■ John Baker

Updating

the Next Generation Digital Learning Environment for Better Student Learning Outcomes

By now we're all far too familiar with the new realities of higher education. Educators everywhere are facing tight budgets, experiencing greater competition, and trying to accommodate increased demands for accountability. To top it off, learners themselves are demanding better learning experiences and environments. This is the new normal—and part of the day-to-day lives of postsecondary educators.

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Serving this changing population—under these demanding conditions—is challenging for teachers, administrators, and institutions. As educators look for ways to resolve these complex problems, many are turning to education technology (edtech) as one possible solution.

I say this as someone who owns an edtech company: a learning management system (LMS) is never the solution to every problem in education. Edtech is just one part of the whole learning ecosystem and student experience. However, it is an increasingly critical part of the landscape.

Therefore, the next generation digital learning environment (NGDLE), as envisioned by EDUCAUSE in 2015,[1] serves an important purpose: to keep us talking about and better defining our "True North." The NGDLE points us toward the vision and the direction we're all hoping to realize: the improvement of our society through education.

Looking at the NGDLE requirements from an LMS perspective, I view the NGDLE as being about five areas: interoperability; personalization; analytics, advising, and learning assessment; collaboration; accessibility and universal design.

Interoperability
- Content can easily be exchanged between systems.
- Users are able to leverage the tools they love, including discipline-specific apps.
- Learning data is available to trusted systems and people who need it.
- The learning environment is "future proof" so that it can adapt and extend as the ecosystem evolves.

Personalization
- The learning environment reflects individual preferences.
- Departments, divisions, and institutions can be autonomous.
- Instructors teach the way they want and are not constrained by the software design.
- There are clear, individual learning paths.

- Students have choice in activity, expression, and engagement.

Analytics, Advising, and Learning Assessment
- Learning analytics helps to identify at-risk students, course progress, and adaptive learning pathways.
- The learning environment enables integrated planning and assessment of student performance.
- More data is made available, with greater context around the data.
- The learning environment supports platform and data standards.

Collaboration
- Individual spaces persist after courses and after graduation.
- Learners are encouraged as creators and consumers.
- Courses include public and private spaces.

Accessibility and Universal Design
- Accessibility is part of the design of the learning experience.
- The learning environment enables adaptive learning and supports different types of materials.
- Learning design includes measurement rubrics and quality control.

While this is all very exciting and captures most of what will be necessary in a vision for moving education forward, I feel the NGDLE framework is still missing a few key elements.

From Lego to Central Nervous System

The core analogy used in the NGDLE paper is that each component of the learning environment is a Lego brick:

- The days of the LMS as a "walled garden" app that does everything is over.
- Today many kinds of amazing learning and collaboration tools (Lego bricks) should be accessible to educators.
- We have standards that let these tools (including an LMS) talk to each other. That is, all bricks share some properties that let them fit together.
- Students and teachers sign in once to this "ecosystem of bricks."
- The bricks share results and data.
- These bricks fit together; they can be interchanged and swapped at will, with confidence that the learning experience will continue uninterrupted.

While the Lego approach would be an amazing technical feat, the issues that stop most instructors from using even the intermediate capabilities of the "one-size-fits-all" LMS would be magnified with such a system. It's hard to imagine instructors both constructing a new mash-up environment and crafting improved learning activities. Any "next-gen" attempt to completely rework the pedagogical model *and* introduce a "mash-up of whatever" to fulfil this model would fall victim to the same criticisms levied at the LMS today: there is too little time and training to expect faculty to figure out the nuances of implementation on their own.

To find a more appropriate analogy, let's back up to some arguable requirements for a next-gen student experience. Because to paraphrase the NGDLE paper, learning isn't simple

or complicated—it's complex. And this complexity is the reason the creators of systems like the LMS—not the instructor—need to intelligently orchestrate all these different "bricks" to serve the student. We cannot leave it to instructors to be LMS, content, and pedagogical experts. We need to give them a ready-made, but flexible, system.

The Lego metaphor works only if we're talking about "old school" Lego design—bricks of two, three, and four-post pieces that neatly fit together. Modern edtech is a lot more like the modern Lego. There are wheels and rocket launchers and belts and all kinds of amazing pieces that work well with each other, but *only* when they are configured properly. A user cannot simply stick together different pieces and assume they will work harmoniously in creating an environment through which each student can be successful.

An additional analogy can better describe the NGDLE: the LMS needs to be a *central nervous system* that connects the components (the bricks) in a unified learning ecosystem. And the NGDLE nervous system needs to understand, at a minimum, the learning outcomes, the learner assessment, the learner record, and how to launch the right learning moments.

What's Possible?

Once we have an LMS that understands learning, it could help instructors construct advanced learning pathways that connect the bricks to support improved learning experiences and outcomes. Just as in our personal lives we need a core system that is a flexible way to get things done and intelligently coordinate all our activities, the hub coordinates different systems, which talk to each other.

To accomplish these improved learning outcomes, we need to purposefully design learning experiences that are personalized to a student and are highly engaging—and the most natural place for this to occur is in the LMS. People will not, and cannot, do this alone. Technology is needed to make it feasible to do this at scale. As the NGDLE paper states:

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"Despite the high percentages of LMS adoption, relatively few instructors use its more advanced features—just 41% of faculty surveyed report using the LMS 'to promote interaction outside the classroom.'"

Viewed from a workflow coding perspective, it would go something like this:

- IF [Student chooses "Project Option" as assignment1] THEN [Release assignment folder, and project instructions, schedule project draft review meeting]
- IF [Student hasn't read content1 by Wednesday] THEN [Send reminder to student with links to content1]

Or more generally, the LMS would connect the Lego bricks, similar to how the workflow engine would draw its recipes:

IF

THEN
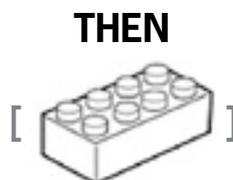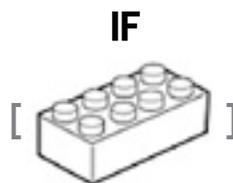
These examples are very basic; what's important is that they are practical. Having an LMS working as a central nervous system in this manner encourages practices like mastery-based feedback, timely and personalized communication, student choice in expression and activity, authentic assessment, and self-regulation.

The process of articulating, supporting, nurturing, demonstrating, and evaluating learning outcomes is, of course, far more complex than a series of simple "If/Then" statements. But this is what the next generation LMS is good at: being a central nervous system—or learning hub—through which a variety of learning activities and tools are used. This is also where the LMS needs to go: bringing together and making sense of all the amazing innovations happening around it. This is much harder to do, perhaps even impossible, if all the pieces involved are just bricks without anything to orchestrate them or to weave them together into a meaningful, personal experience for achieving well-defined learning outcomes.

We Have to Get "IT-Less"

I travel the world talking to educators, data scientists, administrators—and everyone in between. Everywhere I go, I hear the same thing: "If new tools didn't require so much IT time, data exports, and integration, we might actually have some time to help our faculty design an amazing student learning experience. But it's so complicated!"

Our contribution toward the NGDLE vision is a next generation learning system designed to create great learning experiences that improve learning outcomes. It will let faculty and students use the tools they love.

I think it's up to the edtech community, particularly LMS vendors, to give IT and instructional support staff more time. They can do so by being better partners:

■ Making a commitment to build easy, flexible, and smart technology
■ Working with colleges and universities to remove barriers to adopting new tools in the ecosystem
■ Standardizing the vetting of accessibility compliance (the Strategic Nonvisual Access Partner Program from the National Federation of the Blind is a great start)
■ Advancing standards for data exchange while protecting individual privacy
■ Building integrated components that work with the institutions using them—learning quickly about what is and is not working well and applying those lessons to the next generation of interoperability standards
■ Letting people use the tools they love and providing more ways for nontechnical individuals (including students) to easily integrate new features into learning activities

Many of these recommendations have to do with how a vendor builds a relationship with customers, though others rely on the community of vendors organizing around standards and breaking down accessibility barriers.

Open standards have a long way to go before they can become the frame for the NGDLE vision, but they're getting closer every day. I have seen amazing work being done to further the vision of the NGDLE in the last two years. Two examples are the IMS Global Learning Consortium's Learning Tools Interoperability (LTI) Content-Item Message and Caliper, both of which are starting to show their promise. They are critical to allowing us to move beyond a simple integration of apps and leaving the data behind, to the ability to launch a third-party tool and get the data, context, and results back. The ability to easily record and analyze the learner record and activities is very valuable from an instructional perspective.

Even with these pieces in place, we still need to think about the experience for the student. Consistency as the learner moves between apps and services must be preserved. But that's all very technical edtech work. The real excitement of the NGDLE is found in rethinking the experience through the lens of what humans need rather than what technology can do.

Humanizing the NGDLE: Universal Design for Learning

One of the key lessons I've learned in building edtech is that real results require three ingredients to be transformational: technology, pedagogy, and system change (see figure 1).

Technologists are often very focused on the technology, but the reality is that the more deeply and closely we understand the pedagogy and the people in the institutions—students, faculty, instructional support staff, administrators—the better suited we are to actually making the tech work for them.

Figure 1. Ingredients for Transformation

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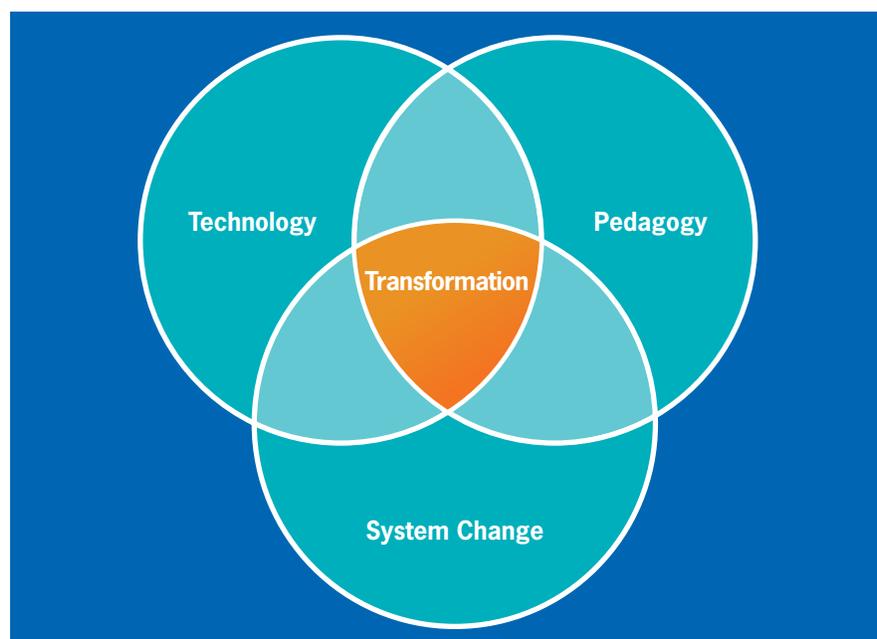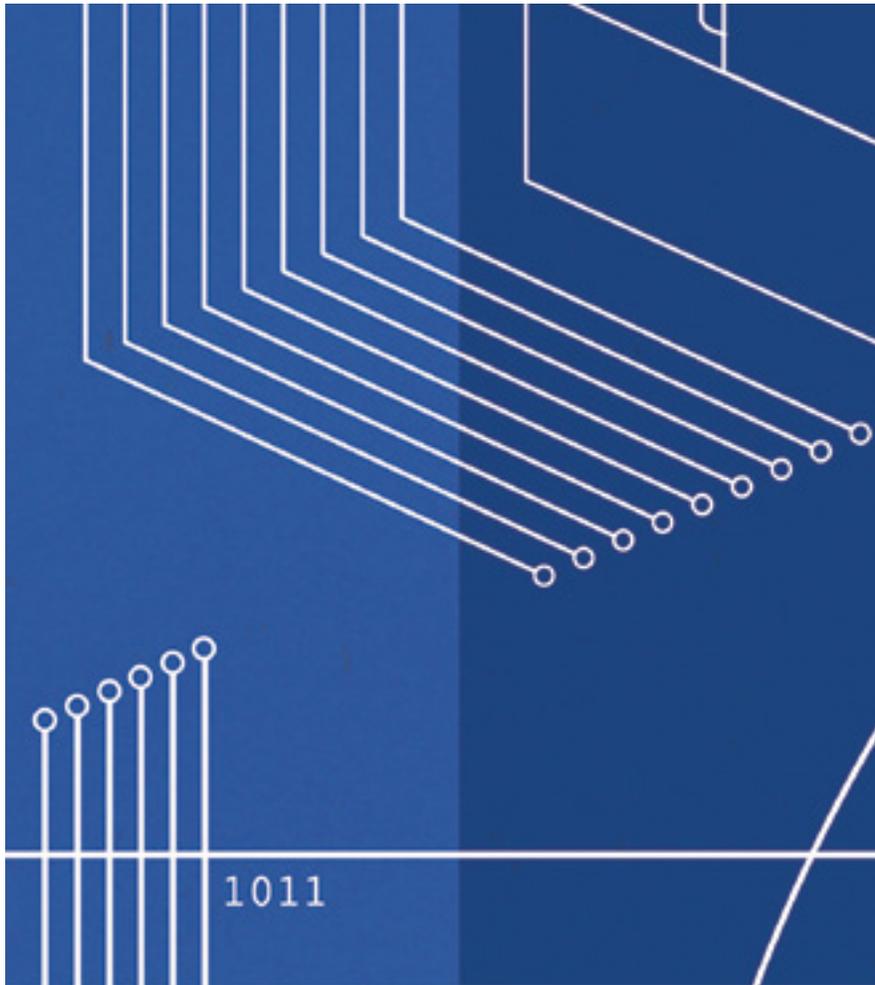
When designing products, most software companies today take a human-centered approach, with empathy for the user being central to developing design goals. With this in mind, the question of "what will the next generation learning management system look like?" may be the wrong question. We need to ask other questions as well. For example: "How will this next generation learning management system improve learning outcomes for all students?" Critical to this question is the use of "students," plural. There is not one mythical "average" student. Each student is different, unique, and capable of succeeding when given the right chance.

I applaud the discussion in the NGDLE paper about Universal Design for Learning (UDL). This is a model that encourages us to design learning environments, content, and services that systematically remove the barriers to success for our students. It seeks to provide multiple ways for students to consume information, to express ideas, and to engage. It is how we purposefully design a learning experience to reach every learner—something we should all be striving to achieve.

The impact of the NGDLE paper is huge. I've personally seen it impact the development of next generation learning models, such as the Macy Foundation paper on the future of the Health Professional Education. The NGDLE framework is now a regular part of conversations with executives at various universities and colleges, and I've seen it used as the measure of fit in several LMS selections. More and more, institutions are turning to partners to help them transform and realize their vision for student achievement through technology.

As the president and chief executive officer of an edtech company known for its LMS, I believe that our contribution toward the NGDLE vision is a next generation learning system designed to create great learning experiences that improve learning outcomes. This learning system will understand learning outcomes, learner assessment, the learner record, and how to launch the right learning moments for each student. It will be based on UDL, with flexibility and actionable data embedded in its core workflows. It will support standards and interoperability. It will let faculty and students use the tools they love. This is an exciting path forward in achieving the NGDLE vision in a way that can be practically applied by today's instructors and used for the benefit of all learners.

Finally, we all need to continue to focus on building learning experiences that deliver real results: improving adoption, strengthening learning outcomes, increasing retention, lifting engagement, enhancing learner satisfaction, and making our time more productive. ∎

Note
1. Malcolm Brown, Joanne Dehoney, and Nancy Millichap, *The Next Generation Digital Learning Environment: A Report on Research,* an EDUCAUSE Learning Initiative (ELI) white paper (April 2015).

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