

DRIVING
K-12
INNOVATION

Accelerators
2019

Driving K–12 Innovation is an initiative of CoSN (Consortium for School Networking). This initiative addresses a key challenge for educational technology leaders: making smart, strategic decisions to transform learning experiences and environments and preparing students to thrive in a digital world.

Technology is a vital aspect of this endeavor, but the challenge transcends technology. Equally important is the impact of megatrends—major shifts in the status quo that redefine the future and accelerate the pace of change. Megatrends can be double-edged swords: They can test organizational and human capacity to enact innovative strategies, and they can inspire entrepreneurial mindsets and game-changing technologies that propel innovation.

The Driving K–12 Innovation annual series of publications explores Hurdles, Accelerators and Tech Enablers to creating a systemic, digital ecosystem—

where individual learners can fully realize their potential in engaging, personalized and connected learning environments. CoSN commissioned an international Advisory Board of more than 100 distinguished educational technology experts to identify, rank and elaborate on hurdles, accelerators and tech enablers. A culminating toolkit each year will provide practical guidance to help educators navigate in changing times.

This second report in the series focuses on Accelerators. The first report, [*Driving K–12 Innovation / 2019 Hurdles*](#), was released in January 2019.



HURDLES

Hurdles are more than pesky obstacles. They are significant organizational and human capacity challenges that force educators to slow down, prepare themselves and—with sufficient practice, knowhow and tools—make the leap to innovation.



ACCELERATORS

Accelerators are megatrends that drive the needs and skills expected of students and educators. Some disruptive shifts are moving rapidly (even suddenly), while others are happening so gradually that their effects may not be felt for years.



TECH ENABLERS

Tech enablers are supporting tools that smooth the way to more expansive opportunities and solutions in education.

Learners
as
Creators*

Data-Driven
Practices

Personalization*

Design
Thinking

Building
the
Capacity of
Human
Leaders



Top 5

ACCELERATORS

- 1** The idea that students don't have to wait to graduate to change the world is motivating schools to embrace real-world learning experiences that promote student-generated ideas and solutions.
- 2** Schools are increasingly leveraging data about the student experience, measuring engagement and skills acquisition to inform decisions about curriculum, hiring, technology investments and more.
- 3** Just as the consumer sector has exploded with new ways to customize user experiences, products and recommendations, schools are finding ways to provide individualized learning pathways and promote student voice, choice and autonomy.
- 4** Design thinking is a strategy for creatively exploring and ultimately formulating solutions to challenges based on empathy and iterative processes.
- 5** When leaders take actions to strengthen the professional community of their schools, providing and incentivizing opportunities for leaders and educators to learn and master new skills, it opens the door to innovative practices and approaches that can further student engagement.

CoSN's popular EdTechNext reports align with the reports in the *Driving K-12 Innovation* series. Developed by CoSN's Emerging Technologies Committee, member-only *EdTechNext* reports provide deeper coverage of a top five hurdle, accelerator or tech enabler, including emerging technologies, best practices, guidance and tips for district and educational technology leaders.

* Featured in this *Driving K-12 Innovation / 2019 Accelerators* report

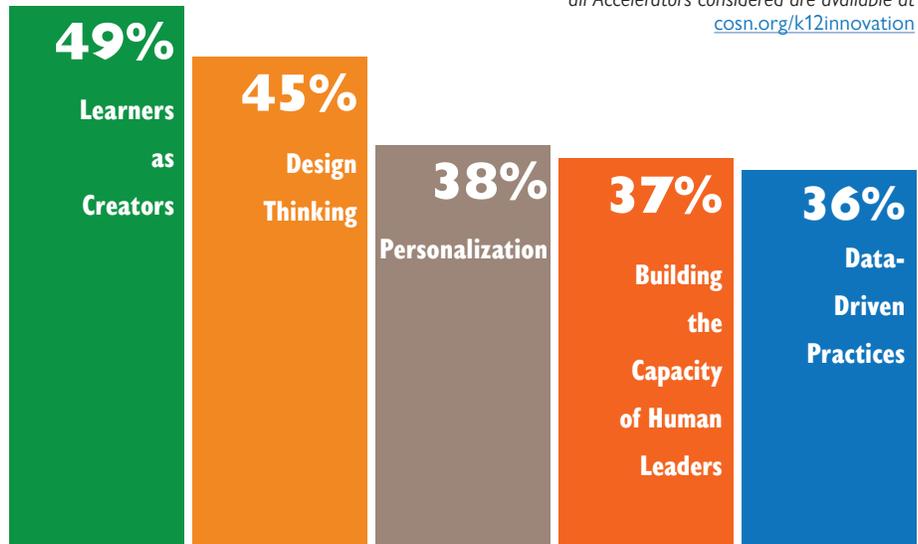
Top 5 **ACCELERATORS** 2019 Survey Results

The Driving K–12 Innovation Advisory Board includes members of the CoSN Emerging Technologies Committee and leaders from key U.S. and international education organizations and ministries of education. The Advisory Board began its work with a short list of potential accelerators to consider and then added to the list. In all, the experts considered 23 distinct accelerators of innovation.

Full survey results and the list of all Accelerators considered are available at cosn.org/k12innovation

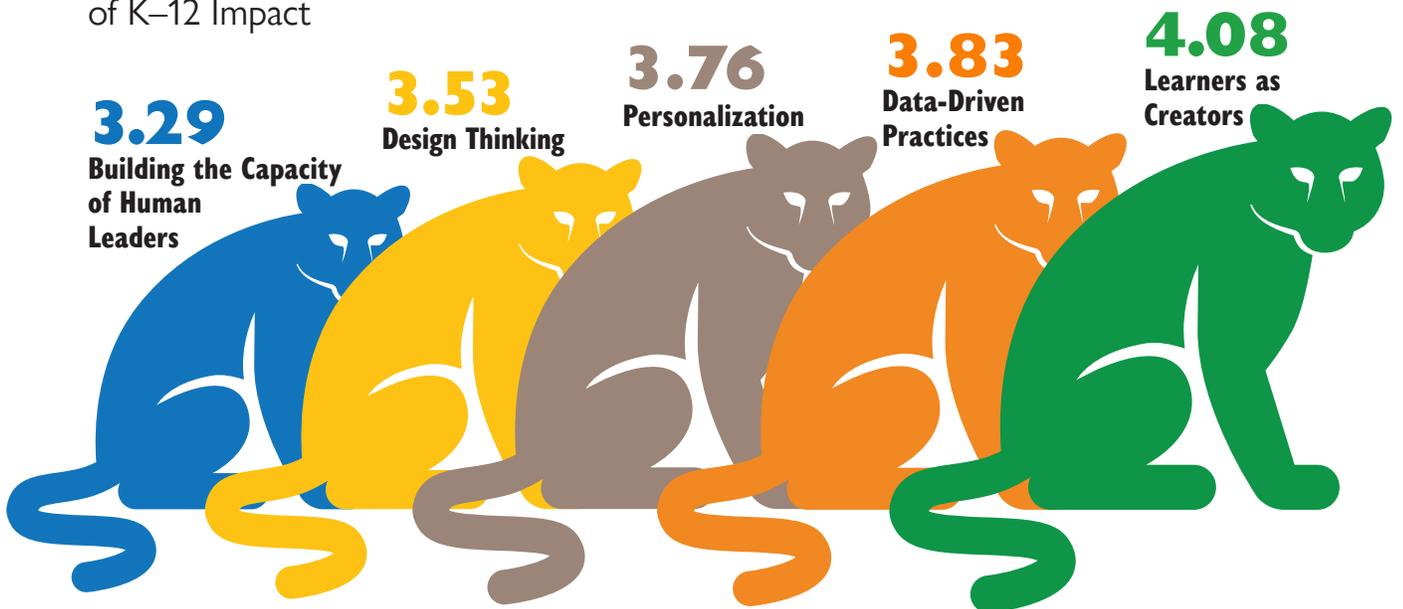
Most Important **ACCELERATORS** to Address in 2019

Percentage of Advisory Board members who believe these accelerators are the most important for schools to address in 2019 to drive teaching and learning innovation.



Top 5 **ACCELERATORS** Accelerators by Speed and Intensity of K–12 Impact

Average ranking by Advisory Board members on a **1-to-5** scale.
1 = slowest and least intense accelerator
5 = fastest and most intense accelerator



SPOTLIGHTING TWO ACCELERATORS



Accelerator

#1

LEARNERS AS CREATORS

This top accelerator recognizes that creativity is a valuable, indeed essential, competency in workplaces and communities today.¹ Merely grasping facts and concepts is not sufficient. Future-focused learning means learning by doing and making—applying knowledge and skills to solve real problems not just theoretically, but practically. Creating engages students in active and meaningful learning. Student work contributes to schools’ knowledge ecosystems as students become co-constructors of knowledge.



Exploring the Opportunity

Sparking students’ creativity might not seem like a radical new idea. However, traditional schooling, assessments and learning spaces don’t allow much time or space for this as a central focus of learning. But educators know that students are often naturally curious and full of ideas and questions.

Thinking of learners as creators is actually a pendulum swing. Educational titans such as Jean Piaget, Seymour Papert and Reggio Emilia regarded learning through a constructivist lens. Piaget believed educators “have to make inventors, innovators—not conformists.”² He advocated fostering curiosity and providing experiential activities to help students build new knowledge from prior experiences.

Papert built on Piaget’s constructivist theories with the idea that “the ability to physically make, test, analyze, rethink, remake, and retest, as often as needed, allows for deep learning on the student’s terms.”³ Papert connected his ideas to new technologies that could empower students to create and collaborate. Emilia furthered constructivism through pedagogy in studio- or workshop-style spaces where artifacts become tools for reflection.

The Maker movement captures the spirit of this body of inquiry about student-focused experiences. Makerspaces are popping up all over the world, in nooks and crannies and repurposed spaces in schools, community organizations and even on wheels.

In San Antonio, for example, Geekbus is a mobile makerspace that travels to schools and other organizations to provide STEM (science, technology, engineering and mathematics) educational experiences. An initiative of SASTEMIC, a nonprofit organization, Geekbus offers 12 STEM programs that teach design thinking and encourage students to apply these concepts to solve problems. Students are engaging in work, such as designing building structurally sound bridges or towers, building and testing a Maglev vehicle to explore magnetic properties, and designing, constructing and testing wind turbines to generate optimal electricity.⁴

Robust makerspaces, or other authentic methods, such as project-based learning, challenge students to do extensive research, information analysis and synthesis before they propose a project or build a solution. Thus, they are well aligned with deeper learning. There's also a renaissance in applied learning in secondary education, where career and technology academies, for example, focus on hands-on, real-world work that prepare students for the future.

“Learners as creators really goes to the core of the mission of education: To develop independent, robust citizens of the future.”

Øystein Johannessen
Chief Executive
Sømna Municipality, Norway



Imagining the Potential

The Maker movement and its relatives—fab labs, hackerspaces, STEAM labs, libraries of the future—are inspiring experimentation to reimagine the future of education, even in unlikely places:

▶ **Singapore** is the perennial top-ranking nation on the Organization for Economic Cooperation and Development (OECD) Programme for International Student Assessment (PISA) and Trends in Mathematics and Science Study (TIMSS). For decades, Singapore has focused strategically on improving student achievement and has developed a reputation for “didactic teaching, rote learning and academic brilliance.”⁵

Now, Singapore is in the midst of a “silent revolution almost entirely unnoticed in the West,” according to OECD’s Andreas Schleicher.⁶ The school system is staking its reputation on the premise that students can ace tests *and* be innovators and creators. Woodgrove Primary School, for example, turned its library into a Makerspace where students let their imaginations run wild after school, from creating 3D products, stop-motion films, and digital art to building mechanical objects and coding to create a gaming console. The school gives students regular innovation challenges—design tasks that stretch their problem-solving skills.⁷

▶ In **El Salvador**, DAI Maker Lab is supporting two makerspaces where youths can build and demonstrate technical skills in 3D computer-aided design and digital manufacturing for

rapid prototyping, among other creative learning opportunities. With access to maker technology and training for skills in demand locally, young people turn their physical work products into credentials for employers. The makerspaces are part of an innovative initiative, Puentes para el Empleo (“Bridges to Employment”).⁸

▶ In the U.S., **Pittsburgh** has a thriving Maker community. Remake Learning is a regional network of more than 350 organizations across “early learning centers and schools, museums and libraries, after-school programs and community nonprofits, colleges and universities, educational technology startups and major corporations, philanthropies and civic leaders.”⁹ The Children’s Museum of Pittsburgh is now one of more than 20 hubs across the country partnering with Google and MakerEd to jumpstart and sustain maker education in communities nationwide.¹⁰

The maker mentality transcends physical spaces. It’s about integrating choice and autonomy into everyday learning activities, letting students select how they want to actively demonstrate their knowledge and skills—whether through storytelling, music composition, video creation or a podcast. Digital makerspaces are the next wave. An exemplar:

▶ MY World 360° invites young people worldwide to become next-generation journalists who create and share immersive, multimedia stories about sustainable development goals (SDGs).¹¹ A partnership between the United Nations SDG Action Campaign, Digital Promise Global and Oculus, MY World 360° engages young people worldwide in powerful

learning experiences that help them build new digital skills, such as virtual reality production, for a purpose.

Driving Innovation

This accelerator is moving into education at a fast, intensive pace—and sometimes changing schooling in unplanned, surprising ways. Fortunately, an emerging body of research^{12,13,14} and thought leadership can prepare education leaders to champion learners as creators, integrate creative learning into the core instructional program and channel students' imaginations toward productive learning activities.

The Advisory Board members offered this advice:

- ▶ **Take an expansive view of creativity.** Creativity should go well beyond the Maker movement. Generating a great idea, content or process is just as creative as making a tangible object—as is creation in virtual environments.
- ▶ **Integrate creative learning with the core instructional program.** “Some makerspaces in some schools remind me of the previous era of computer labs,” said Ann Lee Flynn, director of education innovation at the National School Boards Association. They’re down the hall, out of the way and run by someone other than classroom teachers. Moreover, not all students can access makerspaces in after-school or enrichment programs, an equity issue.
- ▶ **Develop meaningful literacies.** “A literacy is the ability to participate in advancing a community goal through a particular interactive medium,” said Jeremy Roschelle, executive director of learning sciences at Digital Promise. Educators can support students

in developing deep literacies and skills in the realms they pursue, such as scientific, artistic or political literacies.

- ▶ **Pay attention to rigor.** Unleashing students' creativity lets them pursue their own passions, take ownership of their work and craft solutions to problems that concern them. Student choice and independence foster both academic and noncognitive skills, such as student agency, risk-taking and resilience. At the same time, “choose-your-own adventure or -passion learning, focusing on loosely scripted assignments and structures,” doesn't automatically result in rigorous learning, said Gordon Dahlby, senior fellow at the Center for Digital Education.
- ▶ **Set challenging parameters to deepen learning.** “Incorporate interdisciplinary opportunities to produce solutions in a variety of ‘creations,’” said Kim Flintoff, learning futures advisor at Curtin University in Australia. “Throw wicked challenges and problems at students and allow them the time to navigate the challenges, try, and try again, to find compromised solutions, to identify flawed solutions, and to evaluate their own creative processes and those of others. Allow them access to a wide range of expertise. Use the limitations of available and extant resources as a creative hurdle that makes their solution unique and relevant.”
- ▶ **Broaden assessment.** Performance assessments, observations, reflection and external, real-world evaluation are better suited to assessing creative learning than standardized tests.

IN THE FIELD: ACCELERATING CREATIVITY

“In Brazil, we see a boom in the implementation of makerspaces, STEAM curriculum, Fab Labs and other strategies for rethinking the curriculum and the school spaces so students will have a place to learn and practice creativity. The schoolbooks are being rewritten to conform to the new national curricular standards, all incorporating creativity as one of the competencies sought after. There has been an increase in project-based learning curriculum.”

— Cristiana Mattos Assumpção
STEAM and Educational
Technology Director
EDUC'4x100, FL



Accelerator

#2

PERSONALIZATION

This accelerator exemplifies pressure for schools to stay relevant in the midst of a seismic shift away from one-size-fits-all to tailor-made interactions. People customize their playlists and social media feeds, their footwear and fashion accessories. They are accustomed to personalized recommendations for products and services. They value bespoke experiences—end-to-end involvement in the consumer process.¹⁵ Students and parents increasingly expect the same from education.



Exploring the Opportunity

Educators have long recognized that one-size-fits-all schooling does not work for many learners. Students come to school at vastly different places in their learning journeys, with distinct assets, needs, styles, interests and preferences. For the most part, though, they have been expected to march in lockstep in the classroom.

Over the past decade, this uniform model has been giving way to more flexible, student-focused instruction. Educators know that engaging and motivating students is the starting point for deeper learning. They are trying out multiple innovations to light these fires in every student. They're differentiating instruction based on assessed capabilities and needs, switching up pedagogical routines, incorporating digital tools and content, flipping classrooms, transforming learning spaces into active environments, and amplifying student choices and voices in learning. Educators also are adjusting content and contexts to be more educationally and culturally responsive to the students they teach.

Personalization has become a popular buzzword for these instructional shifts, but the term can be confusing. Here are some variations on the theme:

- ▶ Personalization is “instruction that is paced to learning needs, tailored to learning preferences, and tailored to the specific interests of different learners. In an environment that is fully personalized, the learning objectives and content as well as the method and pace may all vary (so personalization encompasses differentiation and individualization).”¹⁶
- ▶ “Personalized learning is learning that is focused on, demonstrated by and led with the learner, connected to students’ communities and cultures.”¹⁷
- ▶ “Personalized learning is a progressively student-driven model where students deeply engage in meaningful, authentic, and rigorous challenges to demonstrate desired outcomes.”¹⁸

A national scan of personalized learning in the U.S. found that personalized learning has taken root “in thousands of classrooms

and schools throughout the country. This expansion is fueled by both the energy of teachers who are embracing the personalized vision for learning and the emergence of supportive systems and policies.”¹⁹

Interest in personalized learning is global. The United Nations Educational, Scientific and Cultural Organization (UNESCO) International Bureau of Education developed a framework and training tools for educators to promote personalized learning.²⁰

The Hellerup School in the suburbs of Copenhagen, **Denmark**, is a leader in embracing personalized learning. For more than 15 years, the school has given students freedom and autonomy to learn on their own terms, at their own pace, with choice and empowerment. The school design—an open floor plan with multipurpose rooms, comfortable seating and technology tools—supports personalized learning, as does a flexible schedule. Teachers and students negotiate how students handle their coursework, which emphasizes project-based learning. Teachers use questions and prompts to help students “develop greater insights into their individual abilities and skills they need to build.”²¹

Imagining the Potential

Personalized learning is akin to the kind of education expected for students with special needs or disabilities, for whom educators and parents develop individualized education programs (IEPs). In the future, every student could have a personalized learning plan.

Technology can simplify and amplify personalized learning. Already, digital platforms are beginning to support educators in understanding each of their students from a 360-degree perspective and at a granular level.

Increasingly robust learner profiles in learning management systems (LMS) synthesize longitudinal datasets, which could include:

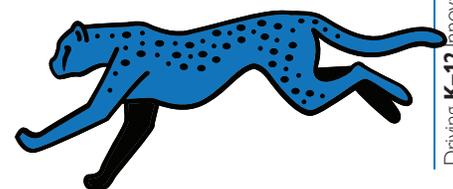
- ▶ Student information systems
- ▶ Formative, interim and summative assessment results
- ▶ Student effort and efficacy on digital tasks
- ▶ Student works in progress, badges, and portfolios—plus extracurricular activities and accomplishments
- ▶ Student participation in learning activities
- ▶ Teacher observations
- ▶ Parent and student insights

Predictive analytics from this data can pinpoint students’ immediate needs even further. As with any technology, schools must take into account the vast privacy and ethical concerns associated with capturing, storing and sharing data. Further, it is vital for school leaders and practitioners to collaborate on the aspects being measured and to accurately capture a holistic picture of learner engagement and needs.

An emerging body of research could help make learner profiles much more personalized. Adaptive learning systems may one day capture a range of cognitive, affective and behavioral personal traits—singly or in combination—such as cognitive style, emotions, and knowledge and behavior.²²

Learner profiles empower educators to meet students where they are and tailor teaching and learning to leverage individual strengths. Digital resources also can help teachers adjust the pace and content of instruction for individual students.

In **China**, for example, an educational “teaching assistant” platform enabled by artificial intelligence (AI) connects students there to educators across the



globe, “helping half a million students receive additional education each week.”²³ The English-language platform can personalize classes and homework to each student and at low cost—potentially a way to address barriers to digital equity.

Driving Innovation

How can educators craft systems where students can pursue learning as “a thousand ways, one destination,” in the words of Guy Levi, chief innovation officer at the Center for Educational Technology in Israel? “The one destination needs clarification. It is not that they are all the same when they get to the end, but they do need to get to a mutual place. There is a need for some common denominators.”

Where to start? *The Future We Want*,²⁴ an OECD position paper on the future of education and skills that calls for personalized learning environments. Among the recommendations: Develop student agency, shrink the curriculum and move to competency-based education. The paper sets out a shared vision and design principles for changing curricula and education systems.

Waukesha STEM Academy – Saratoga Campus (WI) is moving in this direction. The school’s mission is to provide a personalized learning experience for all students. The school offers proficiency-based pathways, which allows students to enter at different places and move at different paces, immerse themselves in in STEM-centered learning environments and solve real problems.²⁵

Based on his research, Scott McLeod, founding director of the University Council for Educational Administration’s Center for the Advanced Study of Leadership in Education (CASTLE), identified “four changes that are key to making the learning process relevant and personalized”²⁶:

1. Moving from factual recall to higher-level thinking
2. Moving from teacher control to student agency
3. Moving from traditional activities to authentic work
4. Moving from traditional resources to a technology-rich environment

In the U.S., LEAP Innovations is spearheading action around relevant and personalized learning. The national nonprofit organization developed a framework for personalized learning based on research and evidence-based practices, and it provides collaborative professional learning to school leaders and teachers. LEAP also holds “Match Days” for educators to meet with technology company experts and assess technology products that could support personalized learning.²⁷



CONCLUSION

Driving K–12 Innovation / 2019 Accelerators is the second in the CoSN series focusing on challenges and opportunities to digital transformation.

The two accelerators featured in this report—**learners as creators** and **personalization**—present enormous opportunities to educators. Both accelerators put students at the center of learning. Both respond to megatrends in the nature of work, changing societal expectations and the pace of technology innovation. Both are among the top five accelerators that the Driving K–12 Innovation Advisory Board believes are important for school systems, schools and educators to begin addressing this year.

Both accelerators are already gaining traction in some places. To expand acceptance of these accelerators, we recommend initiating conversations with your community, considering how to leverage the accelerators and turn them into opportunities:

- ▶ What would it take for your students to experience innovative education?
- ▶ How could you help students become agents of their own learning and creative learners?
- ▶ How could you help teachers personalize learning for every student?
- ▶ How would you have to change your education system, curriculum, instruction and assessments to embed creative and personalized learning into the student experience?
- ▶ What changes would you have to make in your learning environments and spaces?

We encourage you to stay connected with this series at cosn.org/k12innovation.



COMING SOON!

This year, CoSN will release the third report in the *Driving K–12 Innovation* series for 2019, *Tech Enablers / 2019*, as well as a practical toolkit to inform strategic planning and smart technology integration into teaching and learning.

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CoSN (Consortium for School Networking) is the premier North American professional association for school system technology leaders. CoSN is the only professional association dedicated exclusively to the educational technology leaders who are working to transform learning. CoSN provides thought leadership resources, leadership development, best practices and advocacy tools for an engaged community of peers, helping leaders succeed in the digital transformation. CoSN represents over 13 million students in school districts nationwide and continues to grow as a powerful and influential voice in K–12 education.

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