PRESIDENTIAL INNOVATION LAB
{WHITE PAPER SERIES}

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This series of Presidential Innovation Papers is edited by Cathy A. Sandeen, vice president for education attainment and innovation at the American Council on Education.

As part of a grant from the Bill & Melinda Gates Foundation, the American Council on Education convened a group called the Presidential Innovation Laboratory (PIL).

The purpose of this effort was to examine and explore new models inspired by the disruptive potential of new educational innovations—technological, pedagogical, organizational, and structural—especially those that could increase the number of Americans able to earn a postsecondary degree, certificate, or credential.

Fourteen chief executive officers from a diverse group of colleges and universities participated in the PIL, which provided an opportunity for higher education leaders to engage in proactive thinking about the evolving dynamics of higher education and guide a national dialogue that will help colleges and universities serve students—and close persistent student attainment gaps—in the years ahead. Two-day convenings took place—one in July 2013, and one in October 2013—facilitated by the Institute for the Future, an independent, nonprofit research organization located in Palo Alto, California.

The goal was not to issue a series of recommendations, which is not really possible, the group agreed, given the vast diversity of higher education institutions in the United States. Instead, the goal was to engage in a robust and wide-ranging conversation about the various drivers of change and potential reactions to those drivers.

This series is a reflection of some of the important conversations of the group, with a focus on four somewhat overlapping areas: major drivers and signals of change in postsecondary education; business model innovation; students of the future; and the changing faculty role. We are pleased to be able to share some of this thinking with a wider audience.

This paper, *Signals and Shifts in the Postsecondary Landscape*, provides a general overview of the broad context discussions and activities that occurred within the PIL, including a summary of a design thinking exercise and some of the graphic recordings from the sessions.
The editor acknowledges and thanks Marina Gorbis, Devin Fidler, and Bettina Warburg of the Institute for the Future in Palo Alto, California for their facilitation of the PIL sessions and for their contributions toward this paper, especially their deep knowledge of emerging and innovative technology and related structures.

PRESIDENTIAL INNOVATION LAB

Signals and Shifts in the Postsecondary Landscape

A combination of drivers—the availability of digital content-delivery platforms, an abundance of data and new analytic tools, the changing landscape of work and skills requirements, intensifying international competition, financial strains, and others—are challenging many traditional models of higher education. Indeed, education seems to be experiencing disruptions very similar to those facing the fields of journalism, health care, and finance. At the same time, unconstrained by legacy assumptions and costs, new educational platforms and ventures are emerging virtually every day. Some of these ventures complement existing education structures, but many may be draining value from them. New players entering the arena of higher education are challenging established models of knowledge delivery and pathways to degrees, as well as current assessment and certification systems. Together with established institutions, they offer predictions for a potential new ecosystem of higher education.

This ecosystem holds the promise of providing previously unimaginable access to learning resources to a wider-than-ever global population. At the same time, it is challenging some of the business and pedagogical models of existing institutions. In this environment, few existing institutions have the luxury of remaining completely unchanged. All of today's colleges and universities are engaged to one degree or another in rethinking the assumptions, structures, and principles that have guided them thus far.

This paper provides an overview of the broader context of future trends in higher education, inspired by various conversations and discussions during the Presidential Innovation Lab, a convening of presidents and chancellors charged with reflecting deeply about future changes in our institutions of higher education.

The paper begins with a summary of signals of the future and the key shifts unfolding in the next 10 years that may impact higher education. It also highlights an exercise identifying parameters for potential institutions of the future. It concludes with some broad issues that should be considered by the greater education ecosystem. These are neither predictions nor recommendations; they are offered as food for thought—the context for potential future thinking and future planning.

KEY SHIFTS BASED ON FUTURE TRENDS

The Rise of Content Commons

"The commons" is a concept used to describe resources that are owned in common or shared between or among larger communities and populations. While the term still encompasses physical resources, such as the air or public land, it increasingly relates to the tidal wave of open digital materials—text, simulations, video and audio recordings, photographs, and learning tools—that are becoming available to people around the world via the Internet.

Historically, books and broadcast media were limited by production costs and the constraints of physical binding, recording, and storage technologies. Today, this constraint is quickly disappearing as shared and open content accumulates into a massive worldwide

open resource. One notable example of a free and accessible resource is the massive open online course (MOOC). We have now moved beyond discussions of how MOOCs will disrupt existing classrooms and educational institutions. MOOCs are now seen as just one piece of a much larger and growing wealth of content resources. They include a rapidly growing and open content commons (Wikipedia is just one example), highly structured and media-rich Khan Academy video modules, Massachusetts Institute of Technology (MIT) OpenCourseWare, and various other free or low-cost online courses.

Even newer resources include assistance in the form of on-demand online expertise and assistance (e.g., Mac Forums, Fluther, Instructables, and wikiHow) and mobile devices that offer access to geo-coded information in the physical world around us. In addition, new work and social spaces appear to be evolving as new learning opportunities and spaces. TechShop, meetups, hackathons, and informal community science labs are current, notable examples.

The preoccupation with MOOCs in the media and education discourse a year ago is a reminder of the old forecasting paradigm—in the early stages of technology introduction, we try to fit new technologies into existing structures in ways that have become familiar to us. Very few people today remember early TV broadcasts in which TV personalities sounded like radio announcers, or often *were* former radio announcers. In a sense, many MOOCs represented our equivalents of early TV, conceived as replacements of traditional lectures or tutorials, but in an online rather than physical classroom format. In the meantime, other forces are separating learning activities from formal, traditional institutional environments and embedding them in everyday settings and interactions, distributed across a wide set of platforms and tools. Online and mobile resources are widely available. The extent to which these innovations will intersect with higher education is still debatable. However, it is likely that this shift will affect student needs, preferences, and behavior and will encourage deeper changes in existing pedagogy, not just the transfer of existing practices to new modalities. A spectrum of open resources and emerging informal learning settings are future trends to watch.

Actionable Data Streams

The emerging world of big data and advanced analytics is likely to impact education in a number of ways. The rise of accessible digital content makes personalization far easier to implement. The creation and use of actionable data streams is central to the business models of content-driven Internet companies ranging from Amazon to Google. Digitized learning promises similar capabilities. For example, just as Amazon has worked to devise algorithms to offer personalized media and product recommendations, new learning platforms are beginning to recommend specific materials and areas of focus based on their analysis of learners' current needs and capabilities. Applications like Desire2Learn's Degree Compass program are beginning to offer the kinds of personalized approaches traditionally performed by an academic advisor but on a much larger scale. As students begin to build their course schedules each term, predictive software ranks course combinations based on how well they address graduation requirements and how well students are likely to perform across the group of courses. Eventually we may see applications akin to Match.com that may extend beyond academic coursework selection, matching learners with institutions, courses, tutors, and other materials based on their unique profiles and learning styles.

Mirroring the use of predictive analytic tools in business, some colleges and universities are beginning to use these to identify students who need help or are in danger of dropping out. Looking at variables such as the number of times students log in to their class web pages,

check syllabi, download homework assignments, and collaborate online with classmates, and whether they turn in homework assignments on time, institutions are able identify potential problems early and intervene as needed. Some of the organizations are using SAP's Predictive Analysis software for this purpose.

The use of predictive analytics does not end there. Many institutions increasingly turn to analytical software to aid in retention and even to recommend the interventions most likely to be effective in halting individual students' academic decline. Accessible data streams also enable flexible adaptation and improvements in the learning process by providing immediate feedback on an ongoing basis or tailoring content to user needs. Data can be used, for example, to identify exactly where students stopped watching a video, thereby identifying areas that need improvement.

Eye-tracking technology is beginning to be used to study exactly how students interact with textbooks, even identifying specific terms or phrases that slow a student's progress. Researchers are working on creating adaptive reading materials in which the computer recognizes if a person is having trouble understanding a particular word and changes the text in real time to provide the definition in the next sentence.

Education is a much more complex process than e-commerce, so it is likely to take some time before we achieve the holy grail of completely effective personalized and targeted learning. Nevertheless, the role of data and predictive analytics is another future trend to watch.

"Socialstructed" Work and New Work Skills

A decade ago, workers worried about jobs being outsourced overseas. Today U.S. workers have the opportunity to engage in—and be paid for—project-based work in a global marketplace. Companies such as oDesk and LiveOps can assemble teams "in the cloud" to accomplish sales, customer support, editing, research, and many other tasks. Work is becoming de-institutionalized, and people are called on to contribute to tasks based on their skills and abilities rather than solely on their degrees and certifications. The new generation of digital platforms is changing not only the nature of work itself, but also how we think about determining someone's knowledge and skill levels. These are increasingly assessed based on the individual's actual performance on specific tasks.

The era of stable long-term, full-time jobs in large companies continues its rapid demise. In its place we see the emergence of new forms of value creation. The Institute for the Future uses the term "socialstructing" to describe a new employment paradigm, defined as *a form of value creation that involves aggregating microcontributions from large networks of people utilizing social tools and technologies*. In this paradigm, employers or project sponsors can access contributions from thousands of people—or make contributions alongside thousands of people globally—aided by software and algorithmic coordination for task routing, breaking down larger tasks into smaller components, finding and assessing the best people to perform each one, and aggregating these contributions into a larger whole.

Microcontributions are a key feature of socialstructed work. Such small individual contributions can take different forms—a hundred people coming together online to solve a design problem using a crowd-sourced competition or people simply sharing some of their own health-related data collected on digital devices that they voluntarily submit as a way to contribute toward health-related research projects or the development of health interventions or devices. Similar to the effectiveness of crowd-sourced fundraising in political and

other campaigns, these new methods of deploying talent to quickly scale up to thousands of potential contributors. They also broaden the base of these contributions from unexpected places—allowing a higher degree of interdisciplinarity and global collaboration than might be achieved through more conventional work processes and structures.

Facebook, Twitter, Google, Flickr, and many other stalwarts of today's digital economy are enablers and beneficiaries of such microcontributions. The launch of Amazon's Mechanical Turk service embodies this type of work. Users can upload work and have it divided into very small tasks, to be tackled by thousands of anonymous workers. MIT and Stanford University (CA) researcher Michael Bernstein's Soylent platform takes the tools of Mechanical Turk further by using them to orchestrate dozens of anonymous contributors to effectively co-author text documents in near-real time. The next iteration of microcontributions can already be seen on sites like MobileWorks that now act like real-time global online staffing agencies, or TaskRabbit, which allows people to hire others in their neighborhood who are looking for odd jobs.

Many of the platforms focus on integrating learning for specific tasks or job categories, and some are built upon novel funding models. Duolingo, for example, provides free foreign language instruction, funding the operation by engaging learners in translating short pieces of content on the web for Duolingo clients as part of their course assignments. Elance University, a part of the Elance crowd platform, aims to train freelancers worldwide in desired skills via online course programs. For each job or task category listed on the site, Elance directs the user to many online courses and learning resources, some free and others at cost. Both Elance and oDesk also test people on various skills to certify their levels of knowledge.

Other initiatives, such as Dev Bootcamp, provide advanced skill-specific training and qualifications in a short period of time, eschewing traditional college requirements. Its online, intensive nine-week computer programming course aims to develop the essential skills within students to prepare them for work in entry-level developer positions. Admission policies are liberal, so students possess diverse backgrounds, ranging from master's degrees in computer science to fast-food workers with minimal formal education.

Socialstructing is affecting every domain of our lives, from manufacturing to writing, from business to health care, from governance to education. Within this model, people, not just institutions, more directly participate in the value they create. Individuals may support themselves by pursuing and performing a large number of smaller work projects and products they access through the evolving socialstructing networks. So far, these new initiatives are just beginning to emerge, and appear to be focused on specific projects and relatively narrow, technical job-related skills (albeit some commanding high compensation, like software programming and developing). Assuming this new socialstructing model continues to evolve, more traditional colleges and universities may find themselves rethinking the kinds of skills and knowledge they need to provide their students— both individually and collaboratively—in order to thrive in such a world. The socialstructing model may offer interesting hybrids and areas for potential collaboration. It, too, is a trend to watch.

Alternative Assessment and Credentialing

As the rise of the content commons and socialstructed work begin to take shape, credentialing approaches in the learning ecosystem may evolve as well. Traditional assumptions underlying concepts like seat time, the credit hour, and even the default presumption of a unified institutional degree program, are being questioned. For example, "How to Get a Job at Google,"

Thomas Friedman's February 2014 op-ed in *The New York Times*, highlighted a trend—at least in some technology companies—to make hiring decisions based on demonstrated skills and competencies, rather than solely on degrees and majors.

Some current platforms allow an individual to amass a "reputation score," based on work performed, somewhat similar to the array of online rankings and reviews of other products and services that are so prevalent today. Listing completion of individual MOOCs on an individual's LinkedIn and other profiles is another example of conveying specific achievements in an effort to enhance reputation.

Mozilla's Open Badges initiative seeks to credential learners at a more granular level of individual skills and accomplishments. The system is designed as a way for participants to verify their skills through a tapestry of credible organizations. The software behind the program is open source, allowing any institution to issue and verify badges on the basis of its own reputation and evaluate and verify the value of badges issued by others. Though the open badges movement began in K–12 and youth programs, some colleges and universities are experimenting with how digital credentials might integrate into their existing academic programs.

These emerging credentialing innovations reinforce and make possible a reliance on reputation at the level of the individual. Currently, the results of a Google search of a prospective employee are used to validate or augment information contained on the candidate's application or resume. As individuals' past work portfolios become more detailed as well as more readily accessible, one can envision a day when these credentials might possibly substitute for more traditional forms. While the logistics of this kind of approach would have been prohibitively difficult in the past, greater visibility makes it an ever-easier strategy to use. Assessment of skills or suitability for a particular task or job, particularly digital work, will become more varied and complex than it has been in the past. Those in the position of enrolling students and hiring others will need to take into account a wider array of credentials, certificates, badges, reputation, and other markers of suitability. As credentialing is a core function of colleges and universities, the emerging alternative credential trend will be important to track.

NEW INSTITUTIONAL MODELS FOR HIGHER EDUCATION

Taking into account the shifts described above, we explored the student perspective on this new ecosystem using a design thinking approach. *How would different types of students experience an educational offering? What might students' distinct needs be going forward?* Working with a set of student personas, we developed a list of design parameters that could inform the types of innovations that might operate in the new learning ecosystem. Personas ranged in age, academic skill and background, experience, geography, and interest areas, and, consistent with design-thinking methods, provided a human lens for mapping the changing learning landscape.

Considering the new technologies, collaborative processes, and new pedagogies disrupting the higher education ecosystem, existing and new institutions will need to adapt and alter their offerings. *What might a set of resilient institutions look like in the next decade?*

In designing these institutional models, we focused on several design parameters, including:

- Affordability
- Student learning outcomes
- Provision of multiple and adaptable pathways to learning

- Student centricity
- Portable credit availability
- Incorporation of experiential and research-based learning
- Provision of rich mentoring and tutorial experiences
- Use of feedback mechanisms to improve learning outcomes

Based on our observations and discussions, we offer brief summaries of potential types of institutions—or adaptations of institutions—of the future, taking into account many of the tensions and opportunities of the new learning landscape. Each of the institutional models was developed with the student personas in mind, and some are radically different from anything that currently exists. Again, these are not forecasts or recommendations, but they illustrate the process of thinking critically and deeply about the future. This process and some of these ideas may be useful to college and universities as they contemplate their own futures.

The Historic Liberal Arts College

While many institutions will not be able to transition to a stable offering in the new learning ecosystem, many institutions built on and embracing the pure educational experience of Plato's Academy will survive. These institutions will enhance the experience they offer through carefully evaluated, stepwise, and customized use of technology. This model is not inherently scalable, and thrives on its idiosyncratic character. The model will attract students who value the liberal arts as well as a certain prestige and status. The model can limit itself to undergraduate degree offerings, incorporating advanced learning tools and new spaces. It will require financial support through endowment growth.

The Greater Community College

The mission of the community college will expand to serve an even greater segment of its surrounding community than is currently the case. The model is student-focused and offers improved access for students to formal learning. Community colleges will provide smaller modules and boot camps to build student portfolios and achievements that meet the personal learning goals determined by each individual student. Learning will be competency based and process oriented, with multiple pathways spelled out for measured student experimentation using predictive analytics, diagnostics, and goal advisors. Students will be able to progress seamlessly to achieve additional degrees and credentials. The college will build a volunteer pipeline from within the larger geographical community, connecting retired workers from the large baby boomer cohort with students to serve as tutors and mentors.

The Entrepreneur's Institution

This represents a new model designed to attract aspiring entrepreneurs through an entirely new educational offering. Eschewing traditional tuition, this institution will take an equity stake in new ventures launched by its students and provide a screening process to evaluate business plans. Venture capital firms will invest in the university in exchange for early access to its students and their discoveries. The physical campus in this model would offer high-immersion live/work spaces, ample networking events, mentorship, and spontaneous group meetings. The institution will not offer traditional degrees, but rather portfolio-based credentialing that supports its students' career paths throughout their lives.

The Corporate and Global Learner's Institution

This model expands upon existing proprietary institutions, taking a Netflix approach to for-profit education, charging a monthly subscription fee and motivating positive learning outcomes by offering the equivalent of frequent-learner points and rewards. The model will carry a low barrier to entry for learners worldwide, and offer globally recognized validation. The experience will provide a highly supportive online platform, with flexible and individualized skill-gap training. The online experience will be supplemented with interactive gaming, to build team and interpersonal relationships, an analogue to traditional athletics and co-curricular offerings at brick-and-mortar universities. The institution will partner with corporations, state governments, and foundations to identify skills needed in the workforces and to match individual students with job opportunities that align with their competencies and interests.

KEY TAKEAWAYS

Based on discussions of key future trends and the institutional persona exercise, we identified several underlying threads to be considered as higher education innovates to meet the changing learning ecosystem:*

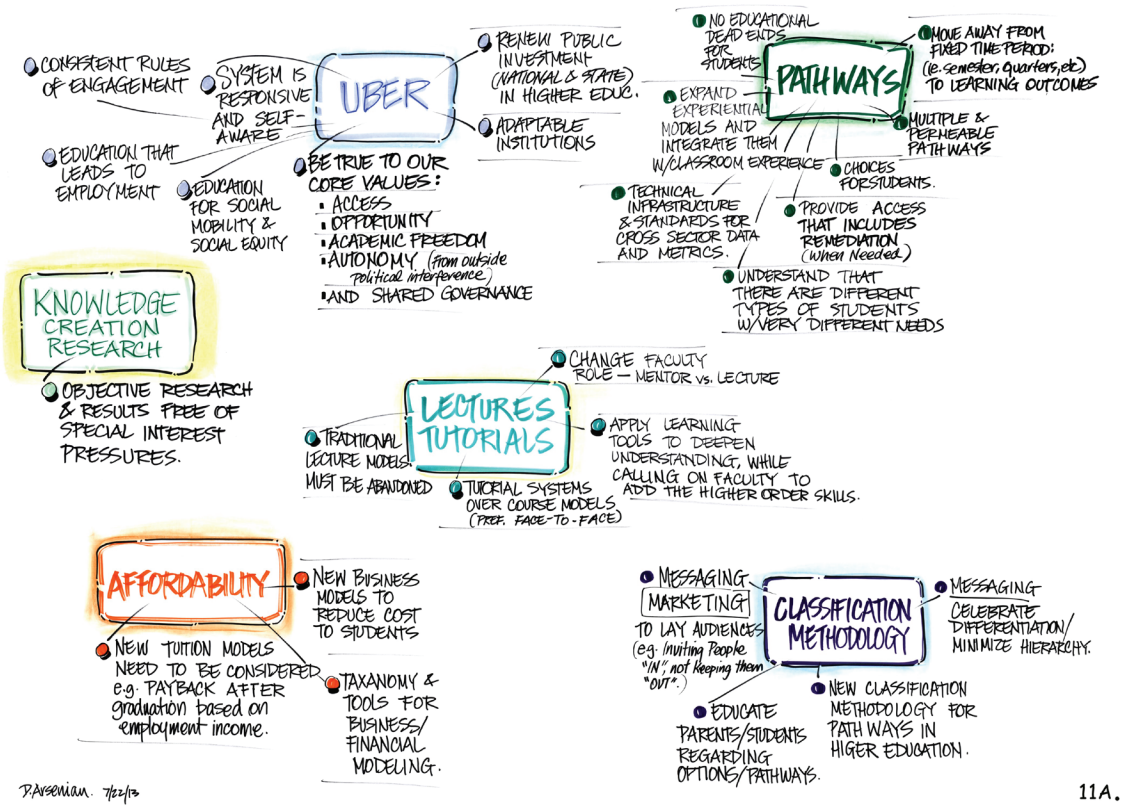
- Technology-enhanced education will be available in abundant supply and be treated as part of the standard academic environment.
- Education will link a student's life purpose and an effective pathway to his or her postsecondary education.
- Personal needs in the learner's educational journey will be addressed with appropriate support services.
- Pathways for learning will be better defined and will be identified through more robust systems than the current ranking systems.
- Analytics and simulation will become more significant in facilitating the best pathway for a learner.
- Life coaching, predictive analytics, and the human touch, combined in new and innovative ways, will play a greater role in the life of a student.

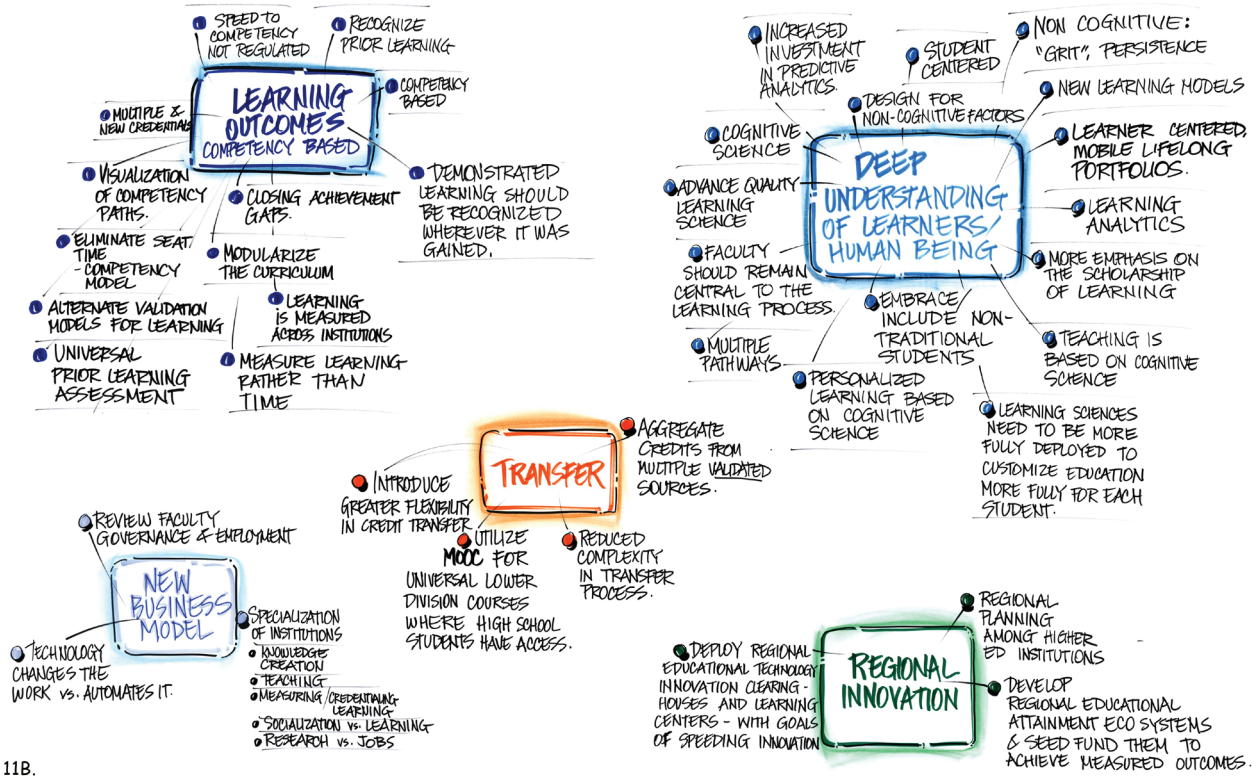
**This list is based on summarizing comments by ACE President Molly Corbett Broad, July 23, 2013.*

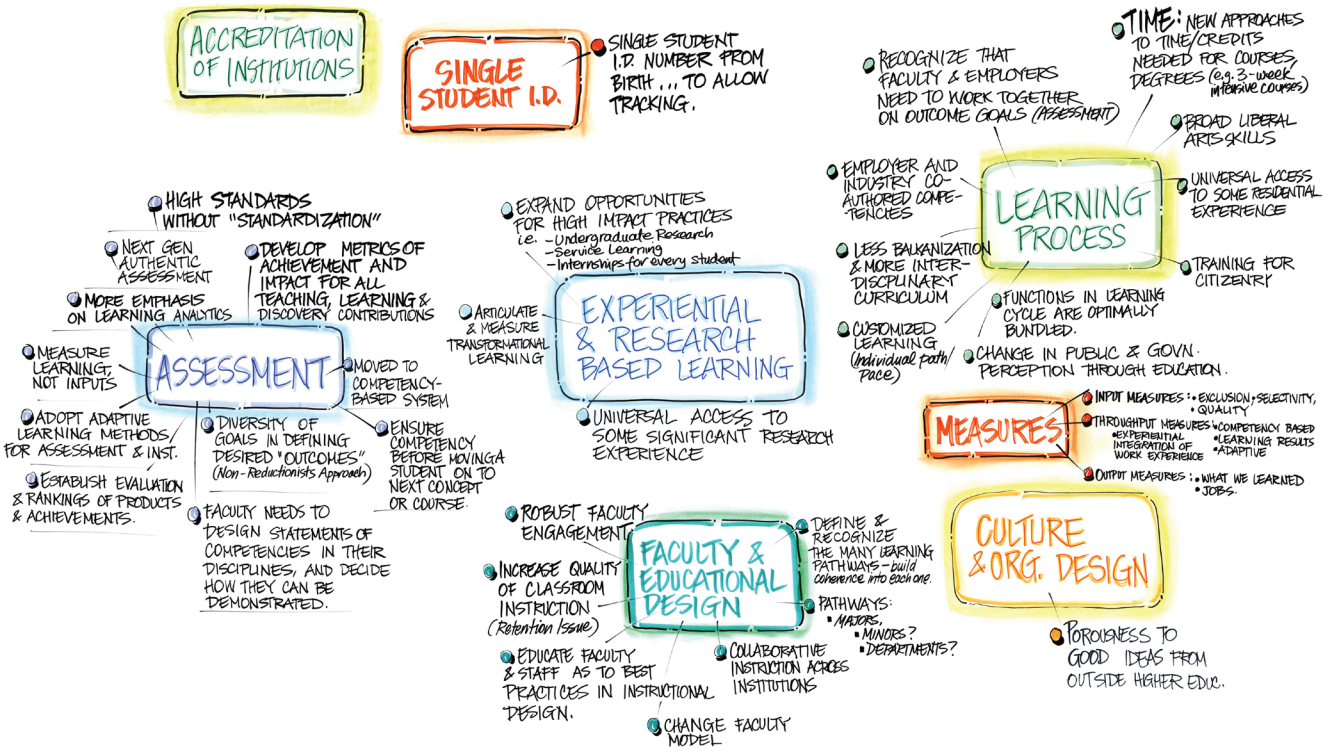
Many of these various signals, shifts, new institutional models, and key takeaways are recognizable to us while others represent significant departures from prevalent models and practices. Although there is no crystal ball to help us predict which of these innovations will take hold, colleges and universities would be well-served by monitoring and openly discussing the potential ramifications of this new higher education ecosystem—and their institution's place within it.

APPENDICES

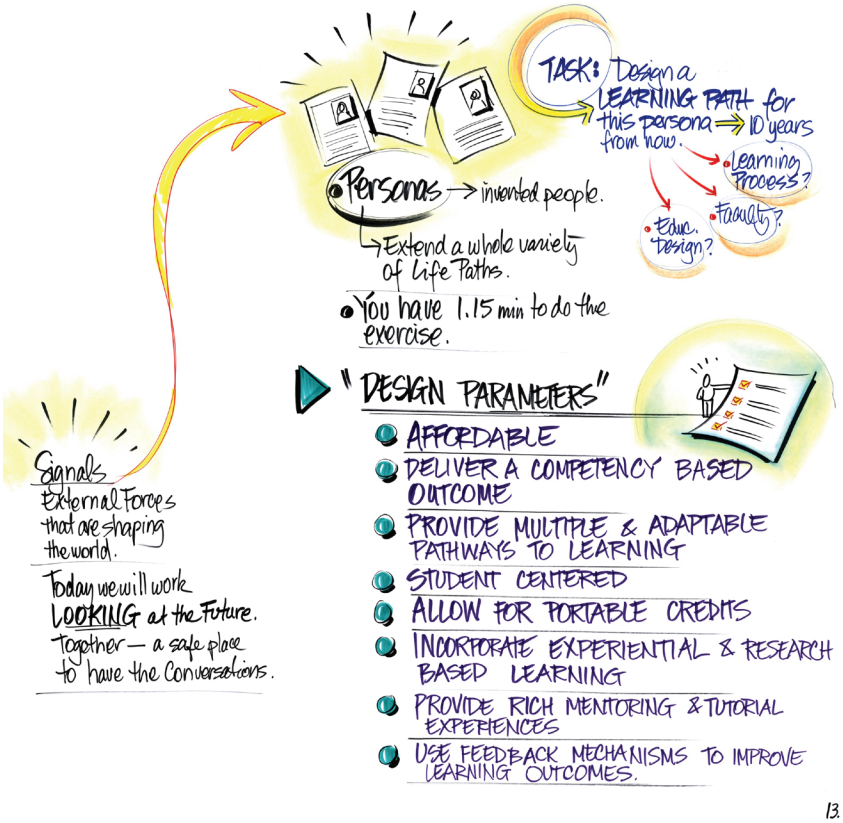
A. Relevant Clusters in the Learning Ecosystem, Graphic Recording, PIL Session July 22–23, 2013



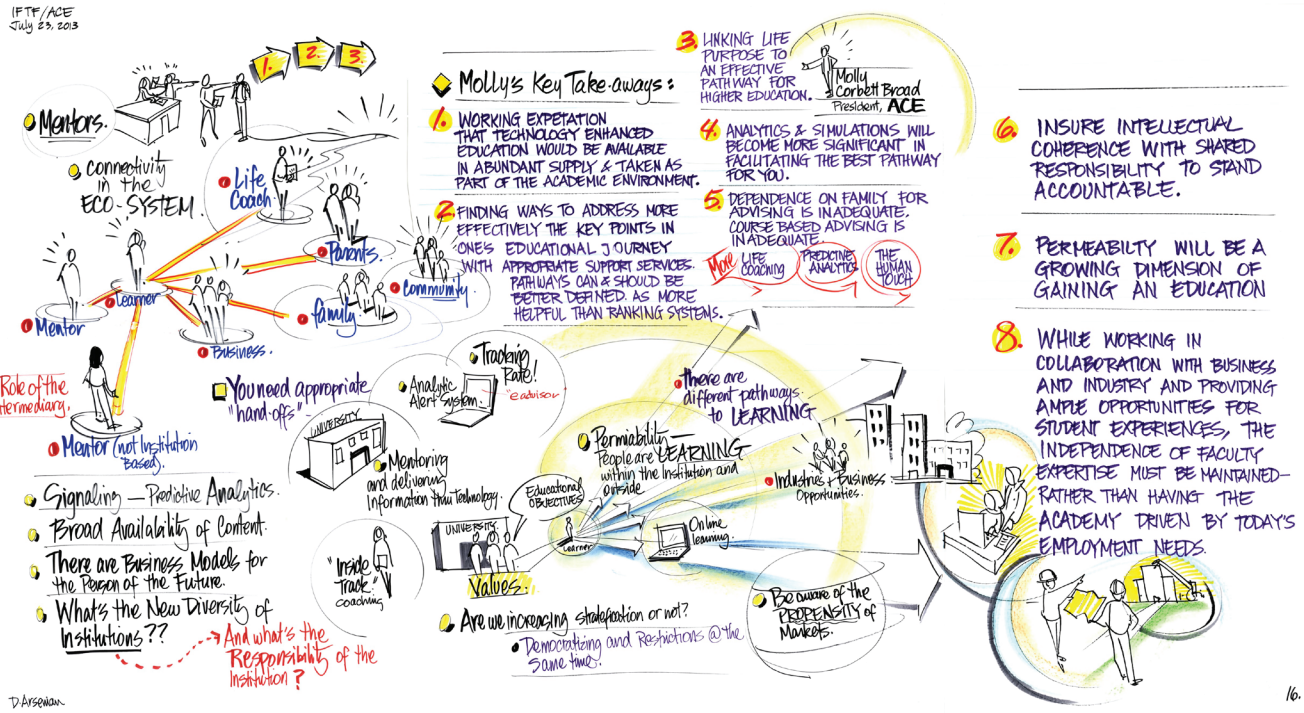




B. Educational Design Parameters, Graphic Recording, PIL Session July 22–23, 2013



C. Key Takeaways, Graphic Recording, PIL Session July 22–23, 2013



D. Empathy-based Design Exercise Template, PIL Session October 6–8, 2013

Using Empathy-based Design Thinking

Traditional Educational Institution _____

In this exercise we'll apply some of the empathy-based design thinking strategies we have discussed to explore the affordances and challenges that traditional higher educational institutions offer their students. Use this template to imagine both traditional and possible future learners at one traditional institution, and the role that higher education plays, and could play, in their life. Building from these students, think about the challenges this institution will face.

Student Who Fits Traditional Profile

- Student's name _____
- How is this school a fit with this student's life? (economic circumstances, personal goals, family dynamics)
- What is working well for this student at this school? How is it meeting their expectations?
- What is not working? How could it better connect with their learning journey?
- What does this student want to do after completing school?
- How is their education being paid for?

Possible Future Student

- Student's name _____
- How is this school a fit with this student's life? (economic circumstances, personal goals, family dynamics)
- What is working well for this student at this school? How is it meeting their expectations?
- What is not working? How could it better connect with their learning journey?
- What does this student want to do after completing school?
- How is their education being paid for?

Challenges for this Educational Institution

- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____

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