.** Studies by McKinsey, Oxford, and others predict that the rise of robots and other forms of artificial intelligence may trigger the loss of up to 50% of current jobs over the next 20 years.[1] Even if this number is an overestimate, the implication is clear: not just individual jobs but whole job types will be eliminated. Moreover, this technology change impacts different regions in the country and the globe. For example, nationally, the ratio of robots to people is higher in the Midwest and parts of the South than in the rest of the country.[2]

- **CLOUD COMPUTING.** Cloud computing is enabling the diffusion of online courses (which are improving in quality and decreasing in price), allowing them to reach deep into underserved markets. In time, online courses will become a direct challenge to the tuition costs of the existing university enterprise.[3]

- **RAPID OBSOLESCENCE.** The rapidity of technology change affects how universities invest and can hamper their change process. For example, university technology planning cycles tend to be longer than the cycle of innovation, which can make technology plans obsolete before they are even implemented.

Populations

- **RACE, ETHNICITY, AND EQUITY.** New college classes are becoming more diverse. In some regions, that shift is happening rapidly. Research indicates that people of color, primarily Hispanic, will account for most of the increase in the number of high school graduates.[4] These shifts have important implications for student success, as over 90% of high school graduates will enroll in a higher education institution.[5] And yet, about 60% of learners who enroll in a four-year course complete their degree, and only 40% of those who enroll in a two-year course complete it. The completion rates are lower among students of color. Only 41% of all African-American students who began at a four-year college in 2012 earned a degree in six years. And for Hispanic students, the degree completion rate is 49.5%.[6] Strategies to improve degree completion must center on equity of access and outcomes.

1   https://cew.georgetown.edu/wp-content/uploads/Press-release-WorkingLearners__FINAL.pdf
2   https://economics.mit.edu/files/15254
3   https://www.forbes.com/sites/joemckendrick/2016/02/26/is-cloud-computing-truly-truly-disruptive/#15a014684295
4   https://knocking.wiche.edu/reports/2017/3/22/the-west-a-decade-of-rapid-increase-of-hispanic-graduates-before-a-sudden-reversal
5   https://www.amacad.org/content/Research/researchproject.aspx?i=21999
6   https://www.npr.org/2019/03/13/681621047/college-completion-rates-are-up-but-the-numbers-will-still-surprise-you

- **RISE OF NONTRADITIONAL LEARNERS.** As traditional college-aged populations have flattened in regions in the U.S., specifically in the Northeast and Midwest, there has been an influx of nontraditional learners (i.e., stopouts, dropouts, etc.) entering higher education institutions. In fact, 70%, or 14 million, students work while in college, 43% of which are low-income and a third of which are over 30.[7] Adult and transitioning populations can have very different needs around education (e.g., convenience and access, family support, pricing structures) compared to traditional students.

- **DIGITAL NATIVES AND GEN Z.** Long accustomed to working across digital devices and platforms to build or supplement their own learning agenda, Gen Z may challenge universities' standard approaches to teaching and learning. According to research by Pearson,[8] Gen Z have a higher regard for a college education, teachers, and learning than millennials, and Gen Z learn and engage digitally differently from millennials. In a nutshell, Gen Z spend more time with visual and game content online and prefer YouTube (millennials prefer Facebook), in-person group activities, and learning apps or interactive games rather than books (preferred by millennials) as their approach to learning. Critically, 59% of Gen Z report that they believe YouTube contributes to their education.

Shortage of Skilled Talent

One of the most complex challenges facing higher education is unpacking the multitude of issues wrapped up in the concept of lack of skilled workers, which includes

1) lack of technical workers, which may or may not need a four-year degree;

2) lack of sufficient STEM graduates;

3) lack of certain skill types in college graduates (e.g., team working, time management, problem solving, communication);

4) lack of sufficient workers within an identifiable work category (e.g., cybersecurity, nursing); and

5) upgrading and reskilling existing workers to a higher or different level.

For example, only 11% of employers believe colleges do an effective job preparing learners.[9] Translating that insight into strategies and tactics is not as simple as identifying those skills, but it requires continual assessment and reassessment of skill needs.

A Partisan Divide

Public support for colleges and universities has declined, especially as questions around affordability and the "value added" of degrees take root in the public discourse. According to a survey by Pew Research Center,[10] a majority of Republicans and Republican-leaning independents (58%) say colleges and universities have a negative effect on the country. Democrats and Democratic-leaning Independents (72%) report colleges and universities have a positive effect. These findings are a wake-up call and an opportunity to rethink costs to the student and to the institution.

The Hidden Cost Crisis

There is a growing concern around how to support learners who face significant financial challenges either close to graduation or from reenrolling if they are forced to stop out. The National Student Clearinghouse notes two-thirds of all students with at least a year of enrollment left school, and of these, about two-thirds are under 40.[11] Students who stop out with unpaid bills join the population of adults with some college and reduced wage-earning capabilities. More ominous, they may carry an accumulated debt load they cannot easily or quickly pay off, which almost ensures financial instability and an inability to accumulate wealth for a significant proportion of their lifetime. Not only is this a direct barrier to student success and

---

7   https://cew.georgetown.edu/wp-content/uploads/Press-release-WorkingLearners__FINAL.pdf

8   https://www.pearson.com/content/dam/one-dot-com/one-dot-com/global/Files/news/news-annoucements/2018/The-Next-Generation-of-Learners_final.pdf

9   https://news.gallup.com/reports/208535/gallup-strada-education-ecp-inaugural-report-2017.aspx

10 http://www.people-press.org/2017/07/10/sharp-partisan-divisions-in-views-of-national-institutions/

11 https://nscresearchcenter.org/wp-content/uploads/NSC_Signature_Report_7.pdf

a roadblock to the efforts to boost college degree attainment, it is a loss for the students and their families and for our employers and our communities, given how close these students are to graduation. This situation has prompted a call for institutions to test initiatives that address these growing financial challenges, such as low-cost degrees, campaigns that guarantee financial support for local college-attendees, reclamation grants, and completion grants.

21st Century Competencies for All Learners

T he confluence of all the pressures discussed above has profound implications for what learners need to know to survive and thrive today and in the future and how this knowledge is delivered. The National Association of Colleges and Employers (NACE) identified seven core competencies that all learners require, and these remain important and relevant for answering this question. Those competencies are

    1) critical thinking/problem solving,

    2) oral/written communication,

    3) teamwork/collaboration,

    4) information technology application,

    5) leadership,

    6) professionalism/work ethic, and

    7) career management.

NACE's framework aligns learner outcomes to employer needs, which is necessary to succeed in the workforce. Given all of the wider changes in motion, are learner outcomes e enough? The Partnership for 21st Century Learning (P21) offers a different lens for exploring 21st century skills. Developed by practitioners to better integrate skills into the teaching of core disciplines, this framework recognizes that education is about the mastery of skills needed for work, life, and citizenship. These skills are interconnected in the process of 21st century teaching and learning, and include the following:

- Life and career skills
  - Flexibility and adaptability
  - Initiative and self-direction
  - Social and cross-cultural skills
  - Productivity and accountability
  - Leadership and responsibility
- Information, media, and technological skills
  - Information literacy
  - Media literacy
  - Information, communication, and technology literacy
- Learning and innovations skills
  - Creativity and innovation
  - Critical thinking and problem solving
  - Communication and collaboration

While these skills are an excellent place to start, the rise of artificial intelligence is expanding this list, and will require universities to transform how they do business. Joseph Aoun's recent book *Robot-Proof: Higher Education in the Age of Artificial Intelligence* lays out an additional set of literacies and cognitive capacities that are necessary to survive and thrive in an era of smart machines and the increasing automation of ever more jobs. He argues the goal is to continue to develop the skills that are uniquely human, and doing that means incorporating the NACE skills, the P21 set, and beyond. Human skills include not only communication, critical thinking, leadership, and teamwork but also the core human

elements of curiosity, empathy, creativity, cultural agility, and entrepreneurialism. Here is what Aoun recommends adding to the curriculum, design, and sequencing of higher education:

New literacies

- **DATA LITERACY**, to navigate in a world defined by continuous connectivity and information flows, and to make sense of data coming from both people and machines

- **TECHNOLOGY LITERACY**, to understand the basics of how machines, now ubiquitous, work with an ability to automate processes as needed

- **HUMAN LITERACY**, which focuses on humanities, communication, and the growing importance of design

Cognitive capacities

- **SYSTEMS THINKING**, or thinking holistically and making sense and connections among disparate pieces and ideas

- **ENTREPRENEURSHIP**, which applies creative thinking to economic endeavors, to develop workarounds and solutions in extreme environments that are becoming more common

- **CULTURAL AGILITY**, to help learners work with people from other places and with widely different perspectives to contextualize information to understand people and things

- **CRITICAL THINKING AND PROBLEM SOLVING**, or evaluating vast amounts of information to formulate well-reasoned claims, while building capacity to analyze situations

In addition to cognitive skills, professional and academic credentials, emotional, creative, and other human skills also lead to resilience and adaptability in the 21st century. These include emotional intelligence, anticipation, contextual competence, authenticity, and social connection and innovation.

Labor market data underscores the importance of these skills. According to a recent Strada report, "human skills like leadership, communication and problem-solving are the most in demand skills in

> In fact, like Aoun, the authors of the Strada report agree that delivering what is truly needed requires real university transformation to serve a broader cohort of learners across a lifetime.

the labor market."[12] Moreover, the report cites that more liberal arts graduates than computer science and engineering graduates have been entering the technology market, although the report is quick to follow-up that liberal arts may be necessary but insufficient to meet the needs of learners and employers. In fact, like Aoun, the authors of the Strada report agree that delivering what is truly needed requires real university transformation to serve a broader cohort of learners across a lifetime.

Notably, the skills and competencies discussed thus far have neither focused on an individual discipline (e.g., math) nor have centered on a particular industry. This does not mean that industry-specific skills do not matter, but 21st century skills refer to what all learners need to know irrespective of focus, discipline, or career path, which will change significantly over a lifetime and across many jobs, careers, and gigs.

In fact, there is clear overlap between 21st century skills and industry core competencies. For example, the National Center for Biotechnology Information identifies the following competencies needed for healthcare workers: providing patient-centered care, working in multidisciplinary teams, employing evidence-based practices, applying quality improvement, and using informatics and data. While this list is specific to healthcare, the congruence between these skills and the overarching competencies required for all learners is apparent.

---

12   http://www.stradaeducation.org/news/robot-ready-labor-market-analysis-finds-human-skills-in-high-demand/

Being able to integrate precise industry needs—which will be changing rapidly over time—means building deep partnership with employers and other partners to keep the curricula agile and in step with changing social and economic conditions and the skills and competencies needed to navigate them.

While the identification of core 21st century competencies and the recognition that implementing these requires re-envisioning of the work of the university are critical, another key insight from Aoun's book is the need to ground this transformation in learning science. The implications of this idea are equally profound, underscoring the need for curriculum redesign that is not just academic and organizational but also behavioral, designed in a way to maintain motivation, curiosity, and a love for learning.
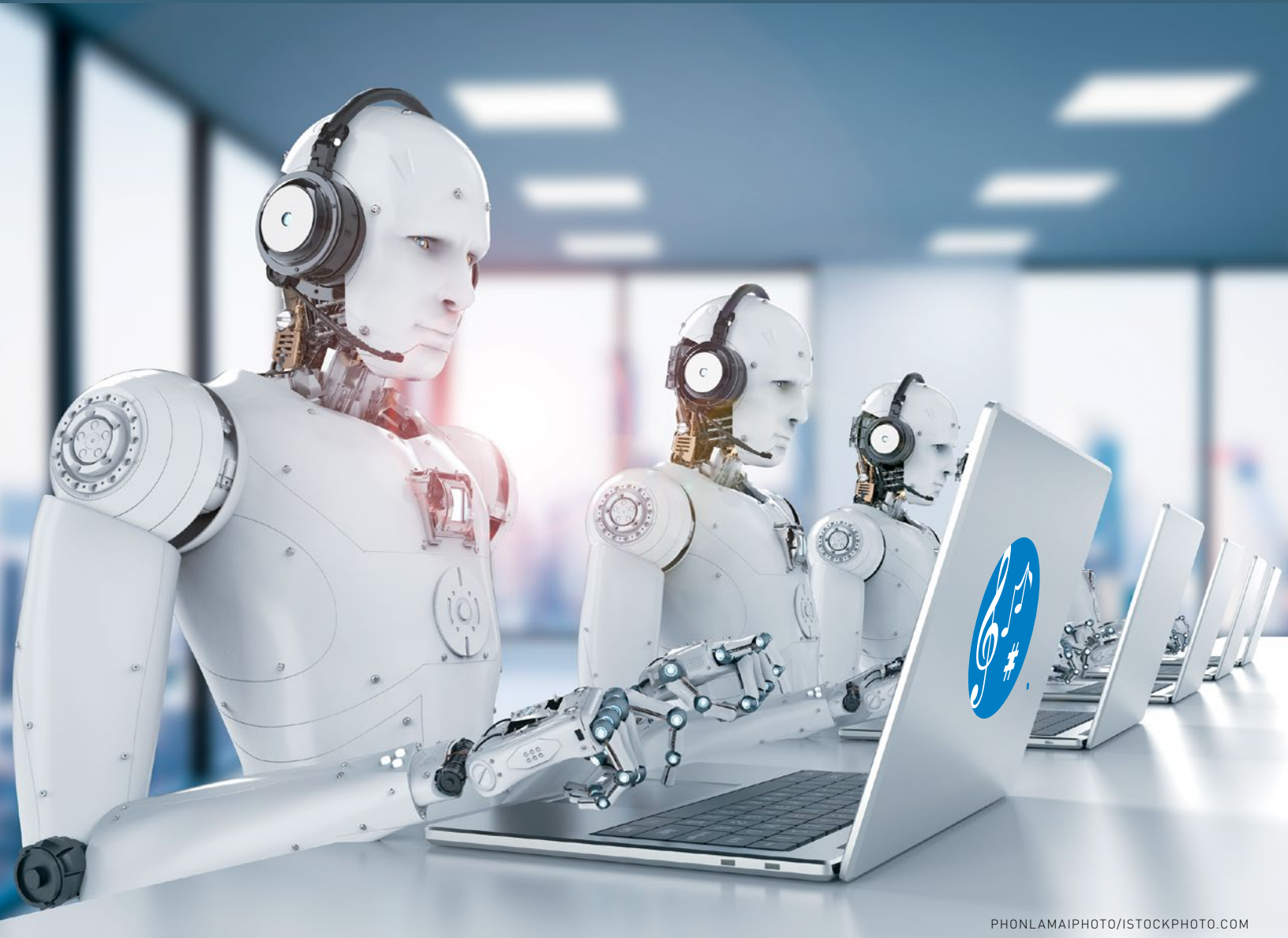
The Implication of 21st Century Skills for Universities

Delivering education to meet the needs of the coming AI revolution and to a broader cohort of learners with diverse education needs, and to compete with emerging new business models, suggests the following directions: curriculum redesign, re-engineering and deepening relationships with the stakeholders, and rethinking finance models and pricing structures.

Curriculum and Instruction Redesign

Delivering 21st century skills will likely require a more agile curriculum with more coherent on- and off-ramps for a broader and more diverse cohort of learners, and will include some or all of the following components.

- Integrating career and academic advising throughout the student journey, to help shape pathways and guide learners to better align a course of study with career aspiration and navigation. This will require more and better use of real-time labor market data to ensure skills and competencies and learning align with market demand.

- A more multidisciplinary approach to education, which includes cross-training across disciplines (e.g., ensuring English majors also have business, finance, and technical skills, and STEM and professional majors have the humanities skills needed) and the creation of, and the ability to leverage, experiential learning and real-world problem-solving opportunities to improve learners' integrative thinking. In this context, integrative thinking refers to making connections between what students learn in the classroom and what they see in the workplace.

- Building seamless, integrated, and customizable education and training pathways that are available to learners to manage a lifetime of career and life transitions. The foundation of this approach includes a series of stackable badges, credentials, and certificates connected to credit that certify workforce competencies and provide new on- and off-ramps for students and competency-based assessments and frameworks that enable those seamless transitions in and out of the workforce.[13]

New Curriculum, New Relationships

The future of education and the workforce calls for renegotiating competencies and credentials in already complex validation systems, which are increasingly challenged by the entry of many new players offering a wide range of credentials. Renegotiating competencies will require re-envisioning partnerships, which will be become increasingly critical in a resource-constrained, high-speed environment. Partnerships between state, community, and educational organizations secure quality alignment between the skills students learn and the skills students apply.

---

13   https://www.dol.gov/apprenticeship/docs/task-force-apprenticeship-expansion-report.pdf

- **STATES.** Workforce partnerships prepare learners for employment and support their progression, especially in high-demand industries, by aligning the efforts of education and training programs. These partnerships require engagement and buy-in from key state stakeholders. State leaders are leveraging colleges and universities to advance economic and workforce outcomes, including nontraditional education, grants, and strategic employer and community partnerships.

  - **TENNESSEE** developed and implemented "Reconnect," a program that allows adults 25 and older enter postsecondary education to reskill and upskill.

  - **PENNSYLVANIA** has begun re-aligning academic programs and providing academic flexibility to meet specific regional needs.

- **COMMUNITIES.** Partnerships require multiple perspectives and complementary needs from training providers, community resources, and organizations. Community partnerships provide the opportunity to leverage individual knowledge, assets, and resources of diverse organizations. Through workforce partnerships, employers earn skilled workers, and local organizations gain access to pathways for their communities.

  - **UNIVERSITY OF WISCONSIN-MILWAUKEE** partnered with the Business Roundtable association to develop an initiative titled "Pathways to the Industrial Automation Workforce of the Future" to focus on the interdisciplinary nature of the emerging digital field and the need to develop talent who possesses technical, business, and workplace competency.

  - **THE UNIVERSITY OF NEW MEXICO** partnered with the Presbyterian Healthcare Services and local anchor institutions to teach basic job skills that their entry-level workers, such as those in janitorial or food services positions, are more likely to succeed and ultimately advance to better positions.

  - **MORGAN STATE UNIVERSITY** partnered with the Maryland Department of Natural Resources to provide students with internships and skills training in emerging green careers and fields.

- **EMPLOYERS AND INDUSTRY PARTNERSHIPS.** As it is clear, new types of employer and industry partnerships are required to build the needed skills for the 21st century. The following are examples of such partnerships:

  - **UNIVERSITY OF MEMPHIS** partnered with West Tennessee Healthcare to help adult learners make faster progress toward earning a degree.

  - **ARIZONA STATE UNIVERSITY** partnered with Uber to provide a seamless pathway to fully fund college degrees for Uber drivers and their families.

  - **WAYNE STATE UNIVERSITY** partnered with Microsoft to help train students for jobs in high demand.

Rethinking Finance Models and Pricing Structures

With tuition rising, how universities deliver skills is also an economic question. Key pressures on the university business model include rising tuition, income stagnation, the declining value of the Pell Grant, and state funding reductions.

- **INCOME STAGNATION.** A postsecondary education is no longer a privilege of the advantaged few, but an individual necessity for economic growth. At a time when the workforce is quickly changing and cost of tuition is rising, training, skills, and credentials will determine success. However, since flattened and uneven wage expansion has been a key factor driving the income inequality in the United States, many students are unable to pay to complete degrees or are paying for degrees unvalued by emergent industry leaders. Based on an analysis of the 2016 household income data from the Census Bureau, DeSilver reports that Americans in the top tenth of the income distribution earned 8.7 times as much as Americans in the bottom tenth ($109,578 versus $12,523). In 1970, when the analysis period began, the top tenth earned 6.9 times as much as the bottom tenth ($63,512 versus $9,212).[14] As tuition continues to rise, the ability for students and families to shoulder these increased costs is declining. A Sallie Mae survey[15] has found "that

---

14   https://www.pewresearch.org/fact-tank/2018/08/07/for-most-us-workers-real-wages-have-barely-budged-for-decades/

15   https://www.insidehighered.com/news/2013/07/23/salle-mae-survey-finds-families-unwilling-pay-more-higher-education

> With tuition rising, how universities deliver skills is also an economic question. Key pressures on the university business model include rising tuition, income stagnation, the declining value of the Pell Grant, and state funding reductions.

since the economic downturn in 2008, higher education consumers have been more receptive to lower cost alternatives such as community colleges or colleges closer to home in order to avoid the cost of living on campus." Even more alarming, students from low-income families are less likely to enroll in or earn a baccalaureate degree, even when their academic capability is taken into consideration. Only 9% of students from the lowest income quartile earn a baccalaureate degree by age 24, compared to 77% for the top income quartile.[16] Historically underrepresented, low-income, and first-generation students are particularly affected by the income stagnation and the rising cost of degrees. Addressing growing tuition costs is critical as many more students need access to affordable and debt-free, quality degree options. The rise in tuition impacts all prospective college students; however, this issue threatens campus diversity at public four-year colleges since students of color are less likely to enroll. A National Center for Education Statistics report notes the share of students coming from communities of color at public two- and four-year colleges rose significantly in the years leading up to these tuition increases.[17] Budget cuts trigger tuition and fee increases and will deter students of color from attending college, inevitably jeopardizing the increase in diversity across campuses.

- **DECLINING VALUE OF THE PELL GRANT.** Since its origin, the Pell Grant Program has been the most significant federal program that provides low-income students need-based aid to cover costs associated with attending college. In the 2017–2018 academic year, this grant assisted more than 7 million students from low-income families, with incomes less than $40,000 a year.[18] With the tuition cost rapidly increasing, the need for the Pell Grant aid is even more important for students from low-income families. These students struggle with the financial aid process and are unaware of the full costs of college (i.e., fees, room and board, books, etc.) and overestimate the cost of higher education. These students rely on the support of need-based aid, such as the Pell Grant. Goldrick-Rab revealed that today the Pell Grant covers just 29% of the average costs of tuition, fees, and room and board at public four-year colleges, its lowest level in more than 40 years and far below the 79% it covered in 1975.[19] And Yeun highlights the Pell Grant data primarily focuses on first-time, full-time students, totaling 46% of all Pell Grant recipients.[20] But 40% of university and college undergraduate students are 25 and older, and it is estimated that this group will increase to more than 9 million by 2024.[21] Paying for a college degree is different for older students, but despite the increase in the number of adult students entering universities and colleges, merit- and need-based aid is targeted at traditional first-time students.

- **DECREASE IN STATE FUNDING.** The decrease of state and local funding has caused an increase in tuition and a decrease in student services and

---

16 https://www.ed.gov/college

17 https://nces.ed.gov/programs/digest/d16/tables/dt16_306.20.asp

18 https://trends.collegeboard.org/student-aid/figures-tables/pell-grants-total-expenditures-maximum-and-average-grant-and-number-recipients-over-time

19 https://www.cbpp.org/research/federal-budget/pell-grants-a-key-tool-for-expanding-college-access-and-economic-opportunity

20 https://cdn.americanprogress.org/content/uploads/2019/02/21045717/LowIncomeStudentAttainment-brief1.pdf

21 https://www.pbs.org/newshour/education/universities-cut-some-services-for-students-over-25

employees. An Economics of Education Review[22] report has found that the pass-through rate is on average 25.7%, meaning that for every $1,000 reduction in state appropriations per student, we would expect the average students to pay $257 more per year in college costs."

As more conversations around specific partnerships, income stagnation, pricing structures, and financial models arise, higher education leaders must respond to the scarcity of funds amidst inconsistent support for college degrees. The pressure on institutions has spiked as they work to ensure students earn a well-rounded education with the skills necessary to thrive in the new workforce.

---

22   https://www.sciencedirect.com/science/article/abs/pii/S0272775717303618 (available at https://tinyurl.com/y6gxmgdw)

An Emerging New Way of Doing Business:

INNOVATIONS FROM THE FIELD

Before exploring the changes in motion in the world of practice, it is worth taking a moment to warn of potential dangers and wrong roads. As we noted above, there are pressures on universities to deliver a better workforce for today, when universities must stick to their core mission of molding learners for today and tomorrow. Thus, given the range of changes occurring simultaneously, we run the risk of partial or misfocused solutions. In what follows, we point out a few (not all) dangers as universities work their way down this path.

Danger 1: An emerging STEM vs. liberal arts dichotomy

The acceleration of technology combined with a need for skilled workers has led to an undervaluing
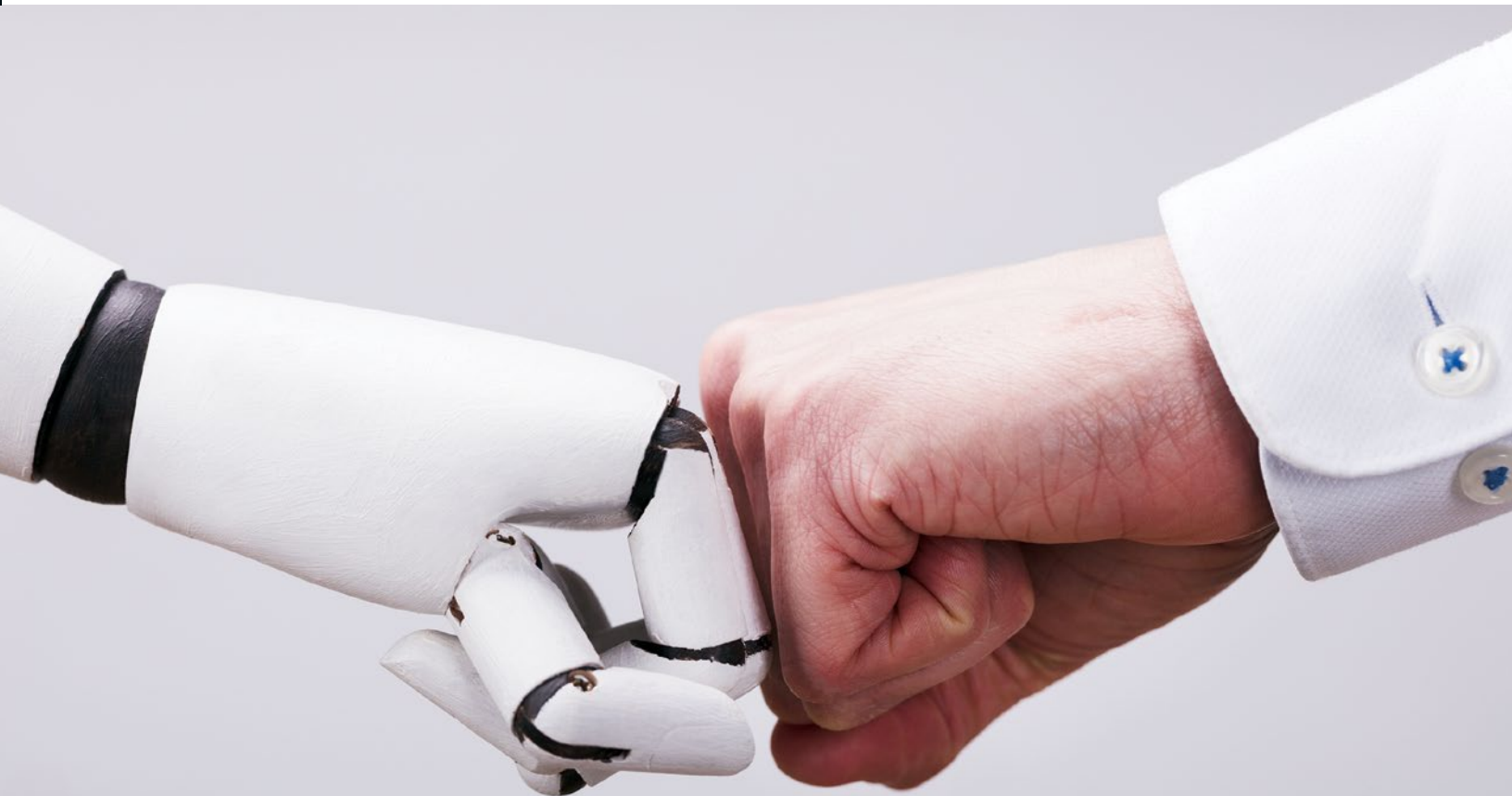
of liberal arts and humanities and an elevation of STEM and more professional tracks (e.g., accounting) which have a direct and immediate connection to the labor market and reasonable starting salaries. As we have seen, the need is for both because it is the skills developed in the humanities (e.g., creativity and critical thinking) which are the most robot-proof. The real irony is that technical skills, which can be reduced to a formalized logic model, can then be automated. In the digital age, we need all learners to handle both STEM and liberal arts.[23]

Danger 2: Short-term training (including badges, credits, and credentials) disconnected from pathways

The volatility of the economy means that any short-term solution (e.g., six-week training course) that leads to a job is only a short-term fix. The new digital age requires continuous access to training and education, and the emerging generation is using just-in-time small bites of education to solve a problem or up their game.

Finding ways to recognize, accredit, and tie pieces to more complete pathways is truly what is needed.

Danger 3: Silver bullet solutions isolated from mainstream transformation

Apprenticeships seem to dominate the language around training and education. While they are a good idea, one size does not fit all. The stronger approach with wider reach is to re-envision curriculum around experiential learning, of which apprenticeships are one important option. We should be focusing on experiential options and work and learn—not on a single model.

Although not all dangers are addressed, the few examples provided help demonstrate the duality universities experience in the face of meeting workforce employer demands with state attainment goals. Leading university practices that represent on-the-ground tactical strategies can help ease anxieties around the potential dangers.

---

23 https://www.nap.edu/catalog/24943/indicators-for-monitoring-undergraduate-stem-education

University Innovations by Category

Change requires buy-in from internal and external stakeholders that enables a broader cohort of learners to access the university across different formats (e.g., online, badges) and across different time frames (stackable credentials), and new approaches to build degrees (e.g., competencies). Innovative models are emerging that are showing us how to think about these changes. We have organized them as follows:

1) pathways and on-ramps for a broader set of learners,

2) curriculum redesign,

3) badges, microcredentials, and certifications,

4) 21st century employer partnerships,

5) strategic community partnerships,

6) rethinking the university enterprise through a 21st century skills lens, and

7) rethinking financial models.

Pathways and On-ramps for a Broader Set of Learners

FLORIDA INTERNATIONAL UNIVERSITY'S Cybersecurity Fundamentals, open to students and the community members, targets technology and information security jobs. FIU has also created Urban Potentials Labs, a center in FIU's Office of Engagement, which works with industry partners to provide opportunities to community members in high-demand fields, and launched an apprenticeship program in healthcare.

UNIVERSITY OF MEMPHIS partnered with FedEx to provide their workers, 50% of which do not have credentials post high school, a pathway starting with high school equivalency leading ultimately to a college degree.

UNIVERSITY OF WISCONSIN-MILWAUKEE is developing a modularized online education system for employee upskilling in digital manufacturing and the industrial Internet of Things through the Design Solutions Center for Workplace and Education Innovations. University of Wisconsin-Milwaukee is also working with Marquette University and Northwestern Mutual to build a Data Science Institute to advance the southeastern Wisconsin region as a hub for technology, research, business, and talent development that accelerates STEM education at all levels.

UNIVERSITY OF MELBOURNE created a blockchain-based credential owned by the recipient, allowing learners to own the record of their academic achievements, especially when elements are taken across multiple institutions over many years.

Curriculum Redesign

PORTLAND STATE UNIVERSITY is crafting a competency-based learning program in GIS with built-in hands-on practical experience that will be

designed as a long-term structured collaboration among GIS employers, community partners, and PSU.

UNIVERSITY OF NORTH TEXAS built the New College at Frisco on the 5-million-dollar mile north of Dallas, which is a partnership-based educational approach to support the adult learners and employers in this region. UNT's main campus also has Career Connect, a campus-community connection vehicle that

- works with employers in Dallas;

- focuses on experiences that build work-relevant competencies;

- builds on service learning, capstone, and student employment; and

- builds and articulates skills and competencies via an electronic portfolio.

VIRGINIA COMMONWEALTH UNIVERSITY'S "Make it Real" campaign is putting experiential opportunities at the center of its transformation, and the Da Vinci Center is prioritizing multidisciplinary, entrepreneurial, and experiential approaches.

UNIVERSITY OF CINCINNATI, home of the co-op, provides a minimum of one experiential learning opportunity for every learner, and some disciplines have many more.

UNIVERSITY OF NORTH CAROLINA, CHARLOTTE developed the Career Success Story model that incorporates the NACE competencies as the foundation to design programming for students, employers, staff, and faculty.

INDIANA UNIVERSITY-PURDUE UNIVERSITY INDIANAPOLIS recently launched the Institute for Engaged Learning, whose goal is to ensure equitable access to a minimum of four high-impact practices for *all* of its learners prior to graduation.

TEMPLE UNIVERSITY is implementing a career-readiness component to its General Education curriculum through the embedding of "soft" career-readiness skills into existing general education courses and learning goals.

UNIVERSITY OF TEXAS AT SAN ANTONIO redesigned its introductory courses for students to expand their cognitive competency skills by identifying, evaluating, and engaging in public policy.

GEORGIA STATE UNIVERSITY'S College to Career is a campus-wide effort to support students to recognize the career competencies they are acquiring through their curricular and co-curricular activities.

Badges, Microcredentials, and Certifications

SUNY, UNIVERSITY AT ALBANY is developing a microcredential program for its technology industry, recognized by U.S. News as the third fastest growing in the nation.

SUNY, STONYBROOK UNIVERSITY offers both for-credit and professional development badges credit. The badges can either stand on their own or stack towards a finance or MBA degree.

THE UNIVERSITY OF UTAH offers noncredit credentials designed to provide graduates a skill-set outside of their degree program to help distinguish them in the job market.

21st Century Employer Partnerships

SAN JOSE STATE UNIVERSITY has partnered with Jabil Industry and the Santa Clara County Social Services Agencies to meet the continuous demand for technology and social service workers.

UNIVERSITY OF NORTH CAROLINA, CHARLOTTE has partnered with Bank of America for a 17-month work-based, technology-focused experience with competitive pay, executive mentorship, scholarships, and a 95% placement rate. UNC Charlotte's career center created a new system that incorporates competencies as a basis to develop programming on campus. Specifically, it is creating an online system like Amazon's AWS Educate,[24] where students can see activities and class assignments, and what competencies are received.

---

24 https://aws.amazon.com/blogs/publicsector/introducing-aws-educate-classrooms/

INDIANA UNIVERSITY-PURDUE UNIVERSITY INDIANAPOLIS has partnered with industry sector promoter TechPoint to extend a successful summer internship program such that learners would continue to work with employers following the internship for up to two semesters, thus addressing concerns that employers have around the short nature of internships.

ARIZONA STATE UNIVERSITY partnered with Starbucks in 2014 to provide tuition-free higher education to the company's eligible employees. The partnership subsidizes 100% of the employees' tuition for over 80 degree programs.

Strategic Community Partnerships

UNIVERSITY OF WISCONSIN, MILWAUKEE Career Center works with all seven counties surrounding the city of Milwaukee.

UNIVERSITY OF TEXAS, SAN ANTONIO Downtown Campus is building the School of Data Science and National Security Collaboration Center, to advance economic development in the urban core and create greater prosperity in San Antonio.

WAYNE STATE UNIVERSITY and the Detroit Regional Chamber Detroit Drives Degrees (D3) initiative offer the Detroit 411 chat resource targeted at re-engaging adult students with some college and no higher education degree, at no cost to them.

CLEVELAND STATE UNIVERSITY partnered with College Now, a community organization, to identify students who have left the university before completing their degree and help them re-enroll and finish their degree.

FSCAFEINE/ISTOCKPHOTO.COM

Rethinking the University Enterprise through a 21st Century Skills Lens

SOUTHERN NEW HAMPSHIRE UNIVERSITY'S strategic plan is grounded in a vision of the world in 2030 and how it must support learners to meet that vision.[25]

Rethinking Financial Models

NORTHEASTERN UNIVERSITY developed the Lifetime Learning Membership Network. Through a subscription model, it provides learners with postgraduate degree opportunities and pathways to nearly 200 master's and doctoral degrees, bootcamps, and certificate programs across the globe.

NATIONAL UNIVERSITY OF SINGAPORE launched programs for current students and alumni with local universities in eight priority and emerging areas to help equip working adults with the skills required for new hi-tech industries.

PORTLAND STATE UNIVERSITY developed the Revenue Cost Attribution Tool (RCAT) to help in evaluating where revenue is generated and where costs are incurred, as a way to inform more strategic decisions across the campus.

---

25   https://snhu-externalaffairs.app.box.com/s/7k526w442reszti50fdtceyrre2f1il8

Conclusion

Colleges and universities have been tasked with educating a more diverse population of students while fostering innovation to meet the individual and societal needs of the 21st century workforce. Learners must be engaged in the interconnected cycle of improved educational experiences to be successful in today's competitive market.

As the economy continues to evolve, employers will need a wider range of competencies delivered in different formats under different timelines. Therefore, leaders of institutions of higher education will need to move beyond the traditional measures of teaching and learning and redesign their curricular and co-curricular offerings to include cognitive, technical, human, and social competencies. To achieve this, it is vital to leverage industry leaders as partners to aid in the validation of the future of our workforce and participate in the development and continuous improvement of the curriculum. The relationship between industry and institutions can give birth to innovative validation credentials and systems to improve the value of credentials for students, institutions, and industries.

As institutions of higher education adapt to the new conditions, their way of working with their partners and stakeholders will require similar rethinking and reorganizing. This will range from more regularized employer input on skill needs, to solving community problems by engaging learners, to creating meaningful learn and earn opportunities, and to working with the state to open up more opportunities to more learners. Therefore, delivering 21st century skills calls for new ways of working with industry leaders as partners in the development and continuous improvement of the curriculum.

While some institutions of higher education have already developed programs and initiatives in response to workforce changes, these initiatives only tackle general components of the shift in the workforce (i.e., microcredentialing, adult-education options, competency-based frameworks and assessments, employee-university partnerships). Although these efforts address the immediate issues, they do not sufficiently address the changing needs of learners and industry leaders. Issues such as affordability and the misalignment between education and workforce demands persist.

Meeting the needs of the 21st century workforce means that institutions of higher education face another point in their evolution and must find ways to move from their siloed approaches into campus-wide efforts necessary for success. While this work has begun, we have a long way to go.

Through collaborative work, universities can develop models and frameworks (i.e., financial models, pathways, integrated credentials into the curriculum, etc.) to address the change in the workforce to make great strides toward substantive advances in these areas. Without a fundamental transformation in how we view lifelong learning and skill attainment, institutions, communities, and the economy risk being left behind.

CONTRIBUTORS

Shari Garmise, USU/APLU
Andréa Rodriguez, USU/ APLU

EXECUTIVE ADVISORY COMMITTEE
Jay Gladden, Indiana University-Purdue University Indianapolis
Patrick Madsen, The University of North Carolina at Charlotte
Cindy Parnell, Arizona State University

LEADERSHIP TEAM
President Mark Rosenberg, Florida International University (USU Chair)
Chancellor Mark Mone, University of Wisconsin, Milwaukee (Strand Chair)
Dr. Breny DeParre Garcia, Florida International University
Dr. Phyllis King, University of Wisconsin, Milwaukee
Vicki Turner, University of Wisconsin, Milwaukee

21ST CENTURY WORKFORCE STRAND
Daniel W. Berman, Temple University
Scot Chadwick, University of California, Denver
Deborah Cours, California State University, Northridge
Bridgette Cram, Florida International University
Christy Crutsinger, University of North Texas
Jasbir Dhaliwal, The University of Memphis
Shelly Drouillard, The University of Toledo
Debra Gelinas, University at Albany
Saif Y. Ishoof, Florida International University
Peter Lyons, Georgia State University
Nicole McDonald, University of Houston
Christopher Z. Mooney, University of Illinois at Chicago
Thomas Pokladowski, California State University, Los Angeles
Louie Rodriguez, University of California, Riverside
Jean Salzer, University of Wisconsin, Milwaukee
Deborah Noble-Triplett, Virginia Commonwealth University
Thomas Tunstall, The University of Texas at San Antonio
Keith Whitfield, Wayne State University
Jianping Zhu, Cleveland State University

Coalition of Urban Serving Universities

1307 New York Avenue, NW, Suite 400
Washington, DC 20005
www.usucoalition.org

ASSOCIATION OF PUBLIC & LAND-GRANT UNIVERSITIES

1307 New York Avenue, NW, Suite 400
Washington, DC 20005
www.aplu.org