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Feature

Design Thinking for Higher Education

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To meet the challenges of a new era, universities should redesign their core functions while also creating capacities to reach emerging and underserved markets.

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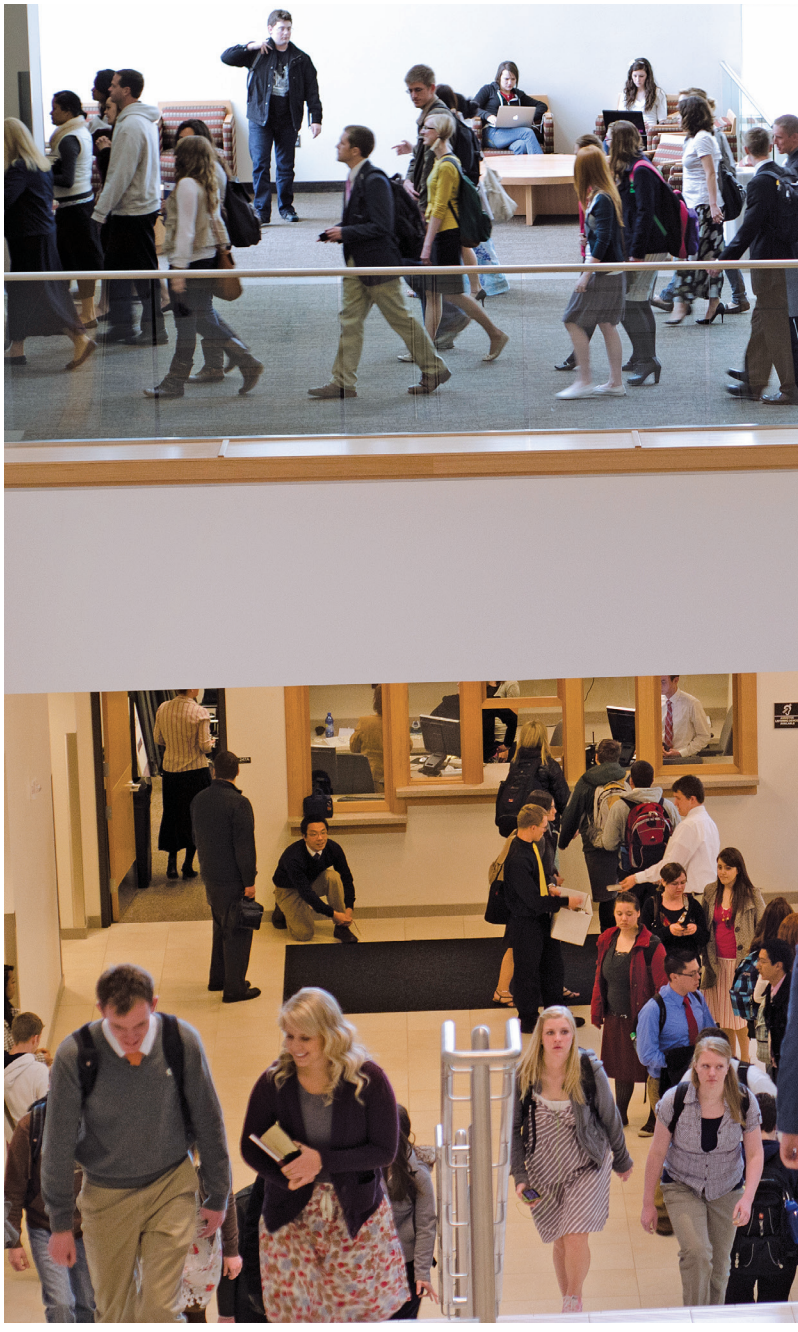

Photograph by Michael Lewis/BYU-Idaho

Higher education has entered into an era of transition. Changing student demographics, rapidly evolving stakeholder demands, and new technologies are requiring universities to reconsider abiding assumptions about geography, time, and quality. We expect that in the coming years, long-standing models of higher education that prefer tradition and stability will be supplemented, if not displaced, by new models that embrace organizational innovation, responsivity, and adaptation.

Design thinking offers important pathways for shaping these important new models. Organizational change can embody deliberate choice that purposefully shapes the object and direction of the change itself. A design perspective suggests that there are architectural choices to be made about what the organization seeks to accomplish and how it is organized to achieve those ends. Many industries, especially higher education, confront challenges from both legacy and emerging markets. Few universities, if any, should be willing to ignore one market in favor of the other, since legacy and emerging markets are both vital and can play important roles in fulfilling higher education's social mission.

We have found that a *dual transformation* design strategy has proved especially effective for addressing both legacy and emerging markets. According to this approach, efforts are divided into dual

operations acting in parallel—one to develop strategies that optimize the core organization to become more responsive to the new profile of demands it faces, and a second to design and implement disruptive innovations that provide a basis for future growth, agility, and responsivity.[1] We provide here a set of recommendations for how dual transformation can be implemented in higher education.

While we reference many colleges and universities, we focus on how our own institutions, Brigham Young University-Idaho and Arizona State University, have embraced these principles of transformation. These two institutions are important as case studies for their similarities as much as their differences. Brigham Young University-Idaho (BYU-Idaho) is a private religious four-year college established less than two decades ago from the dramatic reorganization of a distinguished residential junior college. Alternatively, Arizona State University (ASU) is a comprehensive public research university born from a regional teachers' college that now stands out among national universities for its commitment to both access and excellence.

Despite these important historical and structural differences, both universities have adopted design models that facilitate innovation along multiple, seemingly competing trajectories. Both are committed to the success of all students. And both have undergone transformation in their efforts to be continuously responsive to the new spectrum of challenges facing higher education.

Students leave the BYU-Idaho Center after the weekly devotional. The university has expanded enrollment by focusing on nontraditional students.

TECH MEETS THE MEDIEVAL UNIVERSITY

Knowledge is the core of higher education. The roots of modern higher education date back to 11th-century Europe, where the first universities were formed from guilds of student practitioners and expert instructors. In this system, knowledge was accumulated by experts and passed to apprentices, a tradition that to this day informs the self-governing, faculty-centric nature of university design.

Tradition casts a long shadow over higher education. For generations, universities have been able to fulfill their scientific and socioeconomic missions by replicating past success. As a consequence, many of today's colleges and universities are internally driven by the same structures of power and decision making over resources, the means of production, and sources of authority and legitimacy. Thus, the design logic that has prevailed in higher education can sometimes encourage uniformity and discourages innovation. From the number of books in libraries to the number of hours that students spend in seated lectures to what constitutes a degree, there are widespread pressures to conform.

This rigorous standardization has served higher education well until this point. It helped ensure quality through centuries of upheaval marked by the rapid proliferation of new institutions. However, the modern era demands greater flexibility and innovation. Factors that aim to ensure quality, such as accreditation, must avoid becoming too focused on examining a narrow set of academic processes. An overemphasis on process conformity arguably limits exploration, differentiation, and, in some cases, even system-wide quality.

What's more, the challenges facing higher education are historically unique. Rapid, ubiquitous, and accelerating technological progress is now part of the human condition. While intergenerational technological progress has been observed since the industrial revolution, the benefits of progress have primarily flowed to the wealthy. But we are swiftly approaching the point where the benefits of technological advancement will (or through design choices easily could) reach everyone, even the poor.

We also know that society's capacity to absorb new technologies is growing. While telephones took 25 years to be adopted by 10 percent of the American population a century ago, tablet computers achieved that level of market penetration within five years.[2] And while the personal computer reached one quarter of the American population in 16 years, the Internet took only seven.[3]

As a consequence of rapid technological progress and the increased capacity to integrate new technologies into already complex social systems, we now have greater access to information and tools to collect, transmit, and process information. In years past, trade skills could be expected to transfer from generation to generation. Today it is estimated that 65 percent of schoolchildren will work in a job or career that doesn't presently exist.[4] For the first time in human history, how people live and work is fundamentally changing within the duration of a single lifespan or less.

Coupled with widespread technological change are steadily increasing expectations for social mobility. According to a recent report by the Brookings Institution, the global middle class is growing by about 140 million people per year and accounted for approximately 3.2 billion people at the end of 2016. Yet, in the United States, real access to college, measured in terms of student success and completion, remains the province of wealthy families. While college attendance for students in the bottom quartile of family income has increased from 28 to 45 percent since 1970, this figure is dwarfed by the 82 percent of students from families in the top quartile who attend college.

In terms of college graduation, the gap is even more dramatic: 77 percent of US students from the top family income quartile will go on to earn a bachelor's degree by the age of 24, compared with just 9 percent of students from the bottom quartile.[5] In other words, students from the highest-income families in America are *eight times more likely* to graduate from college than students from the poorest families. Thus, the capacity of American higher education to contribute to American democracy is inherently limited, arguably by design.

MOVING TOWARD DESIGN SOLUTIONS

Taken together, these technological and sociological trends suggest that in maintaining their value to society, many colleges and universities will need to teach new material to new types of students at new, large scales. Doing so will require entirely new design models. However, in the face of rapid social change, the trend among many in higher education has been to reinforce traditional models. Some of this active entrenchment comes from pouring resources into technology that perpetuates the traditional classroom model and fails to harness the unique benefits of online and distance learning. University leaders also choose to invest in amenities and efforts to bolster rankings in order to increase enrollment—at the expense of innovations with long-term, real student impact.

We believe that the problems that beset colleges and universities are the result of failures to lead design-driven adaptation. As a first step in formulating design solutions, we recommend viewing the challenges posed by both legacy and emerging markets as independent ones, and assigning specific responsibility for innovation for each challenge to differentiated functions of the university. While this is only one approach, it offers important opportunities to reinvigorate the core of the academic institution while allowing new organizations to explore and innovate areas that are either ignored or needlessly bound by tradition.

In general terms, the dual transformation framework we advocate encourages organizations to embark on two separate but carefully connected efforts. *Transformation A* is a redesign of the core organization to improve capacities in teaching and research. *Transformation B* entails carefully designing a capacity to respond to emerging opportunities or social demands. In the context of higher education, through Transformation A, academic organizations must lower their costs (or even exit) those offerings that do not sufficiently differentiate them and invest in areas that will reposition core teaching and research in ways that will drive competitive advantage in an ever-changing landscape.[6] Thus, Transformation A is about deliberate choice that every university confronts, where failure to choose is a de facto choice for expensive mediocrity.

Transformation B, by contrast, should be treated as a distinct opportunity focused on entirely new models and separate student markets. Examples of Transformation B innovations include online learning, distance education, and other forms of increased access for students. The higher education sector offers numerous case studies of institutions that have undertaken successful transformations along one or another of these dimensions. A smaller number of cases—including BYU-Idaho and ASU—provide examples of successful transformation along both dimensions.

TRANSFORMATION A IN DIFFERENTIATED RESEARCH

While not all universities are research intensive, those that are can achieve dramatic gains in research productivity by focusing on their core strengths and building up programs in which they have natural advantages. Since 2002, when this paper's coauthor Michael Crow became its president, Arizona State University has increased research

CLARK G. GILBERT is the president of BYU-Pathway Worldwide, a global online higher education provider, and immediate past president of Brigham Young University-Idaho.

MICHAEL M. CROW is the 16th president of Arizona State University and former executive vice provost of Columbia University.

DERRICK ANDERSON is an assistant professor at Arizona State University's School of Public Affairs and advisor to the president for innovation.

expenditures by a factor of four, constituting the highest growth rate of any university research enterprise in the United States. But even as it has expanded its research investment, it has done so by consistently considering "place." For 15 years, ASU has strategically increased capacity in fields that are accessible in and relevant to Arizona and the Phoenix metropolitan area, such as water scarcity and resource management, solar and thermal energy technologies, and sustainable urban development; merged programs and departments to create new synergies—for example, fusing geology and astronomy into a School of Earth and Space Exploration; and employed the participation of key industries in sponsored projects such as ASU LightWorks, a multidisciplinary effort pursuing breakthroughs in solar energy and sustainable fuels.[7]

As a consequence of executing a carefully designed strategy, the research enterprise at ASU has expanded from approximately $123 million in FY2002 to nearly $520 million in FY2016 with remarkable efficiency. For example, the size of the faculty has remained nearly constant since 2002. According to recent data from the National Science Foundation, ASU now ranks tenth of 724 universities without medical schools in total research expenditures—ahead of California Institute of Technology, Princeton University, and Carnegie Mellon University.

But more than simply expanding research investment, ASU has chosen to differentiate itself from its peers by bringing to its research clarity of purpose through a focus on use-inspired research. Accordingly, for ASU, the notion of "place" is not just geographic; it relates also to seeking a unique thematic position within the broader national innovation system. Other universities have also benefited from committing themselves to a thematic interpretation of place. For example, Rockefeller University has achieved and maintained its status as a global leader in biomedical research and training while operating pursuant to its motto, "Science for the benefit of humanity." And Brigham Young University in Provo, Utah, has incorporated the cultural and religious priorities of its Latter-Day Saints community to pursue a leadership role in research pertaining to religious freedom, family social science, and poverty alleviation.

In pursuing design strategies for research differentiation, universities assess the promise of a research enterprise relative to their unique institutional assets rather than muddling through a medley of scientific fields where their capacity to maintain the path of academic inquiry becomes fragmented. As a consequence, new lines of inquiry can be discovered, and universities with otherwise limited resources can assume leadership roles in new disciplinary fields.

TRANSFORMATION A IN TEACHING AND LEARNING

On the teaching side, many universities have unfortunately responded to rising costs and decreasing state support by increasing selectivity or passing an excessive share of instructional costs to students and their families. Whether through high costs or highly selective admission standards, exclusivity narrows the pool of admitted students to those who are almost certain to succeed. Instead, we think universities should be defined by who they include and how those institutions improve their students' chances of success.

Accordingly, Transformation A calls for carefully planned innovations that allow for gains in student outcomes without succumbing to the magnetism of exclusivity. For example, rather than increasing selectivity and turning away students who are less likely (or unlikely) to graduate, the University of California, Riverside (UCR), has made inclusivity a core part of its identity: 57 percent of UCR students are low income (federal Pell Grant eligible) or first-generation students. Notwithstanding the abundance of evidence proving that these students are less likely to succeed, federal data show that 90 percent of UCR students persist after their freshman year and 68 percent of students graduate in six years—26 points higher than the national average.

The reasons for UCR's success graduating students includes a combination of targeted financial aid for needier students (students with a family income under $80,000 per year pay no tuition);[8] a robust suite of student services, which emphasize peer ties between students through learning communities; and opportunities for undergraduate students to partner in faculty-led research. (More than 50 percent of undergraduates undertake a research experience.)[9] By taking a different tack from competing institutions, UCR has shown that it is possible to maintain robust growth, hold down costs, and drive success for students of all demographics.

BYU-Idaho has also undertaken a major transformation of its teaching enterprise. Created in 2000, BYU-Idaho grew out of Ricks College, a two-year junior college, to become a four-year, bachelor's-degree-granting institution that primarily focuses on access, student success, and teaching excellence. Designed to "have a unique role and be distinctive from" its sister institutions within the BYU system, BYU-Idaho has managed to grow its enrollment and keep costs low by upending the traditional academic calendar in favor of a three-track, year-round calendar. Applicants to BYU-Idaho are assigned to a cohort that begins in either a fall, winter, or spring term and remain with their cohort through graduation, with each cohort assigned to attend only two of the three terms.

Since the new system was announced in 2000, total annual enrollment on campus has increased from fewer than 15,000 to more than 30,000 students, while the relative cost per student has declined. In other words, because each cohort attends only two of three available semesters each year, one-third of the students are away from campus at any point in time—effectively growing the capacity of the school by 50 percent without adding infrastructure. Rather than taking the downtime that many schools have in the summer, BYU-Idaho operates year-round, always at full capacity. The university keeps the system flexible by allowing students to take online courses at any time, regardless of their cohort calendar, and offering qualified students the option to enroll year-round to accelerate graduation.[10]

Not only has its focus on a teaching-oriented faculty and a three-track calendar addressed the affordability and access challenges of higher education, but also it has enabled BYU-Idaho to zero in on student outcomes. Even though the university has a policy of virtual open enrollment and more than 50 percent of its students receive federal financial aid, BYU-Idaho consistently has nearly a 20 percent higher graduation rate than the national average, well above that of its regional peers.[11] Moreover, BYU-Idaho students graduate in the 82nd percentile in the Collegiate Learning Assessment (CLA) for critical thinking and writing, while their incoming credentials suggest that they should only achieve the 65th percentile. For BYU-Idaho, the focus on teaching has not only expanded access and reduced cost but also increased quality by concentrating on meaningful student outcomes.

At ASU, teaching is organized according to four Teaching and Learning Realms. Realm 1 pertains to campus-based immersion

learning where 3,400 faculty members interact closely with more than 71,000 students. Realm 2 includes fully online delivery of degree programs offered by campus colleges and departments. Realm 3 provides open scale digital immersion learning (sometimes termed massive open online courses or MOOCs), and Realm 4 focuses on "education through exploration," including virtual field trips, game-based learning, and personalized learning.

Technology-driven enhancements cut across all four Realms, but the focus of Transformation A is Realm 1, where carefully implemented strategies have allowed for dramatic growth in enrollment, especially of disadvantaged populations, along with improvement in retention and graduation rates. For example, ASU's eAdvisor platform, implemented in 2007, uses assorted data points to help keep students on track for degree completion and automatically implements interventions when a student fails to progress. Other innovations are structural, such as partnerships with community colleges that accommodate the careful preparation of students and seamless transfer pathways. Such innovations have helped ASU increase the number of degrees awarded at its metropolitan campuses from 14,444 in 2007-08 to 18,254 in 2015-16, while also raising its public profile. ASU has received a top-five ranking in best-qualified graduates from *The Wall Street Journal* in 2010; a top-10 ranking in graduate employability from the Global University Employability Survey in 2016; and a number-one ranking in the United States for innovation in 2016, 2017, and 2018 by *U.S. News & World Report*.

TRANSFORMATION B FOR NEW OPPORTUNITIES

While Transformation A innovations focus on the established core functions of universities, Transformation B generates entirely new educational models that could not emerge meaningfully from the traditional academic organization. In higher education, this is often manifested through online programs targeting nontraditional student populations or new technology-driven modes of learning.

Prior to the 1980s, higher education was focused almost exclusively on young learners. But now students who attend four-year institutions and live on campus make up only a portion of all US undergraduates. Of the more than 20 million undergraduates attending college in the United States, more than 40 percent are over the age of 25, and this figure is predicted to increase, according to the National Center for Education Statistics.

Technological and social changes are also driving the emergence of new student demographics from diverse locations as well as a broader spectrum of socioeconomic backgrounds. Many of these students face barriers such as the need to balance studies with work and family obligations, high educational costs, transportation and logistical difficulties, a lack of access to information about educational opportunities, and a lack of guidance tailored to their unique needs. Many of these barriers also correspond to the ways in which these students learn that are fundamentally different from the experience of traditional campus-bound college students. For example, midcareer students bring to the classroom work experiences that not only are foreign to traditional students but may be the exact experiences that the classroom is preparing them to confront.

Southern New Hampshire University stands out as an example of a forward-thinking institution that reorganized itself around online education to reach the nontraditional student market. Founded in 1932 as the New Hampshire Accounting and Secretarial School, SNHU since 1995 has expanded its reach to nontraditional students worldwide with the founding of an online distance learning program, SNHU Online. Within six years of launch, the program included students from 23 time zones. Today, as a consequence of the success of SNHU Online, the university enrolls about 85,000 students. Most recently, SNHU launched College for America, a subsidiary nonprofit institution that offers nontraditional learners degrees in competency-based tracks, wherein students advance by demonstrating proficiency through applied projects rather than traditional coursework.

SNHU Online was created as a differentiated organization dedicated to serving the unique demands of emerging online markets but carefully connected to the core university for the assurance of quality. This strategy of establishing a separate organization with careful integration with the core university is not unique. Even in major public universities where significant success with online education has occurred, it has often come when leaders have been willing to create distinctive organizations that could focus not only on the new models tied to online learning but also on the distinctive needs of online students.

Pennsylvania State University is one of the largest universities in the United States, and serving nontraditional students from Pennsylvania's rural population has long been a part of its identity. In 1998, Penn State launched its World Campus, one of the nation's first online programs, which has since grown to offer 125 degrees, certificates, and minors and now has more than 12,000 students enrolled in all 50 states and more than 50 countries.[12] In 2013, Penn State announced that it would invest $20 million to facilitate the expansion of World Campus, which it plans to grow to 45,000 students by 2023.[13]

Like SNHU Online, World Campus exists as a separate unit of the university with carefully designed integrations with other core university units. A key feature of the World Campus that contributes to its business success and 95 percent student-satisfaction rate is the program's integration with central academic units through revenue sharing.[14] When students enroll in World Campus courses in a given subject, the college that offers the course keeps a portion of the discretionary revenue, providing incentives for academic units to promote and accommodate World Campus growth and ensure that students receive the same level of support as on-campus students. In recent years, the World Campus has played a critical role in growing Penn State's system-wide enrollment even as population decreases in rural areas and drastic decreases in state funding threaten the viability of its branch campuses.[15]

Other universities have taken a more targeted approach to growing specific nontraditional markets. For BYU-Idaho, this began with a focus on reaching students who were not being served by the existing BYU system because they did not feel that they could afford college or because, in some cases, they did not feel that they could succeed. In 2009, the university launched a new program called Pathway to target these students. It provides a one-year preparatory experience to ready students for college. Rather than teaching traditional general education courses, the program focuses on study skills and self-organization. Instead of the traditional freshman English and math, the program teaches (to similar outcomes) résumé and cover letter writing, and family financial literacy. The students work through the material in interactive, cohort-based online courses and then gather

weekly in small groups at local religious centers. While the program started with just 50 students in three pilot locations, today it has grown to reach tens of thousands of students in more than 500 locations around the world.

Similarly, BYU-Idaho's online degree programs start with certificates and associate degrees, rather than maintaining the almost exclusive focus on bachelor's degrees at more traditional universities. This has allowed many students to advance more quickly in the workforce and access a more applied curriculum than a traditional campus-centric model of higher education would do. It is important to note that both the Pathway and online degree programs were structured as separate operating entities within BYU-Idaho so they could focus on the distinctive needs of these online students. By helping students build confidence in their early academic efforts, pricing the program at less than $75 a credit hour, and allowing students to access education locally, the Pathway program and the BYU-Idaho online degree programs have grown to more than 35,000 students annually. This combined annual enrollment now exceeds the total annual student enrollment of the residential campus in Rexburg, Idaho. This past February, BYU-Idaho's governing board elected to create a new institution, BYU-Pathway Worldwide, to focus on serving the needs of these nontraditional students.

Transformation B at ASU cuts across multiple realms of teaching and learning, each pushing further into the frontiers of innovation in higher education. Like BYU-Idaho, ASU's Transformation B is coordinated primarily through an independent unit dedicated to the cultivation of technology-intensive disruptive ventures. ASU founded this unit as EdPlus. In what is termed Teaching and Learning Realm 2, traditional undergraduate and graduate degrees are offered in online formats. Since its inception in 2009, ASU Online (now operated under the umbrella of EdPlus) has gone from just under 1,000 students in five programs to nearly 26,000 students in more than 100 fully online programs. Through Realm 2, instructional designers connect faculty expertise to the unique learning needs of online degree seekers. This enables ASU to be responsive to nontraditional learners. It can also facilitate rapid, scalable response to very specific opportunities. For example, through an innovative partnership with Starbucks, ASU is on track to provide degrees to 25,000 Starbucks employees (or partners) by 2025.[16]

ASU's Teaching and Learning Realms 3 and 4 venture further into the frontiers of university innovation. ASU's Global Freshman Academy (GFA) is the chief effort in Realm 3. In partnership with the MIT/Harvard University nonprofit venture edX, GFA is a massive open online course (MOOC) platform. Existing MOOC platforms offer certifications or badges for completed courses, but GFA is the first to offer course credit from an accredited university. GFA is also priced affordably for learners around the world—less than $200 per credit hour—and students pay for course credit only *after* passing the course and only if they want the optional university credit. Initial enrollment in the first 10 GFA courses exceeded 350,000 students.

ASU's Realm 4 is dedicated to education through exploration. Similar to the research and development arm of a large company, Realm 4 at ASU aims to understand, integrate, and shape the newest technology-driven approaches to learning. Efforts here involve the development of platforms for game-based learning, adaptive learning, and personalized learning. For example, one Realm 4 project, driven in part by ASU's Center for Education Through eXploration (ETX), is the "immersive virtual field trip" or iVFT. This project uses digital photo, video, satellite, and map technologies to capture the experiences of field scientists and share them with learners through interactive tools. It is but one of many potential ways that the university can expand the number and kinds of students it reaches, and the means by which they can learn.

A NEW ERA

Higher education in the United States has entered a new era shaped by profound social and economic challenges and historically unique technological acceleration. To confront these challenges, tradition, replication, and standardization are not enough. Design thinking offers an important pathway for transforming universities into adaptive institutions that can carry out the important work of effectively responding to legacy and emerging markets. Although design thinking and strategic thinking are often tightly coupled, no amount of strategy can remedy an organization whose design is incapable of responding to the full spectrum of problems it faces.

University leaders who would risk dual transformation are required to exercise full commitment to multiple, potentially conflicting visions of the future. They undoubtedly confront skepticism, resistance, and inertia, which may sway them from pursuing overdue reforms. We recognize that this marks a tumultuous time in the history of American higher education, but we see it as an opportunity. America's leaders in higher education must rise to the challenge of creating new, innovative design models for their universities—for the betterment of their institutions, higher education, and society as a whole. ■

NOTES

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