As the chief digital officer for McGraw-Hill Education, I have hardly a minute in my day when I’m not thinking about educational technology (edtech). Often, that means I’m focused on solving a particular problem or making incremental progress on a project. But I also spend a good deal of time reflecting on the bigger picture: the true human impact that edtech can have, the progress that our industry has made in the past decade, and the work that we still have ahead of us.

Tearing Down Walls to Deliver on the Promise of Edtech

Stephen Laster
I've worked in the higher education technology space since the early 2000s—first as the head of Curriculum and Technology Innovation for Babson College and then as the chief information officer for Harvard Business School before joining McGraw-Hill Education. As I've watched the sector evolve and mature, I've been struck both by how transformative edtech has been in higher education and by how much room we still have for improvement. If I were to give the edtech industry a grade—channeling the former software-design instructor in me—I would give us a solid “B.”

So how can we bump our performance up to an “A” quality? What does the ideal future of postsecondary edtech entail? On a practical level, some of the best insights and guidelines come from forward-looking research projects such as the EDUCAUSE next generation digital learning environment (NGDLE) framework. But before we discuss those specific insights and guidelines, it’s worth quickly exploring one of the “bigger picture” concepts that I mentioned earlier: the true purpose and human impact of edtech.

**The Fundamental Promise of Edtech**

In 1984, Benjamin Bloom published a seminal piece of learning science research called “The 2 Sigma Problem.”1 The research explored the effects of three different instructional environments on students’ ability to learn: a conventional classroom environment; a “mastery learning” environment, where students received personalized feedback and support based on formative assessments; and a tutor-supported mastery learning environment. The results definitively demonstrated that students in a mastery learning environment significantly outperform those in conventional environments and that those with tutorial support perform even better.

These findings might sound obvious today—and indeed, they now inform how virtually every modern classroom and learning solution is structured, especially as technology has allowed us to improve personalization for every student. But it’s vital to understand just how groundbreaking this research was at the time—and how truly invaluable the latest learning research continues to be today.

Too often when we talk about edtech we focus on the “tech.” The only way that edtech can truly be impactful is if it’s focused on solving real, concrete educational challenges, identified through research. Great edtech should fade into the background, solving problems and supporting authentic learning and teaching experiences without ever drawing attention to itself.

But that kind of great edtech can’t be created in a vacuum. It needs to be developed collaboratively, in an open environment involving researchers, course designers, faculty, and technologists from across the sector, each contributing his or her expertise toward a common cause: developing solutions that seamlessly, effectively, and efficiently achieve research-based goals.

So what are the most pressing research-based goals for higher education today? What should the next generation of higher education digital learning environments look like?

**A Shared Worldview**

EDUCAUSE provided a powerful framework for rethinking what digital learning environments should look like in its April 2015 ELI white paper on the NGDLE. Malcolm Brown, Joanne Dehoney, and Nancy Millichap wrote: “Higher education is moving away from its traditional emphasis on the instructor [and] replacing it with a focus on learning and the learner. Higher education is also moving away from a standard form factor for the course, experimenting with a variety of course models. These developments pose a dilemma for any [learning management system] whose design is still informed by instructor-centric, one-size-fits-all assumptions about teaching and learning.”

If higher education is changing, the technology that supports it needs to change as well. The technology systems that colleges and universities have used for the last two decades need to be “supplemented (and perhaps later replaced) by a new digital architecture and components for learning that contribute to and enable the transitions that higher education is currently experiencing.”

Here’s how the white paper describes an NGDLE ecosystem:

- **The implementation will be a confederation of IT systems**, including content repositories, analytics engines, and a wide variety of applications and digital services.
- **The NGDLE ecosystems will be full adherence to standards for interoperability**. As well as for data and content exchange.
- **The NGDLE ecosystems will need to support personalized learning experiences** at all levels of the institution. The NGDLE will not be exactly the
same for any two learners, instructors, or institutions.

- For users, it will be a cloud-like space to aggregate and connect content and functionality, similar to a smartphone, where users fashion their environments directly with self-selected apps.
- If the paradigm for the NGDLE is a digital confederation of components, the model for the NGDLE architecture may be the mash-up. A mash-up is a web page or application that “uses content from more than one source to create a single new service displayed in a single graphical interface.” Hence it uses a heterogeneity of components to produce a homogeneity of function. The confederation-based NGDLE will be mashed up at both the individual and the institutional levels, as opposed to consortia forming to create open enterprise applications.

The overarching theme? Everything must be open. If the promise of and the investment in edtech are truly going to transform outcomes in this new higher education world, they have to be delivered in a seamless, open ecosystem that prioritizes flexibility over structure and in which institutions have the freedom to construct learning environments that are central to their mission.

**From Framework to Fulfillment**

Whereas the NGDLE framework gives us our template, we’ll need industry-wide interoperability standards—and a robust implementation of those standards—to realize the full impact of open.

While integration might seem to be the concern of IT departments, in truth it has serious implications for teaching and learning. Technologies that live within closed systems create roadblocks for students and instructors as edtech is used to accelerate learner success and faculty efficiency. The free flow of identity, rostering, and learning data, harnessed in service of confident learners and caring faculty, is what allows technology to move us along Bloom’s journey toward mastery learning.

Without commitment to standards, there can be no unified ecosystem, no flexibility for institutions, and no realization of the principles outlined by the NGDLE framework. The simple yet challenging solution is to support technology standards set forth by organizations such as the IMS Global Learning Consortium (https://www.imsglobal.org/) and to support edtech providers who authentically implement the standards. Building digital content and learning technology around open standards ensures that educators and students can determine what is most effective without worrying about whether different technologies will work together.

The true accelerator toward the NGDLE’s world of choice is the virtuous cycle of institutions and faculty demanding the implementation of standards in their procurements of edtech and the commitment of edtech vendors doing their best work to make standards-based integration a core capability of their offerings. The good news is that we’re starting to see this in action. Institutions like Arizona State University and Georgia Tech are embracing learning solutions that bring several providers together, each offering its best contributions and all working together through seamless integrations. In these programs, the costs of course design and delivery have gone down as the quality of teaching and learning has gone up.

As I view it, we in higher education stand at a profound moment of choice. We have a framework, we have standards, and we have the need to greatly enhance the impact of edtech on learning outcomes. Now the choice before all of us in the community is to decide which path to take. Will we simply acknowledge the NGDLE as a helpful framework and go about our business as usual? Or will we embrace it in its entirety and support it with a robust implementation of interoperability standards?

**Moving Forward**

As I consider what I can personally do, and what we can all do, to accelerate down the NGDLE path, a few concrete steps occur to me. In the spirit of iteration, they primarily involve small, community-centric actions:

- In procurements, include an adherence to open standards as a requirement.
- Rather than building software connectors designed to support only a particular campus or product, contribute software connectors (and shims) to the community, enabling legacy systems to talk to open systems.
- For standards that could be improved, get involved and shape their implementation.
- Take the time to document successes in creating an NGDLE, and share the documentation with the higher education community.

The full implementation of the NGDLE framework is hardly the easier path, but I’m confident that taking it—and taking it decisively—will make all the difference. Doing so not only will allow us to cement the powerful role that technology can play in solving our efficiency and effectiveness issues but also will enable us to achieve an immensely positive impact on education at large.

**Notes**


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