

**Virtually Transforming Higher Education:
*The Case for Building a Digital Ecosystem***

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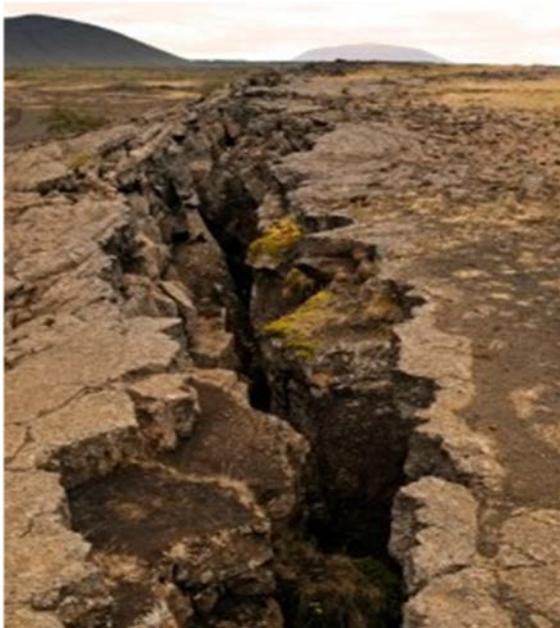
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Tectonic Shifts in the Landscape



Tectonic shifts in the higher education landscape – from changing student demographics and expectations, to escalating market competition, transformative technologies and the need for lifelong learning – are rapidly realigning the attitudes and principles, norms and practices that have traditionally powered the academic enterprise. Consequently, postsecondary institutions of all sizes and types are struggling to keep pace with these shifts, exploring innovative academic approaches and sustainable business models that will empower them to successfully navigate this rocky terrain in the years to come.

“Non-traditional” is the new normal. While most colleges and universities are still designed for so-called “traditional” students – those who are 18 -24, attending full-time and living on campus – the reality is that “non-

traditional” students are fast becoming the new normal, given the ever-expanding global demand for an educated workforce. Indeed, this demand has paved the way for more than a few ambitious education initiatives in every corner of the world.

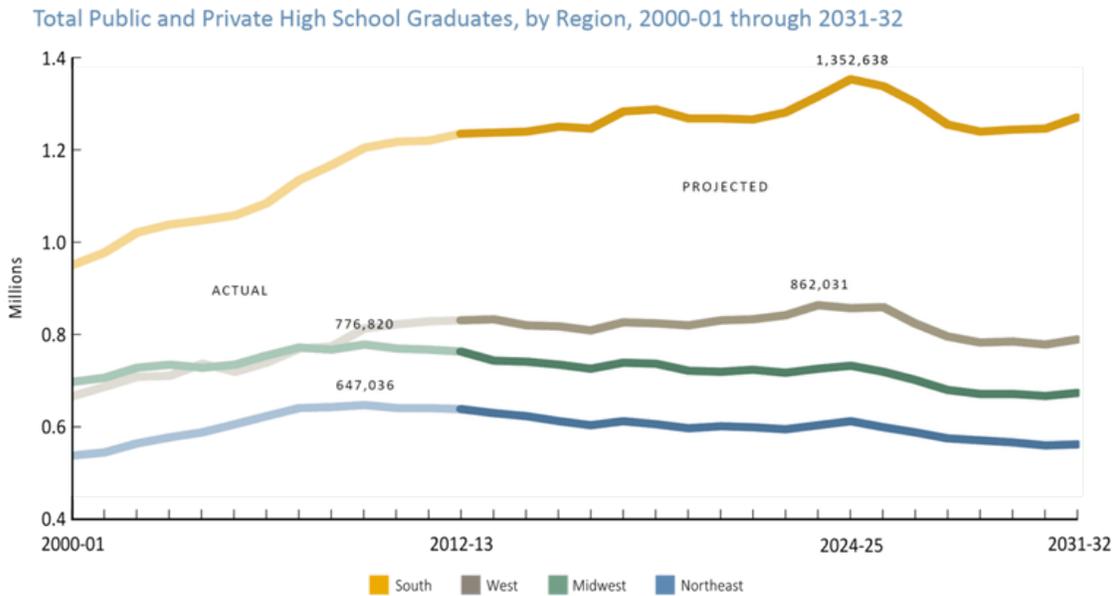
Although the United States has been moving in this direction for some time – thanks to the growing popularity of both community colleges and online education – the Great Recession of 2008 and the loss of 8.4 million jobs truly opened the floodgates, particularly in light of former President Obama’s *American Graduation Initiative*, which called for raising the proportion of 25- to 34-year-olds with college degrees or certificates to 60%. And today, some 38%, or around nine million, of those now enrolled in American postsecondary institutions fit the adult student age demographic.

Equally significant, an estimated 73% of all college students are by definition “non-traditional” in that they are balancing the demands of school with the responsibilities of work and family – which often means attending part-time and/or online. Equally notable, the American Council on Education estimates that the “latent market” for adult students between the ages of 25 and 64 with no postsecondary credentials may be as high as 80 million.

In a similar vein, *Europe 2020* – the European Union’s strategy for “smart, sustainable and inclusive” economic growth – affirms that 40% of those aged 30 – 34 living within the EU will have completed higher education. So, while non-traditional postsecondary students are still a decided minority in Europe, there is a growing movement to create academic pathways for those considered first-generation, low-income, and/or “mature.”

For example, Poland has "non-stationary," part-time university programs that run on weekends and cater to older students who work full-time and need a degree for career enhancement. Moreover, "distance learning" universities in Spain and the Netherlands, Germany and the United Kingdom have greatly increased higher education access among students of all ages and abilities, cultural traditions and socio-economic backgrounds.

The pool of high school graduates is also declining significantly in large parts the United States – which will further reduce the traditional college student population going forward. In fact by 2030, the American South will graduate *nearly one half* of all U.S. high school students, while the Midwest will lose some 93,000 graduates and the Northeast, roughly 72,000 – resulting in an estimated 15% decrease overall.



Source: <https://bryanalexander.org/uncategorized/the-next-15-years-of-high-school-graduates/>

At the same time, the number of full-pay international students attending American colleges and universities – a revenue generator in recent years – has been dropping over the past two years in the face of more restrictive visa policies. According to the most recent Open Doors survey, new enrollments among this population fell by 6.3% at the undergraduate level, 5.5% at the graduate level and 9.7% at the nondegree level from 2016-17 to 2017-18.

Needless to say, both of these trends will make non-traditional students an even more critical factor when it comes to sustaining adequate tuition revenue levels.

Student needs and expectations are changing. The shifting student demographic has also brought about a change in needs and expectations. Unlike traditional students who seek the whole college experience while completing a degree that reflects their personal interests, non-traditional students are generally looking for effective, efficient pathways to marketable professional competencies and credentials. Thus, they want academic courses and programs that not only closely align with industry needs and standards, but also encompass both formal and informal learning opportunities – from structured degree and certificate programs to customized professional development courses.

What's more, while a significant number of countries offer free or extremely reasonable tuition, the cost of a college education continues to rise in other parts of the world, with the United States and the United Kingdom leading the trend. Although the U.S. once held the record for the highest tuition, the UK now bears that distinction, which has led to a sharp uptick in outstanding student loan debt there (from £40.2 billion to £100.5 billion between March 2011 and March 2017). Still, the U.S. tuition growth continues to outpace the rate of inflation, as student loan debt approaches \$1.5 trillion dollars.

Consequently, prospective students have become increasingly more adept at shopping the American higher education market for an affordable academic package that checks all the boxes. Because they see themselves as e-commerce customers, they expect a personalized and secure shopping experience that is comparable to that of any other major online purchase – beginning with a user-friendly website that provides the information and self-service options they need to make a decision on *their* timeline. Moreover, in meeting their academic goals and career aspirations, three out of four non-traditional students will attend at least two institutions along the way.

The market is increasingly more competitive and fluid. Whereas colleges and universities used to choose their students, a growing number of them are now under pressure to “attract” them, at a time when the market is increasingly more competitive, fluid and global. According to the U. S. Department of Education, there are some 6,900 postsecondary education institutions and programs in America alone, offering roughly 650,000 credentials. Equally important, the competition for both non-traditional and international students continues to grow now that online education has moved well into the mainstream, with new players entering the market every month, including some of the world's most elite institutions. And while their virtual portfolios are still relatively small, they are meeting the changing student needs in some very creative ways.

For example, the University of Pennsylvania is now offering an online Master of Computer and Information Technology degree. Hosted on the Coursera platform, it is the first graduate program of its kind designed for non-computer science majors. Dartmouth's Tuck School of Business has also unveiled an online bridge program in business, aimed at liberal arts graduates who want to boost their employability by mastering relevant business skills. Likewise, Canada's McGill University has joined the market with a series of online certificate programs and courses in high-demand skills areas.

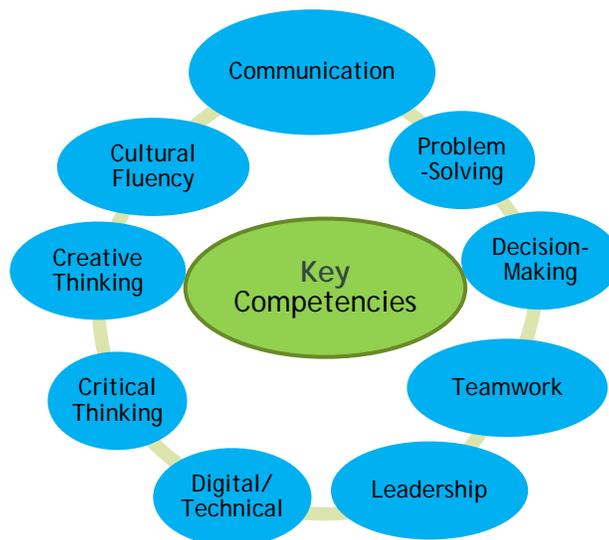
The University of Oxford now hosts a selection of online courses in such popular focus areas as nanotechnology and clinical toxicology – some of which result in credits that can be applied at the undergraduate, advanced diploma and postgraduate levels. In a similar vein, Cornell University provides a wide variety of customizable professional development certificates and individual classes in 12 different business areas through its eCornell online learning program. Enrollees can also tap into a variety of career development services – from resume preparation and career coaching, to job search planning and interview consultations. Even Harvard has a stake in the game with more than 150 virtual courses, delivered through its extension school in both synchronous and asynchronous formats.

So, to stand out among such a large pool of competitors, it has become ever more critical for colleges and universities to differentiate themselves by establishing a distinctive brand voice and a clearly articulated brand value, grounded in a market-driven academic portfolio, a dynamic faculty and a superior student experience.

Lifelong learning is ever more critical to professional success. As technology evolves, knowledge creation is accelerating at a rate beyond exponential. While conventional, 20th century higher education has long operated under the premise that knowledge doubles every 25 years, we are now clocking that rate at a frequency of roughly every 13 months. And according to some experts, the Internet of Things will eventually drive a rate of *every 12 hours*.

On top of that, current and future students in every part of the world are heading into a global economy unlike any other, fueled by innovation and driven by emerging technologies that according to some projections, will displace as much as 30% of the global workforce over the coming decade. To be sure, a recent paper published by the World Economic Forum – *Accelerating Workforce Reskilling for the Fourth Industrial Revolution* – reports that robotics and artificial intelligence will have the same impact on white collar jobs that the globalization of production has had on blue collar jobs.

While a college degree is still a prerequisite for more than half of all jobs, the return on tuition investment is becoming increasingly questionable. According to the New York Federal Reserve, average wages for U.S. workers with a bachelor’s degree rose by 31% between 1982 and 2001. But in the 12 years that followed, wage rates for college graduates fell by more than those of their less educated peers – while tuition costs continued to rise significantly. Moreover, employers worldwide regularly share that newly minted college graduates without prior job experience, do not have the requisite skills for workplace success, particularly when it comes to the following key competencies:



Even those with ample experience in more than a few occupations face the prospect that standard job skills will become either insufficient or obsolete. For example, coding skills are in demand well beyond the technology sector, while marketing professionals are often expected to develop complex algorithms. So, to remain competitive in this economy, today’s workers must continually update their skills or, at times, even reboot their careers – which means becoming agile and independent lifelong learners.

According to a recent Pew Research Center survey, 54% of American workers across all generations, and 61% of adults under 30 believe it is will be essential to develop new skills throughout their working lives. Yet while

employers are investing less in targeted workplace training and tuition reimbursement programs, a 2016 Manpower survey found that 93% of millennials are willing to pay for professional development that helps them forge ahead in their careers. Multilateral agency reports have also touted the importance of lifelong learning over the years - from UNESCO's 1972 *Learning to Be*, through to the OECD's Programme for the International Assessment of Adult Competencies (PIAAC) study in 2013. Likewise, in tackling global development challenges, UNESCO's 2030 Agenda for Sustainable Development underscores the value of continuous knowledge acquisition in its fourth goal: "*Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.*"

Not surprisingly then, being fully invested in and accountable for one's own learning may be the most strategic decision any 21st century worker can make. In meeting this ever-increasing demand, colleges and universities are joining forces with outside partners to design innovative products and programs that better accommodate changing workforce needs, while providing education consumers with options that are valuable and affordable, flexible and portable.

For example, Northeastern University in Massachusetts awards credit for in-house digital badges from IBM, as well as to those who have completed a Google IT Support Professional certificate. Virginia's George Mason University is one of a growing number of schools to partner with Education Design Lab around a blended program that teaches soft skills like intercultural fluency and critical thinking. And companies such as Coursera and Udacity offer a variety of massive open online courses (MOOCs) and low-cost credentials designed to help self-directed learners master a broad spectrum of career-specific skills. But even though these "one-off" efforts are beginning to take root, they are still far from connected, thereby making it difficult at best for working professionals to identify and access the right learning opportunities at the right time.

Technology continues to evolve at a dizzying pace. In just two short decades, the market has exploded with a virtual cornucopia of interactive digital tools and applications – from virtual and augmented reality, to robotic telepresence and artificial intelligence – all of which are transforming higher education in a number of significant ways.

From a transactional perspective, digital technologies have laid the groundwork for highly scalable online education models that are breaking the "iron triangle" of cost, quality and accessibility. Indeed, these models empower institutions to quickly and cost-effectively expand access to quality programming – which, in turn, increases enrollment and encourages persistence. What's more, these technologies yield plenty of targeted data that paves the way for making better business decisions around where to invest, where to divest, and where to partner. Equally significant, they have facilitated a wealth of Open Educational Resources – or OER – that furnish open and free access to high-quality digitized learning content and teaching materials, as well as the means with which to implement them locally.

At the same time, the latest tools and applications are being creatively deployed to meet the personal and professional needs of both traditional and non-traditional students, by providing connected, customized and experiential learning options, experiences and communities. For example, given the rapid rise of logistics as a new and increasingly popular career path, Tec de Monterrey in Mexico has created a trailblazing video game called Logistic Simulator – or LOST for short – to help students master this professional discipline. By

using 12 different game scenarios, grounded in real-world problems, LOST furnishes students with hands-on virtual practice in applying key logistical concepts, such as inventory and production management; scheduling, transportation and quality.

Australia’s Swinburne University of Technology is also using the video game format to engage thousands of undergraduate students in a basic accounting course, thanks to a couple of faculty members, who working with digital developers, produced *Quitich* – a mobile learning application that integrates artificial intelligence and predictive analytics with the latest gaming technology. This app is not only transforming traditional course lessons into interactive games, it is also furnishing plenty of real-time data to use in tracking and improving student performance.

And working with Microsoft, Case Western Reserve University and the Cleveland Clinic in the United States are reinventing the future of medical education, by using Hologens technology to transform the way students learn about the human body. Although anatomy classes have typically involved physical labs and human cadavers, holography now makes it possible for students to cut into and manipulate a virtual, three-dimensional human body, with the goal of truly understanding the intricacies of and connections among all of its systems.

A Transformative Business Model for Higher Education

For more than half a century now, most colleges and universities have clung hard and fast to the same business model – steady tuition price increases and ever-expanding programs and services, with little regard for student expectations and outcomes, market supply and demand. But as the landscape of higher education rapidly changes, consumers, legislators, employers and taxpayers alike have lost faith in the institution. In fact, a recent survey conducted by NBC News and the Wall Street Journal revealed that nearly half of all Americans believe the traditional four-year degree is not worth the cost, given that far too many students graduate with significant student loan debt and skillsets that fall short of industry expectations.

Although some institutions are using digital technology to lead ahead of the change with innovative academic products, programs and delivery models, most remain stuck in the old mindset of price and cost containment to support the traditional paradigm of education – campus-based, degree-driven, and faculty-centered. Yet to successfully navigate this shifting landscape, ed-tech companies like Digarc are urging higher education to quickly embrace a new mindset, grounded in a transformative business model that leverages technology to achieve the following objectives:



With these objectives in mind, colleges and universities potentially have much to gain by reimagining their business model through the lens of a digital ecosystem – a contextual, adaptive, role-based, and self-organizing system that fosters learning and engagement, collaboration and community in a way that is both scalable and sustainable, much like a natural ecosystem.

Brand Differentiation. As the higher education landscape changes to reflect a much broader student demographic with diverse needs and expectations, postsecondary institutions must reposition their brands around a more relevant, albeit rapidly evolving, education model. At the same time, the intensely fierce competition they face in an increasingly crowded, technology driven market is also fueling the need to bring their brands to life online in a way that stands out from their peers. Indeed, a well-conceived ecosystem can serve as a strategic brand differentiator, by transforming a place-based campus operation into a virtual gateway to lifelong learning and collaboration, enabling current students and alumni of all ages and stages in life to seamlessly move in and out at different times, from different locations, and for different purposes.

Under this scenario, the institution becomes an academic home that serves as a central point of convenient, customized and continuous access to a wealth of educational options and communities of practice from multiple resources – much like Amazon operates as a digital marketplace for consumer goods. As such, colleges and universities may move past their current “marketing to enrollment,” approach, to embrace a “marketing to lifetime investment” strategy. In addition, by shifting the focus in this direction, they will be well-positioned to pioneer the future of connected teaching, learning, and engagement – a tremendous brand asset in an ever-changing market.

Increased Resource Efficiency. As envisioned, the ideal digital ecosystem is resource-efficient and growth-oriented, with one-stop, self-service virtual access to lifelong learning options, routine transactional tasks, career connections, and value-added communities of practice. That said, it gives students greater control over and responsibility for managing their own learning content and process. Equally important, it paves the way for significant economies of scale at the institutional level – a critical factor when it comes to maximizing revenue through strategic growth and development.

Truth is, adding students on a physical campus is an expensive proposition these days, as it requires more buildings, instructors and support staff, all of which result in higher development and operating costs for the university. Moreover, extensive tuition discounting – an increasingly common practice for making higher education more affordable and thus, more attractive – further reduces the net profit margin from growing on-campus enrollment. But when properly planned and executed, a digital ecosystem is highly scalable and therefore, more resource efficient in both the short and the long term. Thus, it enables colleges and universities of all types and sizes to *do more with less*, without compromising academic and/or service quality.

Digital transformation is also a highly effective sustainable growth strategy when it comes to lessening the institution’s impact on the environment. One European meta-study (conducted jointly by Design Innovation and the UK’s Open University) found that online courses consumed nearly 90 % less energy and produced 85 % fewer carbon emissions than traditional on-campus courses. Likewise, given that online education eliminates the campus commute for remote students and faculty, reduced travel time was cited as a significant factor in lowering both energy consumption and carbon emissions. In fact, this study demonstrated a 92 % decrease in

"travel-related environmental impact." Simultaneously, campus energy consumption – resources used to power and heat facilities – accounts for a substantial portion of a university’s carbon footprint, while also driving the cost of operation higher (which, in turn, lowers its net profit margin).

Greater Agility. Going forward, agility will be defined as a two-way street. So, just as today’s workers are expected to become proactive lifelong learners in response to a complex world and a changing workforce, colleges and universities must have the capacity to quickly accommodate their learning needs – which is where a well-designed digital ecosystem comes into play.

To begin with, it provides ample pathways for collecting actionable data with which to effectively engage in continuous innovation. Likewise, the digital ecosystem framework enables institutions to streamline business practices and processes that are integral to the student journey, thereby increasing both resource efficiency and competitive advantage. On top of that, it serves as the foundation for a flexible culture of lifelong learning, by expanding access to a progressively more diverse portfolio of relevant, customizable and connected educational opportunities, designed to meet workforce demands.

Much Improved Student Experience. Research not only demonstrates that an exceptional student experience enhances university brand affinity and promotes persistence, it also reveals a direct correlation between high levels of brand affinity and low levels of price sensitivity – a critical factor in a highly competitive market with continuously rising tuition costs. Put simply, by “delighting” students with an seamless, engaging, and customized learning experience at every stage of the academic lifecycle, institutions of higher education can create that all-important emotional connection that reduces – and in many cases, overrides – the desire to “shop around” in search of a better price. But unfortunately, that experience is still for most, disjointed, fragmented and far from personalized.

To begin with, the support that students must have to succeed is typically driven by institutional priorities and distributed among multiple units, with no clear handshake from one experience to the next. On top of that, it is largely generic, rather than customized to address individual, data-validated student needs. What’s more, each unit (from lead cultivation, enrollment counseling and admissions; to academic advising and financial aid) has different service standards, performance metrics, and engagement strategies.

At the same time, the traditional instructional model of higher education affords students little, if any, choice and voice in the learning process – at a time when technology has “schooled” them to expect it. In fact, learners of all ages, abilities and stages in life are accustomed to connecting and collaborating *at will* to access and produce information *on demand*. Consequently, institutions are under extreme pressure to embrace a student-focused, experience driven learning paradigm, as follows:

Instruction Paradigm	Learning Paradigm
Highly structured and degree-driven instruction	Lifelong, open-ended and connected learning
Self-contained learning structures	Collaborative learning communities
Exclusive subset of students	Broadly diverse student population

"One" model of education (one location, one timetable, one delivery mode)	"Individual voice, multiple choice" approach (multi-modal, multimedia, practical and personalized)
Quality based on assets acquired	Quality based on outcomes produced
Passive information transfer	Active learning process
Faculty-directed	Learner-centered
Institutionally defined curricula	Market-driven learning opportunities

With these issues in mind, a comprehensive digital ecosystem leverages high-touch, intelligent technology to build an increasingly more consistent, connected and customized student experience. And in doing so, it empowers institutional leaders to increase enrollment, retention and alumni participation, while generating a higher net promoter score, by:

- Enabling mutually beneficial, symbiotic relationships between students/alumni and other like-minded community members
- Removing common barriers to enrollment and persistence, by providing a truly seamless and integrated, immersive and personalized student experience at every stage of the academic/professional lifecycle – from stealth/known prospect to alumni advocate
- Providing a customer-responsive portfolio of lifelong learning options that encourage meaningful and continuous engagement (lifetime partnership) with the institution
- Building a far more connected and loyal (“stickier”) community of learners and advocates
- Offering a more effective and proactive way to monitor, assess, and improve student satisfaction with the learning experience, both online and on-campus.

Digital Ecosystem Attributes

In achieving these four objectives, the ideal digital ecosystem incorporates the following attributes:

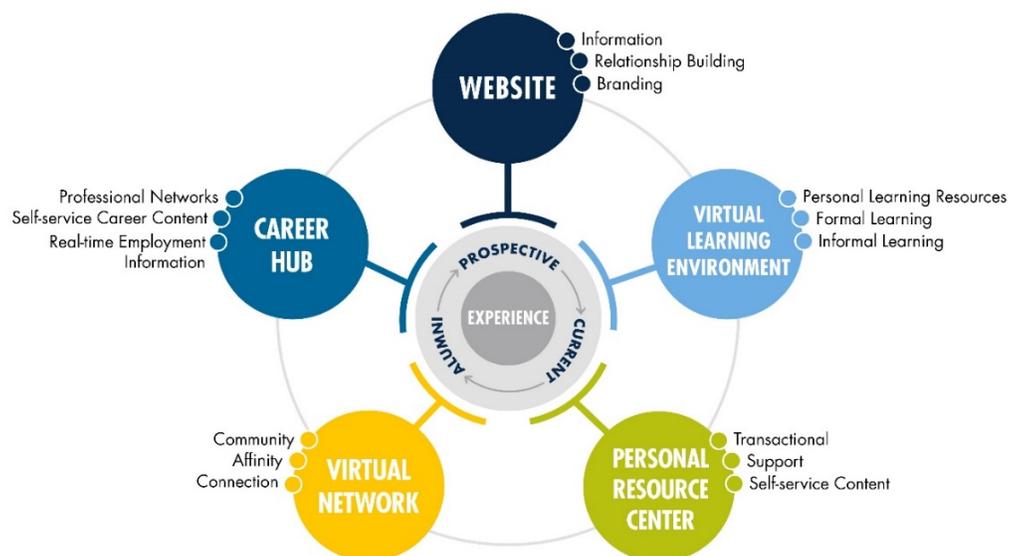
Attribute	Description	Examples
Digital Consolidation	The ecosystem will enable institutions to streamline and integrate digital systems and tools, apps and content into a single platform, with a consistent user interface, designed to allow for self-service, interconnectivity, and innovative use of technology.	<ul style="list-style-type: none"> • Consistent use of DegreeWorks academic advising /degree audit tool across all academic units and programs • Access to and exchange of digital learning enhancements/content beyond the classroom
Personalization	It will also create a strong, responsive record at the known prospect stage, which can be viewed and updated at each phase of the student lifecycle. Using predictive analytics, the ecosystem will then deliver personalized, just-in-time content and support, based on the user’s role, needs, and preferences.	<ul style="list-style-type: none"> • Fully accessible content in multiple formats based on need and preference • Customized transactional checklists • Personalized academic and career development plans

Attribute	Description	Examples
<i>User-Controlled Experience</i>	This approach will also facilitate a flexible and customizable environment in which users can proactively control the defined features, functions, and overall feel of the virtual campus experience. Likewise, the digital ecosystem is single sign-on (SSO) enabled, providing users with secure access to a central profile of key personal data.	<ul style="list-style-type: none"> • Content customized around program of study, professional discipline and/or industry of choice • Connections to campus affinity groups and communities of practice • Personalized transactional “alerts” (reminders around course registration, FAFSA form resubmission, etc.)
<i>Integrated and Robust Learning Environment</i>	Learning will no longer be confined only to the classroom; but will aggregate and capture all interrelated formal and informal opportunities that support the activity of continuous, connected learning.	<ul style="list-style-type: none"> • Formal coursework toward degree/certificate completion • Microlearning • Webinars with industry experts, thought leaders, and top hiring managers
<i>e-Portfolio Maintenance</i>	Students will have the ability to develop and continuously maintain e-portfolios throughout their academic and career lives, which showcase evolving skills and professional accomplishments, while demonstrating professional growth over time. These portfolios will also track critical process skills; and pinpoint competitive strengths.	<ul style="list-style-type: none"> • Examples of outstanding work produced both in and out of the classroom. • A running history of earned degrees, professional certificates, and other skills development training. • Evaluations from professors and employers
<i>Actionable Data Collection</i>	The digital ecosystem will collect actionable, performance-based data – both aggregated and disaggregated – that will pave the way for colleges and universities to provide evidence-based educational options and support services.	<ul style="list-style-type: none"> • Data that reveals common roadblocks to enrollment and persistence (i.e. time to program enrollment, active participation in the virtual classroom, content most frequently accessed, toxic course combinations)
<i>Prospect Support and Conversion</i>	The ecosystem will encourage student enrollment and retention, by allowing prospective students to <i>experience</i> the learning culture and environment first-hand through limited, role-based access to digital tools, content and events, designed to build brand affinity, while also reinforcing their potential for academic success.	<ul style="list-style-type: none"> • Virtual student onboarding • Access to self-service content moving through the enrollment decision journey • Social media platforms

Attribute	Description	Examples
Accessibility and Portability	An ecosystem framework will support an effective and responsive experience, by allowing users to access relevant content from any Internet-connected digital device, regardless of operating system or browser.	<ul style="list-style-type: none"> • Smartphones • Tablets • Personal Computers
Outcomes-based Environment	The digital ecosystem will enable students to shape and track their academic and career trajectories, by measuring personal outcomes against established goals.	<ul style="list-style-type: none"> • Access to continuous career and skills assessment, based on academic and professional goals and continuing needs.
Interactive Community of Learners	Authenticated users may engage with a robust virtual community of learners, while building a social network that can be leveraged both in and out of the classroom, as well as throughout the campus environment.	<ul style="list-style-type: none"> • Professional networking and mentorship opportunities • Special-focus LinkedIn and Facebook groups • Chat rooms • Virtual events for and information exchange among Drexel students, faculty, staff, and channel partners

The Ecosystem Model - Pillars/Engagement Points

While digital ecosystems are typically customized to meet the business and organizational needs of the entity they support, the ideal design for most colleges and universities is grounded in a platform of participation that integrates five pillars or engagement points, which collectively shape the experience throughout each phase of the student lifecycle, as follows:



Using this model, the ecosystem community comprises prospective and current students, alumni, faculty, staff, and business/employment partners.

Relevant Outcomes and Key Performance Indicators

In framing each pillar, the ecosystem design team must first identify both the outcomes they want to achieve and the key performance indicators (KPIs) they need to measure – which should not only align with the institutional mission and goals, but also be accurate, attainable and actionable. The following table includes examples to consider:

Pillars/Engagement Points	Relevant Outcomes	KPIs
Website	Research shows that 80% of prospective students judge an institution by its website – which is hardly surprising given that it is typically the initial point of contact and recruitment. A digital ecosystem enables a smaller and flatter, unauthenticated website, which is not only easier to customize/personalize, but also simpler and less costly to maintain.	<ul style="list-style-type: none"> • Lower bounce rate among first-time users because of streamlined navigation and high-touch experience • Fewer inbound/outbound calls and emails because of self-service content • Increased number of RMI forms and mobile applications submitted • Faster access to relevant information from any digital device
Virtual Learning Environment	In addition to providing a more robust and holistic virtual learning experience across the board, the digital ecosystem will facilitate tiered models for institutional partners (i.e. employment, business, academic), as well as deeper access to student data, information and content. Business partner organizations, in particular, will also realize cost efficiencies as they begin outsourcing a greater volume of their employee training to the ecosystem platform. For example, a university might develop customized training at no cost for its “premier” partner organizations. And by configuring the Virtual Learning Environment around both formal and informal learning, the ecosystem’s community members will have online access to an ever-evolving portfolio of	<ul style="list-style-type: none"> • Higher virtual student retention and completion rates • Additional revenue streams from expanded portfolio of lifelong learning options beyond simply “one in-one out” degree or certificate completion. • Increased volume of user-generated content resulting in lower overall cost of content production • Expanded capacity for delivering customized learning content

Pillars/Engagement Points	Relevant Outcomes	KPIs
	skills-building courses, which may be completed at any time, from anywhere.	
Personal Resource Center	A digital ecosystem will enable institutions of all types and sizes to harness and exploit best of breed technologies, rather than relying on any one single system or platform – thus affording full advantage of current emerging capabilities for optimal self-service. Likewise, they will have a more connected digital environment in which to wrap a better user experience around functioning, but fragmented systems with poor user interfaces.	<ul style="list-style-type: none"> • Increased conversion rates resulting from expanded access to essential data for lead scoring and cultivation at every stage of the enrollment funnel • Fewer inbound/outbound calls and emails because of self-service, customized content and rapid response automation • Higher enrollment, retention, completion, and net promoter score, resulting from a more streamlined, concierge model and expanded self-efficacy among students • Greater cost-efficiencies for the university and its relevant campus units
Virtual Network	Digital ecosystems serve as an important asset for creating lifetime partnerships with students and channel partners, interested in continuous learning, customized training, professional networking, research involvement, and B2B collaboration. And social interaction within a trusted authenticated community will provide institutions with a big leg up on achieving their long-tail goal (to move from a relatively small number of “hits” at the head of the demand curve and toward a much larger number of niches in the tail). Consequently, the virtual network serves as both the glue that holds the ecosystem together and the key driver for long-term revenue growth through stronger university affinity.	<ul style="list-style-type: none"> • Fewer stop-outs and drop-outs resulting from “stickier” students who are invested in lifelong access to a robust community (network) of learners • Expanded research opportunities among faculty because of greater access to potential partners and participants • Enhanced opportunities for institutional partners to engage in collaborative ventures • Higher rates of alumni participation leading to increased revenue, through donations and continuous learning
Career Hub	By facilitating ongoing and personalized access to and interaction among students, alumni, and channel partners,	<ul style="list-style-type: none"> • Expanded student/alumni opportunities for professional

Pillars/Engagement Points

Relevant Outcomes

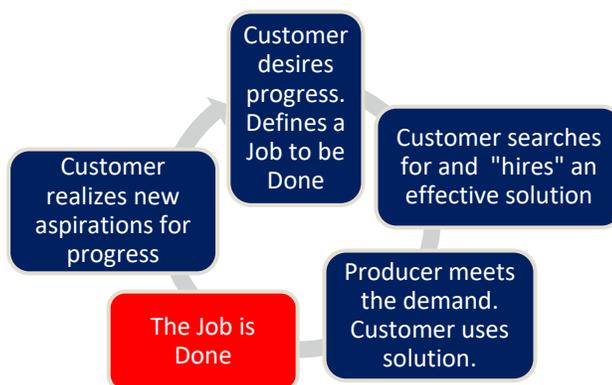
KPIs

	<p>the digital ecosystem will provide customized career development, segmented by program of study, professional discipline, and/or industry of choice. By the same token, it will furnish the institution with a market-driven perspective through which to develop and deliver an increasingly more career-focused curriculum that truly meets the needs of both an evolving workplace and an emerging workforce. What’s more, by giving their partners greater access to student/alumni information, as well as the ability to connect and collaborate with faculty and other partners, institutions will realize deeper engagement among all of its ecosystem community members.</p>	<p>networking, employment, and career advancement</p> <ul style="list-style-type: none"> • Broader and more targeted talent pool within which partners may recruit for and fill competitive, in-demand positions • Increased number of student enrollments across partner organizations, resulting from deeper engagement with the institution • Reduced travel and event sponsorship costs resulting from decreased need for onsite visits to partner organizations • Greater volume of market-driven content from perceived industry experts and leaders
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Guiding Theory Behind the Digital Ecosystem Design

As with any successful innovation – especially one of this magnitude – a digital ecosystem must be grounded in an effective theory that helps its community understand not just *what* is being built and continuously improved, but also the *how* and *why* behind it. Over the years, a group of futurists and business experts (including Harvard Business School professor Clayton Christensen) has developed a highly useful theory they call **Jobs to be Done (JTBD)**.

Put simply, this theory is based on the idea that customers (in this case, students and alumni) do not purchase products and services (education), but rather they “pull” providers (a postsecondary institution) into their lives to make progress within a defined circumstance (the job to be done). And while each “customer’s” job story is unique to his/her circumstance, there is a typical cycle through which all jobs get done:



By aligning the digital ecosystem design with high-demand “jobs,” while creating complex, proprietary systems and processes that are difficult at best to replicate, institutions may cultivate two large and relatively untapped growth markets:

- Prospective students and channel partners for whom there is no real competition for the job they need to be done, given that no other college or university can provide them with the same lifetime partnership and exceptional user experience
- Prospective students who choose to do nothing even when they have a job to be done, simply because there are too many impediments standing in the way (i.e. fear, intimidation, time constraints, lack of direction, complicated application process, unwieldy systems, etc.).

What’s more, students at every stage of the academic lifecycle will not only pay a premium price, they will continue to “hire” an education provider, as their “lifetime partner for lifelong learning” (the long-tail affect) when it can meet their functional, social, and emotional needs, while also furnishing a superlative experience and removing any impediments to their progress.

So once a customer has made the initial *Big Hire* – i.e. that first degree/certificate program – the digital ecosystem can then be deployed to support a continuous stream of *Little Hires* (customized and continuous learning options) throughout a lifetime of professional/ personal progress. And when it comes to revenue-generating *Little Hires*, those options might include: 1) continuing education units (CEUs), 2) professional certification courses, 3) stackable certificates leading to an advanced degree of the customer’s design, 4) an advanced degree/certificate, 5) modular learning content, 6) customized training programs, and 7) webinars.

Potential “Jobs to be Done”

Although there are an endless number of unique “jobs to be done,” here are few compelling examples:

The Job to be Done – Professional Credentialing: At the age of 34, Maria knows it’s time to pursue a master’s level nursing degree if she ever hopes to maximize her earning potential as a pediatric nurse. Yet with her full-time job and growing family, she doesn’t have time to attend classes on a campus – which means that to complete a degree within a realistic timeframe she will have to enroll in an online program. On the other hand, having never even taken an online course, Maria has no idea what to expect and is highly skeptical about her chances to successfully complete an online graduate program. So, she decides to sit on making any decision for the time being.

The Digital Ecosystem Solution: While searching the Internet for new research around a pediatric heart condition, Maria notices a digital ad for an online graduate nursing program and clicks the link on a whim. It takes her to a landing page that includes information about an upcoming opportunity to “test drive” the virtual learning environment, free of charge, which she promptly signs up for. After completing a few modules, Maria is convinced that she could, in fact, succeed in the online environment. So, she applies for a graduate nursing degree that seems to fit her needs and is quickly accepted. With full access to the university’s digital ecosystem, Maria has enthusiastically embraced her “lifetime partnership for lifelong learning,” having just attended her first virtual event - an invitation-only webinar, about the latest advancements in pediatric heart surgery.

The Job to be Done - Skills Update: Immediately after earning her online BS in business administration, Joelle landed an entry level job in the digital marketing field. She loves what she's doing; but has also figured out that she will need to pursue additional skills training in HTML coding and digital user experience to continue advancing in her chosen career path. Likewise, as she moves ahead, there will be other emerging competencies she must have. Joelle is more than willing to pay for this training, as long as she can do it online and at her own pace.

The Digital Ecosystem Solution: By having lifetime access to her alma mater's digital ecosystem, she can complete the online skills-building courses she must have through the *Virtual Learning Environment*, at an out-of-pocket "package rate" she can afford. By taking advantage of the ecosystem's *Career Hub*, she can also view customized, just-in-time content provided by industry experts, while interacting with like-minded professionals in the *Virtual Network*. On top of that, she receives regular alerts through the *Personal Resource Center* for new courses and relevant webinars, networking events and self-service content that meet her lifelong learning needs and professional goals.

The Job to be Done - Professional Networking and Support: After receiving his undergraduate degree in computer engineering from a public institution in his home state, Rob immediately enrolled in a private non-profit university's online graduate program in cybersecurity on the advice of a friend, who is one year into it. While he is having an exceptional learning experience, Rob would love to find a seasoned mentor, who works in the industry and can provide him with ongoing counsel around navigating a viable career path.

The Digital Ecosystem Solution: As an online graduate student, Rob now has continuous, lifetime access to his school's digital ecosystem, including its *Virtual Network* and its *Career Hub*, where he has ample opportunities to connect with industry experts and university alumni, with whom he can develop a professional mentoring relationship. What's more, as Rob gets closer to finishing his degree program, he can begin attending virtual job fairs, hosted through the *Career Hub*. And given that the cybersecurity field is constantly evolving, he will continue sharpening his competitive edge by taking advantage of such customized virtual lifelong learning options as professional certification courses, stackable credentials and industry-focused webinars, offered through the ecosystem's *Virtual Learning Environment*.

Mobilizing a Strategic Blueprint

As with any transformational project, digital ecosystem development begins with a strategic blueprint, which enables the build-out team to explore both its challenges and its opportunities; experiment with alternative options; flesh out novel ideas; and reach desired outcomes. And while there are multiple methodologies to use in mobilizing this blueprint, *design thinking* is particularly effective when it comes to digital transformation that paves the way for a steady stream of customers with plenty of jobs to be done.

According to Gartner analyst Lars Van Dam, "Design thinking is a method for deriving deep insights into customer needs and wants, making it possible to create customer experiences that disrupt incumbents or competitors." As defined, it is an iterative process, grounded in an agile, hands-on and user-centric approach to addressing complex problems and systems, which allows the team to conceptualize and test, measure and fine-tune effective solutions. And in doing so, it incorporates five steps or stages, as shown in the diagram below.

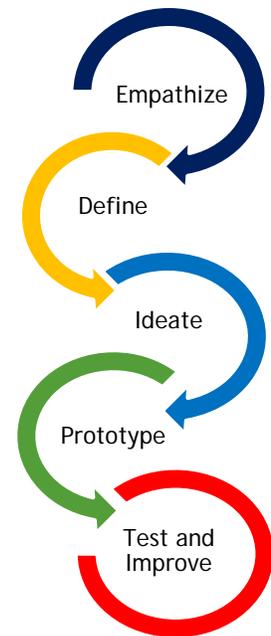
Empathize. In designing an effective ecosystem, it is critical to understand the human element – *who* it will serve, *how* they will use it and *what* they hope to gain from it. That means walking a mile in their shoes, by connecting, communicating and *empathizing* with prospective users to gain a deeper insight into their experiences and motivations, values and behaviors, needs and expectations. This information can subsequently serve as the basis for creating *use cases*, based on potential jobs to be done.

Define. The design team will then analyze, synthesize and interpret this information to reveal and *define* the key issues and challenges at hand from the users’ perspective. The goal here is to produce clear and accurate problem statements that will pave the way for designing targeted solutions.

Ideate. After defining the problem(s), it’s time to brainstorm solutions, building upon existing logic and evidence to envision inventive possibilities for digital transformation – which the team may then consider within the context of available human/financial resources and compatible technologies. Because the best solutions take root in someone’s fertile imagination, design team members should be empowered to unleash their creative juices, while also challenging assumptions.

Prototype. At this point, the team is ready to identify the most effective design by building a series of inexpensive, scaled-down models of the digital ecosystem’s various components, to use in producing a system that incorporates the very best possible solutions. Consequently, prototyping enables the design team to break a massive digital transformation project into smaller chunks that can be more easily tested among selected groups of users.

Test and Improve. Given that transformational change is a journey and design thinking, an iterative process, rigorous testing is essential for driving continuous improvement – with the goal of adding increasingly greater value to both the investment and the student experience. That said, user feedback elicited throughout the assessment phase becomes the basis for adjusting and optimizing each progressive series of prototypes.



A Few Good Examples

Although higher education in general has been extremely slow to embrace the many benefits a fully developed digital ecosystem affords, a growing number of institutions are exploring innovative ways to deploy digital technologies for the benefit of their community members.

EM Lyon Business School in France. Ranked among the top 50 business schools in the world, this forward-thinking institution has built an outstanding track record for employment outcomes (86% find jobs before graduation). That said, it continues investing heavily in career services and business partner relationships (1,600 companies), including *EMLYON FOREVER* – a trailblazing digital platform that provides its 30,000 alumni – in more than 120 countries – with career guidance and connections for life.

Having long recognized the advantages of a contextual, adaptive, role-based, and self-organizing ecosystem, EM Lyon has taken digital transformation to heart, particularly when it comes to differentiating its brand and improving its student experience. Thus, it made perfect sense to create an authenticated online community with a solid focus on professional advancement. In doing so, the school chose Hivebrite – an all-in-one platform for managing and engaging private virtual communities – which it then integrated with its existing ecosystem, including both an SSO and a two-way sync with its Customer Relationship Management software (Salesforce), to create a powerful “Virtual Network.”

As such, EM Lyon alumni worldwide can now easily connect with each other directly, to exchange content and make new contacts; post job opportunities and add external job feeds, while also receiving continuous updates from the community. Likewise, they are able to continuously revise their personal profiles, in addition to controlling how and with whom their information is shared. On top of that, the network administrator can keep a close eye on community engagement with real-time analytics about published content, profile additions/updates and user demographics.

Deakin University in Australia. While Deakin University is relatively young in higher education terms, it is quickly becoming a role model for leadership when it comes to using such cutting-edge technologies as machine learning, artificial intelligence and the Internet of Things, virtual and augmented reality. For instance, in fulfilling its mission to reimagine the student experience, this innovative university has taken artificial intelligence to exciting new heights, having partnered with IBM to create its Watson-based *Deakin Genie* – a rapid response, online student advisory service with 24/7 virtual access from any mobile device.

It all started when campus administrators began investigating digital solutions for reducing costly staff time devoted to answering a steady stream of student queries around a wide range of topics – from admissions, enrollment, and financial assistance; to course information, job skills assessment, and general academic help. So, after a thorough search to find just the right tool, they settled on IBM’s groundbreaking Watson technology and deployed a large team of staff and students to get this “Personal Resource Center” up and running. And today it offers customized virtual support *on demand* to almost 50,000 students, across a broad spectrum of academic and administrative matters – with plans to build out much-needed personalized and discipline-specific academic assistance.

Drexel University in the United States. As a large urban university in Philadelphia with five campus locations throughout the city, Drexel operates a shuttle bus service that runs among them throughout the day. To make the service experience more accessible and efficient, the university’s IT department has joined forces with Cisco Systems to create a mobile app that will enable users to track bus locations through an area network of WiFi hotspots that transmit GPS coordinates in real time. At the same time, this technology will make it possible for Drexel to better manage shuttle resources and schedules by monitoring and analyzing utilization rates and traffic patterns. Equally important, in a move to heighten public safety along shuttle routes, this network will deploy closed-circuit TV security cameras.

In a similar project, the university is working with Aruba Networks to conceptualize and eventually create a mobile application for its Academy of Natural Sciences location, designed to improve the museum experience. By outfitting the facility with beacons (small, wireless transmitters that send signals to nearby smart devices, to enable location-based searching and interaction), museum goers will then use this app to navigate their way

from exhibit to exhibit. Looking ahead, Drexel also plans to employ this technology for expanding museum access and foot traffic, by pushing out promotional alerts about special programs and events, to mobile app users within a certain proximity of the facility. By the same token, it will collect data around *how* and *when* visitors are accessing the museum, which will, in turn, enhance program and event planning efforts to maximize public attendance.

Johns Hopkins University in the United States. Given the increasingly more intense focus on post-graduation employment outcomes, Johns Hopkins University made a brilliant decision to create a virtual “Career Hub” appropriately called *Handshake* – which has met with enthusiastic approval all around. In fact, Sunil Kumar, the university’s provost and senior vice president for academic affairs, calls this development “an exciting ‘one university’ moment,” in that it affords students one-stop digital access to an abundance of employment opportunities, along with a robust resource for managing their careers.

Upon enrolling in any one of Hopkins’ many academic programs, students will have a basic professional profile loaded into the system, which can then be updated periodically to reflect individual career interests and relevant experience. So, whether looking for their first job or enhancing their career trajectory with advanced studies, they can then deploy this user-friendly digital platform to connect with career center staff and other support networks within their individual schools. Likewise, they can search for job and internship openings posted by some 50,000 “approved” employers and personalized around their professional interests and experience. *Handshake* is also the go-to resource for coordinating on-campus, career-related events, like career fairs and meetings with recruiters.

In Conclusion: Moving Forward

When it comes to digital transformation, other economic sectors and industries are already well ahead of the curve. So, as higher education begins to move forward, there is much to learn from both their success and their failure – lessons that can be used to inform institutional strategies and decisions, as the need for digital learning ecosystems becomes ever more critical to institutional growth and development. Here are just a few of the most significant.

Successful initiatives are grounded in a clearly articulated digital strategy that aligns with the institutional culture and demographic profile; IT infrastructure and regulatory environment. To be sure, the digital ecosystem model represents a holistic change in the way colleges and universities have traditionally done business. So, to avoid campus resistance and/or unintended consequences, it is important to develop a digital strategy that enhances, rather than disrupts the institutional culture – those attitudes, values and behaviors that drive an operation and influence the way its people think and act.

In fact, higher education would be well-served to take a leaf from Thomas Edison’s book. In describing Edison’s approach, Andrew Hardagon at UC Davis wrote that the great inventor *worked hard to create the future from the best pieces of the past that he could find and use...combining existing ideas in new ways to bridge old worlds and build new ones around the innovations that he saw as a result.* Take for example, a university’s deeply ingrained cultural commitment to a liberal arts education. Today’s employers actually value liberal arts graduates because they have the skills necessary to adapt in a changing workplace. So, with

Edison’s process in mind, how will the proposed digital ecosystem help the institution deliver a wide range of high-quality lifelong learning options that build upon the school’s liberal arts curriculum?

The digital strategy must also align with the institution’s demographic profile, IT infrastructure and regulatory environment. For instance, do the technologies under consideration help meet stated learning objectives, while accommodating for age, ability, cultural, and learning diversity, on any digital device? Likewise, are they ADA-compliant and relatively compatible with the existing IT infrastructure? And what will need to be in place – strategically, tactically and operationally – to ensure that every segment of the learning community is able to access and effectively use the digital ecosystem?

Digital transformation begins and ends with innovation evangelism and a solid governance model. Truth is, on most campuses major change initiatives are typically instigated and directed by senior leaders. And while it is essential that they support and indeed model change, this top-down approach to project control can also lead to campus resistance. On the other hand, the dynamic shifts when these same administrators assume the role of innovation evangelists, mobilizing and empowering a cross-section of campus community members – faculty, staff, students and alumni – to share the vision and design the change.

This team must also work with senior leadership to choose and implement a solid governance model. Although there are numerous variations on the theme, they all serve the same purpose: to define and maintain the requisite policies and processes, roles and responsibilities that control the ecosystem’s operation – from content and digital asset management, to “right-fit” technologies, teamwork dynamics and campus communication. What’s more, because these systems are fluid and multifaceted, the governance model must be designed to rapidly address changing needs, evolving technologies and emerging regulations.

Consequently, it will need to streamline or, in some cases, radically alter traditional organizational structures, operational practices and decision-making processes. For example, well-conceived digital ecosystems facilitate robust connections – clear handshakes – among people, functions and experiences. Not surprisingly then, they are wholly incompatible with the organizational silos and collection of disparate IT systems that are still very much a part of conventional campus life – a reality that must be addressed through the governance process.

It always pays to think big, start small and scale as quickly as possible. Digital transformation requires a significant investment of human and financial resources, which is becoming increasingly more difficult to make in the current higher education environment. Thus, while it is always critical to ground any such initiative in an ambitious vision for the future, smart institutions follow the mantra “first make it work, then make it scale.” That means starting out with a simple ecosystem design and helping it evolve and grow, as needs change and resources allow.

Digital ecosystems thrive when they are built to leverage dynamic partnerships. And finally, as the saying goes, “two heads (or three or four) are better than one” – especially when it comes to building a holistic digital ecosystem. There is strength in numbers and channel partner alliances bring a great deal of value to the table. In fact, such collaborations provide institutions of higher education with much-needed support around choosing “right-fit” technologies; acquiring new digital skills; and seeding continuous

business model innovation. They also pave the way for identifying and recruiting new student markets from among partner employees and customers.

By the same token, as the competition heats up in higher education, coopertition is on the rise as a viable strategy for digital transformation. Although the concept of coopertition has been slow to catch on in the world of higher education, it is, in fact, a legitimate strategy when it comes to creating and sustaining an effective digital ecosystem. To begin with, it enables colleges and universities to collaborate with rival institutions who share similar values, interests and markets in a way that furthers everyone's competitive advantage. It also offers a unique opportunity to pool precious resources; test-drive expensive new technologies; and provide a larger and more diverse portfolio of educational options.

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pioneer in technology-enhanced education for adult professionals, having launched its first fully online degree program in 1996. With approximately 26,000 students, Drexel is one of the nation's 15th largest private universities and was recently ranked 14th on U.S. News & World Report's list of "Most Innovative Schools."
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