Emergent EDU: Complexity and Innovation in Higher Ed

Innovation is a loaded word on college and university campuses. As more institutions dedicate resources to change initiatives, some academics and technologists are skeptical that these efforts—often coupled with entrepreneurship and startup culture—are little more than a perpetuation of neoliberal values. Innovation, so the argument goes, is the leading edge of a corporatization of higher education.¹

This feared outcome is at odds with what many of us in academia believe is the primary purpose and value of higher education. Although we graduate students into the larger economy, we educate them not to serve it but to shape it. We serve humanity first and foremost.

This tension is not lost on the growing number of us in newly created “innovation” roles, now in place at more than two hundred colleges and universities.² We believe that strong, independent institutions create the conditions that make our value proposition possible. We are concerned with preserving the centrality of accessible higher education in a changing and challenging context, rather than promoting a transition to greater corporatization of higher education.

We face an evolving and competitive global ecosystem. The costs of higher education are outpacing incomes, leading to record student debt and causing the public to question the value of a four-year college degree.³ As the digital knowledge economy demands new forms of postsecondary education and new skills of graduates, less expensive—often online—alternatives are emerging. It is not entirely clear how traditional institutions should respond or how they might best contribute to an evolving ecosystem.

This uncertainty is inspiring institutional investments in innovation strategy. After all, the best time to enact a new vision is when change is already under way. Given the varied change pressures—from economic to demographic—now is exactly the right time to begin planning how to best leverage change in order to move higher education in new and promising directions.

Nevertheless, as we move forward, we should embrace healthy skepticism by making space for critical reflection in this work. Dismissing or resisting innovation misses an opportunity to engage with new organizational structures and ways of working that are ideally suited to this period of uncertainty and emergence.

Complexity and Change

When we talk about innovation in higher education, what we are really talking about is how to manage, or account for, uncertainty. In a thoughtful blog post on innovation and change pressures in higher education, the educator and researcher George Siemens suggests that the Cynefin framework may be the “best guidance … on how to function in our current context.”⁴ Developed by Dave Snowden and Mary Boone, this framework provides a good model for understanding and managing institutions from the perspective of complexity science.⁵

In basic terms, complex systems share many of the attributes of biological systems, in which the environment is constantly in flux and the ways forward are not clear but, rather, emerge as agents interact with their environment. Complex systems possess a degree of unpredictability that isn't evident in complicated (but predictably ordered) systems. The difference between complicated and complex systems is the difference between how engines are designed and built (top-down, ordered) and how ant colonies organize and function (bottom-up, emergent).

Complex systems share characteristics that shed light on how organizations can be designed optimally for emergence. In an excellent primer on the theoretical framework of complexity, M. Mitchell Waldrop distinguishes complex systems from ordered, complicated systems:

- Complex systems are composed of a network of self-organizing agents “interacting with each other in a great many ways.”
- These interactions enable a system to undergo “spontaneous self-organization” within flexible constraints.
- These complex, self-organizing systems are adaptive, with “the ability to bring order and chaos into a special kind of balance.”⁶

The argument when applied to higher education is that the system itself now rests in this “domain of emergence.” This isn’t a completely new context simply because we are in a period of tremendous change; higher education has always existed in the complex domain because it is a human system rather than a mechanical one. Human systems are constantly adapting to social, biological, and environmental factors. Managing them requires an ecological approach. Machines can be engineered. Institutions cannot.

New Ways of Working

Understanding the concept and logic of complexity is an important competency for leading higher education innovation. The frameworks and organizational structures that we design will serve us best if they are aligned appropriately to the system, culture, and context. In the complex domain, future states are not always known in advance. The future is an emergent property of how various agents within an ecosystem interact. We can describe
Successful future states, but we cannot predict the path forward. We need ways to experiment with ideas that come from anywhere and move us closer to certainty.

Entrepreneurs also struggle with uncertainty in product design, with many adopting Eric Ries’s Lean Startup methodology in response. Ries defines a startup as a “human institution designed to create a new product or service under conditions of extreme uncertainty.” In this way, the Lean Startup principles of “build-measure-learn” align with the concept of emergence in complexity theory. When we cannot predict the future, we can employ a scientific approach by breaking down ideas into a set of hypotheses called “leap-of-faith assumptions” or “what needs to be true in order for this to be a good idea.” We can then test these assumptions quickly by deploying a minimal (but viable) design, putting that design into action, and validating the impact.

For example at my institution, Davidson College, four faculty members developed a hypothesis about the habits of our most successful students. They wanted to explore whether a redesigned first-year experience might foster inclusivity by helping more of our students adopt these habits early. Instead of spending multiple years researching and designing a “perfect” solution with a large, permanent financial commitment, we researched a minimal design and piloted it with a representative cohort in the fall semester of 2017. This build-measure-learn approach allows us to understand earlier which of our assumptions are true while making smaller investments of time and money.

The more we understand what works, the closer we move to certainty. Greater certainty leads to better decision-making and to the higher degree of cultural coherence necessary to manage through change. In general, higher education institutions have sound and rigorous processes for known, incremental, and precedent-setting change. What they lack is a valued parallel process for true bottom-up experimentation when the outcomes are unknown.

**Designing Innovation for Higher Education**

By adapting a variation on the build-measure-learn model of innovation, colleges and universities can generate and explore ideas faster and can develop a portfolio of options to exercise in the future. However, adopting the principles from startups returns us to the criticisms of innovation and the lack of trust in a process that looks like a corporatization of higher education. In higher education we need our own designs for managing innovation, and we need those designs to develop from within.

Following in the footsteps of institutions such as Northeastern University and Arizona State University, Davidson College launched a pilot framework of our own making in March 2018. The work started with an assessment of our internal capacity for innovation, followed by a framework-design process that brought together thirty faculty, administrators, staff, and students to address three key questions:

- What are the right focus areas for innovation?
- What are the critical criteria that must be considered to evaluate ideas?
- How should Davidson define and categorize innovation?

The result was an inclusive and customized innovation framework that aligns to our aspirations and provides a valued parallel process for experimentation.

At the same time, I joined a few of my colleagues in newly created “innovation” roles who thought we might advance this work faster as a network. We launched a grassroots convening at the University of Michigan to further explore the idea. The result was HAIL (Harvesting Academic Innovation for Learners), a network of higher education leaders committed to experimentation for transformational change as a response to the uncertainty in the broader education ecosystem. We are optimistic that higher education can address external disruption by advancing institution-led innovation. Meeting twice annually on our respective campuses, we seek to develop a discipline for innovation that aligns to our values. We have a goal to produce resources around the most pressing opportunities and challenges facing innovation leaders within higher education—opportunities and challenges such as new business models, innovation frameworks, culture change, the move from pilot to scale, innovation accounting, and more.

The traditional structures and ways of working in higher education run the risk of falling too far behind the pace of change. If we want our institutions to be the center of accessible education, then the most important next steps for higher education may be to rethink organizational structures and establish innovation teams. Guided by the principles of complexity science and working collectively, CIOs, provosts, directors of academic innovation, and others tapped to lead innovation can and should develop the frameworks that both speak to academic values and help us all adapt to a changing context.

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**Notes**


**Kristen Eshleman** (kreshleman@davidson.edu) is Director of Digital Innovation at Davidson College.

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