THE CURRICULUM OF THE FUTURE

A RESEARCH REPORT FROM
THE CENTER FOR DIGITAL EDUCATION

HOW DIGITAL CONTENT IS CHANGING EDUCATION

Curriculum of the Future in action: Florida Polytechnic University built a bookless library where students can access more than 135,000 e-books with electronic devices.

THE CENTER FOR DIGITAL EDUCATION SPECIAL REPORT is a one-of-a-kind publication that provides education leaders with research-rich content that includes perspectives from industry experts and public sector peers. It consolidates current thinking, best practices, tips for successful implementation, professional development guidance and more — all within a single source. We hope you enjoy this current Special Report on the Curriculum of the Future. Don't miss the next Special Report on Classroom Technology coming out in early 2015! www.centerdigitaled.com/reports

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BUILDING THE CURRICULUM
OF THE FUTURE

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Houston Independent School District is providing students with laptops, replacing print textbooks with a digital platform and giving teachers Web 2.0 tools to design their own lesson plans.

Houston Independent School District — one of the nation's largest districts, serving 210,000 students — is going digital, providing students with laptops, replacing print textbooks with a new digital platform and giving teachers a suite of Web 2.0 tools to design their own standards-based lesson plans.

Lynn University — a small, private liberal arts school in Boca Raton, Fla. — is giving all of its undergrads, MBA and doctor of education students mini tablets loaded with digital texts created by the university's faculty, which replace costly printed textbooks.

These are just two examples illustrating the depth and breadth of the shift to digital curriculum, which is slowly but inexorably taking place in the K-20 education space. Mobile devices and wireless access, along with other drivers, are contributing to this movement, which shows promise of significantly improving student achievement.

This Center for Digital Education (CDE) Special Report takes a deep dive into digital curriculum, looking closely at the benefits and potential pitfalls involved in the shift. From innovative content delivery methods to the latest in open educational resources and other trends on the horizon, this report highlights case studies and best practices from education institutions that have already made the transition to digitally delivered learning.

FutureStructure and Digital Curriculum

While reading this Special Report, it is important to think about the curriculum of the future as part of the larger education system. Our new initiative, FutureStructure, encourages education leaders to consider how policies, programs and progress have an effect on and are affected by other organizations in the larger district, university system and even community. Digital curriculum is just one piece of an interconnected system of many moving parts that support K-20 education. Throughout the report, you will see this icon for "FutureStructure Insights," which provide examples or best practices on how systematic thinking applies to the curriculum of the future.

You will also find references to Future-Structure's hard, soft and technology components. The below list provides examples of what may fall into these three pillars when it comes to a discussion of digital curriculum. Consider how a shift to digital curriculum will impact your institution, community and stakeholders, and how systematic thinking can better prepare you for impending change. ∎

FutureStructure Insight:

↗ Technology

Mobile devices, tablets, e-readers, laptops and computers enable students to access digital content anywhere, anytime.

On- and off-campus Wi-Fi hotspots, charging stations, buses and public transportation outfitted with Wi-Fi ensure students can continue learning even when off campus.

Digital learning objects, lecture capture, education applications, content repositories, online videos, 3-D printers and social media provide students with an interactive, engaging learning experience.

Projectors, interactive whiteboards, content filtering and learning management systems support digital curriculum.

↗ Soft

Parent and stakeholder communication, community planning and local business feedback ensure success for new programs.

Changes in pedagogy are required to support blended, virtual and personalized learning.

Professional development and planning enables instructors and faculty to better prepare for new initiatives, serve students and leverage technology.

Security and privacy laws help ensure students, data and the devices they use are safe from harmful cyber attacks and inappropriate content.

Updated procurement policies and funding allow institutions to implement new initiatives and leverage existing technology.
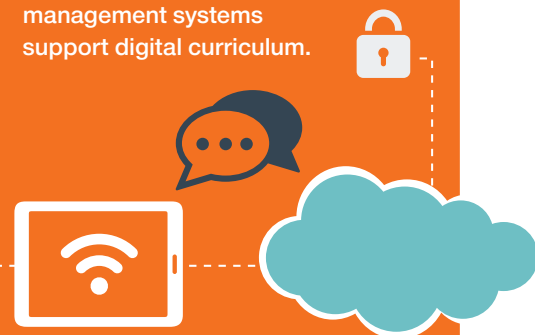
↗ Hard

Workspaces and desks encourage collaboration and complement technology use.

EXPLORING DIGITAL CURRICULUM

Nashville public school students' backpacks got a little lighter this year. That's because Metropolitan Nashville Public Schools (MNPS) — in the midst of a phased transition to digital learning — has eliminated print textbooks for social studies at all grade levels.

Students will use digital materials, accessing content developed by district teachers on district-provided tablets in grades K-2 and laptops in grades 3-12. Other subjects will soon follow, with elementary K-4 science being the next subject to transition to digital content.

"It's a journey and it's a process and it's going to be continuous," says Jay Steele, chief academic officer of MNPS.[1]

Steele insists the change from print books to digital counterparts isn't being done to save money, but rather to improve learning. "It's about meeting kids where they want to learn," he says.

In this spirit, the district also created a virtual K-12 school and mandated more online classes be available from its brick-and-mortar schools. As a result of these changes, in addition to the shift to digital curricula, the district has experienced an attendance rate of 93 percent and lower discipline referrals.

Digital curriculum might not be the silver bullet, and it certainly brings its own challenges. However, it offers a host of benefits, which is why its adoption is growing. But before exploring the benefits of digital learning and new trends and technologies making their way onto digitally oriented campuses, it's necessary to understand commonly used terms.

FLICKR/BRAD FLICKINGER

In the 21st century, students across America have the opportunity to learn via tablets, laptops and digital lesson plans.

- **Digital curriculum** refers to a planned course of study that primarily uses digital elements.
- **Digital content** consists of materials used within a digital curriculum.

For example, a digital science curriculum might include a virtual field trip to study the Great Barrier Reef, a videoconference call with an oceanographer, hands-on learning gathering water samples and testing them using probeware attached to smartphones, an in-class social media poll to check for students' understanding and a group project making a movie about local pond pollution.

Types of Digital Content

- **E-texts:** Textbooks viewable on mobile devices or computers with material either provided by commercial publishers, created by instructors, found online or a mixture of all three resources, are examples of e-texts. E-texts can include information about a topic, a full lesson or a complete textbook.
- **Learning objects:** Pictures, videos, audio clips and other multimedia elements; graphs, charts and infographics; quizzes and tests; exercises and activities are all examples of learning objects.
- **Open source materials:** Explanatory videos from organizations such as Khan Academy or

MIT OpenCourseWare would be considered open source materials.

- **Apps and games:** Game-based learning can be engaging and fun for students. This includes the use of adaptive software that collects data and adjusts to student responses.
- **Online assessments:** Formative assessments are considered a form of digital curriculum. Real-time feedback on student performance during assessments plays a critical role in personalized learning.

Another term often used in a discussion of digital curriculum is modular content.

- **Modular content** is a collection of learning objects, such as an iTunes playlist, that is generally built around a specific standard. Educators can customize their lesson plans by using, modifying or omitting any of the learning objects. This format is appealing to different learning styles and promotes personalized learning.

What are the most common forms of digital content used at your institution?

E-textbooks
68%

Digital learning objects (graphs, charts, quizzes, etc.)
59%

Open source content
39%

Social media applications
28%

Online games
8%

Other
9%

Source: CDE Digital Curriculum Survey, 2014

Trends in Digital Learning

When asked whether a move to digital content was important to their education institution, 75 percent of K-20 education decision-makers who responded to a recent CDE survey said yes. Yet, only about 3 percent said they had fully transitioned to a digital content/curriculum environment, while 64 percent noted they had adopted e-textbooks, but in a limited, siloed fashion.[2]

Respondents cited e-textbooks as the most common form of digital content, which topped the list at 68 percent. Digital learning objects, open source content, social media applications and online games followed e-textbooks in popularity.

Leslie Wilson, CEO of the nonprofit One-to-One Institute, says the use of personalized technology in education is "growing in leaps and bounds every year across the U.S."[3] She estimates the growth of personalized portable technology adoption in schools at about 20 percent annually.

"A lot of what we see today are teachers and students working to collaborate and create their own content and curriculum, as opposed to regurgitating what's out there," says Wilson.

After all, Wilson points out, "digital curriculum involves more than putting textbooks behind a glass screen instead of a hard copy and calling it innovation. There's nothing transformative about that."

Instead, she says, "In the 21st century, we want students to create content and we want teachers to do the same. Producing that kind of thing on the fly in collaboration with one another is really the bleeding-edge trend. Using static resources for reference and historical perspective is also important. But in this age of rapid knowledge and information development and sharing, educators and students must be able to generate current subject matter."

New Digital Technologies to Watch

Some newer digital content technologies are making their mark on K-20 campuses.
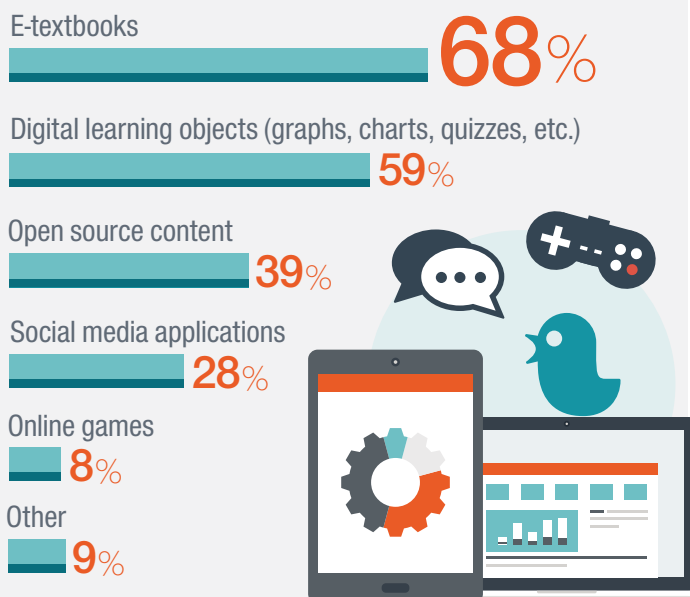
These include:

- **Wearables:** Google Glass is used by instructors at the University of Wisconsin — Madison to provide students with feedback via video. This is just one of the possible applications that are certain to increase in use if computerized glasses become mainstream.[4] Other wearable devices such as digital health monitors are used in physical education classes nationwide to track progress.[5]

- **Robotics and programming:** Building and programming robots in science and math courses is a familiar concept. However, coding and basic programming languages are increasingly part of the core curriculum for younger students, including elementary students.[6]

- **Drones:** Students at Greenon High School in Dayton, Ohio, are learning how to control drones in a simulation. The region hopes to tap into the nascent market of drone manufacturers, with companies exploring commercial drone usage and encouraging students to contemplate drone-related careers.[7]

- **3-D printers:** The British national education curriculum calls for a 3-D printer in every school because it is believed that such machines foster innovation and teach design skills.[8] In the U.S., 3-D printers are making their way into scores of colleges and K-12 classrooms as part of what's being called the "maker movement" — an attempt to create a global community of inventors, designers, craftsmen and artists that leads to innovation.

- **Game-based learning:** Educators have been using games to help teach lessons for decades, which is referred to as game-based learning. Today's digital, interactive and immersive games offer a new world of engaging and collaborative game-based learning. Educational digital games as well as commercial video games can serve as powerful learning environments for students to explore systems that represent concepts in the real world. In Scotland, researchers studied

FutureStructure Insight:

❝ **When you personalize your learning environment, the whole system is affected. Leaders at all levels have to retool, becoming agents of change who can scaffold that 'shift' among staff. They have to activate the transformation as they empower this dynamic, sometimes loud and seemingly chaotic learning environment. The whole system has to become more open, dynamic, nimble and accepting of those processes in play."**

Leslie Wilson, CEO, One-to-One Institute

elementary school students using console-based games. In one course, students played Guitar Hero, taking on rock star personas, creating a virtual band, building their own guitars (which included investigating the nature of sound from a scientific perspective), designing a band website and writing rock star bios (something that interested students who normally disliked classroom writing assignments). The games served as a vehicle for project-based learning. Researcher and Co-founder of the Center for Curriculum Redesign Jennifer Groff found this type of game-based learning engaged students, helped them stay on task, resulted in fewer behavioral disruptions and motivated them to go well beyond the curriculum requirements.[9]

- **Immersive learning, simulations and augmented reality:** Virtual worlds can enable classes and discussions to be held in virtual classrooms, where, in some instances, virtual students attend "real" classes along with physically present students, using video screens to interact. Students in medical fields can use Second Life's virtual environment to practice in simulated interactions with patients, as happens in the nursing program at the University of Michigan.[10] ■

DRIVING THE CHANGE – WHY NOW?

What's causing more districts and colleges to drop print textbooks in favor of online texts and increasingly adopt digital content and curriculum? Many factors are contributing to the transition. Here are a few of the major ones.

Digital is now. It's a common phrase in our tech-saturated, ultra-connected lives. Just look around when you're at the mall, movie theater or coffee shop — or any place that people, especially younger individuals, gather. You'll see a lot of heads down, eyes on screens and fingers typing text messages. For good or ill, mobile devices and their applications are part of every strata and segment of society and pretty much every element of our daily lives — home, workplace and social life.

Student demand. Because digital content and mobile devices are ubiquitous, students — and their families — see their benefits and have grown to expect their use. To stay competitive, institutions need to offer digital learning. You don't want your institution to be the one that lacks today's technology. Students and educators also find tech-enabled learning to be more motivating and engaging — factors that lead to increased academic achievement and retention.

Money, money, money. Many K-20 institutions are suffering from a shortage of funds. Faced with austerity measures, cuts need to take place somewhere — but no educator wants those cuts to hinder student learning. Digital content can save money over print textbooks, especially in the long run, and studies show it can boost student engagement and achievement. There are initial costs in infrastructure and hardware, as well as instructor training. But, over time, savings can add up. Additionally, as digital devices and technologies proliferate, the cost to purchase them typically decreases.

National, state and local standards. National standards are pushing online assessments, which means districts need to increase bandwidth, but also college and career readiness. Students today need to know how to operate in a technology workplace; the jobs they may fill in 10 or 15 years probably don't exist yet, so they need to learn creative thinking, collaborative skills and other 21st-century necessities. The global economy has driven other countries to push more technology in the classroom so their students can be more competitive in the workplace; the U.S. needs to follow suit. Digital content and curriculum provide an opportunity to do this.

Personalized learning and technologies. With a diverse student population, having technologies that can address differing needs is important. Text-to-speech capabilities on mobile devices can "read" material to students, which is especially important for students challenged with reading. Text can also be translated into other languages for English language learners (ELL).

> **Students today need to know how to operate in a technology workplace; the jobs they may fill in 10 or 15 years probably don't exist yet.**

Advances in video capture technologies enable students to search and re-watch recorded lectures. Video materials can be tagged in sections so it's easy to locate specific elements. Flipped classes let students watch video lectures and study other digital materials before class, then participate in discussions or work in small groups during class time.

Learning analytics also support the transition to personalized learning. Learning analytics enable instructors to gather and leverage student data, providing unique insights into the needs of each student. The ability to predict or discern a pattern in the data allows educators to make real-time changes, ensuring the needs of each student are met. While learning analytics aren't new to most educators, there is a gap between what technology promises and how to effectively use data. The good news is there is a growing focus to effectively use education data to personalize learning, improve retention rates and increase overall student achievement. In fact, the U.S. Department of Education's 2013 National Education Technology Plan envisions using data from online learning management systems to improve instruction.[11]

Online/blended learning. In both higher education and K-12, learning that takes place at least partly online continues to grow. In 2013, 33 percent of higher education students — about 7 million — took at least one course online.[12] Meanwhile, 43 percent of K-12 administrators in a 2013 survey by Project Tomorrow reported offering online courses to students.[13] The latter survey also found 60 percent of

FutureStructure Insight: Before making the transition to digital curriculum, consider your institution's end goal and how technology can support that goal. Go outside your campus for help. Ask local employers, nonprofit organizations, civic leaders and other educational organizations what needs to be offered in your curriculum. This helps students find jobs, supports businesses in finding qualified employees, eases the transition from high school to community college to university, and enables the overall community to experience growth and prosperity.

> "MOOCs will change our concept of a university degree — and the concept of the educational system as a whole — as the world learns about these accessible courses and embraces lifelong learning."

Anant Agarwal, CEO, edX

Anant Agarwal, CEO of edX, is helping break down barriers to high-quality education through the implementation of MOOCs.

educators believed online learning better motivated students and virtual, blended and flipped learning instructors use more digital content than traditional instructors.

In addition to regular online courses students pay to take, free, large-scale classes known as massive open online courses (MOOCs) are now drawing up to 100,000 students per course. Some MOOCs also come with verified certifications for students who complete them, which some colleges and universities are beginning to accept for credit.

EdX — an open source, nonprofit learning destination that offers MOOCs — recently began providing courses called XSeries, which are similar to a college minor, allowing students to demonstrate mastery in a discipline. Similarly, Coursera, another MOOC platform, offers a "foundation series" of first-year business courses from the Wharton School of Business at the University of Pennsylvania.

"MOOCs will change our concept of a university degree — and the concept of the educational system as a whole — as the world learns about these accessible courses and embraces lifelong learning," says edX CEO Anant Agarwal.[14]

Digital curriculum offers flexibility for both students and educators. Submitting coursework online or "attending class" via videoconference enables students or faculty members who are ill, disabled or otherwise unable to attend in person equal access to education.

Workforce preparation. Thanks to the adoption of technology, we are now able to conduct business and maintain relationships with clients around the world. As borders blend and the global marketplace expands, the need to master foreign languages continues to grow. Largely due to shrinking budget cuts, many institutions no longer offer foreign language classes, or have significantly

reduced their availability. A lack of emphasis on language learning may lead to high school and college graduates entering the workforce without the necessary skills and make it more difficult to land a job in a competitive market. To address budget and staffing issues, and ensure language learning continues, some institutions are turning to immersive online programs.

For example, Guthrie Common School District (GCSD) in Guthrie, Texas, turned to an immersive online language learning program to fulfill the state's language curriculum requirements without hiring new instructors. With the implementation of a language curriculum that provided both visual and auditory reinforcement, live conversation, social learning activities and

anywhere, anytime access, the district achieved a 96.4 percent pass rate and a 295 percent increase in active learners. According to GCSD Spanish instructor Summer Real, the greatest benefit of the immersive online program was the day-to-day application. "I think the program may provide more opportunities for students to practice speaking the language than they might have had in a traditional setting," she says. Real was impressed by students' pronunciation capabilities and their boost in confidence to communicate and collaborate using a new language.[15]

As traditional educational structures and opportunities transform, digital curriculum and online learning will have an ever-larger role. ∎

What are the main drivers to adopt digital content at your institution?

Increasing adoption of alternative learning environments (blended, online and flipped learning)
53%

The need to improve student engagement/achievement
43%

Limited resources/the need to cut costs
36%

Students and teachers expect to access digital content from mobile devices
35%

Instructors increasingly want the ability to tailor and update content
29%

State and local standards, such as the Common Core State Standards
8%

All of the above
19%

Source: CDE Digital Curriculum Survey, 2014

At Brigham Young University, Professor David Wiley worked with Utah educators to develop science textbooks built around state standards using open educational resources (OER).

CELINE MORTON

WHAT MAKES FOR GOOD DIGITAL CURRICULUM?

In the Sweetwater Union High School District in Chula Vista, Calif., seventh- through ninth-grade students transitioned to a digital curriculum using district-issued tablets to study lessons, complete homework and take tests. At Sweetwater's Hilltop Middle School, science teacher Benjamin Black observed an increase in academic achievement, with students "eager to learn and complete their assignments."

Students submit assignments online, which are automatically logged into the learning management system, saving teacher time and energy for classroom activities. Black says the digital system allows him more "freedom to explore and be interactive" in class.[16]

What are some of the attributes of a good digital curriculum, one that inspires students to be excited about learning?

One-to-One Institute CEO Wilson says a good digital curriculum is in sync with state standards, can be tied to formative and summative assessments, and is "very malleable," allowing students to move ahead or more slowly, depending on their needs.

"I think flexibility and dynamism are absolutely critical to digital content and digital curriculum for tying into the best kind of learning, knowledge and skills for the 21st century," says Wilson.

One big difference between digital curriculum and print-based content is the ability to update digital resources in real time. Textbooks are often purchased once every few years, quickly creating outdated content. Using digital curriculum, an educator can respond to news events or science discoveries with a few clicks, bringing students the latest knowledge and information to discuss and analyze. From this point, they can actually produce current, up-to-date and relevant curricula.

Additionally, past history — including original source documents from the Library of Congress, for instance — can also be accessed immediately, as needed, without having to submit a library request, check out material and wait.

"Information today is so fast and furious," says Wilson. "Managing it, retrieving it and using it meaningfully and thoughtfully for problem solving is really what content needs to allow us to do."

In Arizona, Vail Public School District CIO Matt Federoff says good digital tools should match instructional goals, have a real-time component and allow teachers to easily add value. Federoff says schools should step away from pre-packaged digital curricula. While it may align with standards and goals, he says it lacks the spontaneity that defines digital content. "It's simply the textbook remixed and is deeply flawed

because it assumes the teacher is merely the transmitter of content and will start on chapter one, lesson one or Web link one and dutifully march on through," Federoff says.

Instead, Federoff favors a broader approach, one that allows instructors to customize, curate and fine-tune bits and pieces of timely, relevant content and then bring this to their students in a way that matches their teaching style.[17]

Researcher and Co-founder of the Center for Curriculum Redesign Groff is also leery of programs that don't allow educators to stop and create different experiences based on student interests and needs. Groff advocates for digital tools that give instructors "the flexibility to support dynamic new directions in the content and the curriculum that support the interests, needs and goals of individual students, as well as the class as a whole."[18]

Above all, good digital curriculum should be developed with quality — not quantity — in mind. Digital curriculum should meet quality standards that include cultural and gender representation, and provide adequate privacy and universal access. Look to organizations such as iNACOL and Quality Matters for additional resources on the development of digital curriculum.

Good digital content and curriculum should also be:

Personalized. Technology allows educators to adapt content to meet individual students' needs. Adaptive or intelligent software applications react to a student's answers in formative

> **One big difference between digital curriculum and print-based content is the ability to update digital resources in real time.**

assessments and move a student forward or backward. Such tools also provide instructors with data that allows them to form student ability groups in a more evidence-based way, which makes differentiated instruction more effective.

However, these tools must be considered in a larger classroom environment that promotes collaborative inquiry and knowledge construction. Adaptive tutoring programs have great benefits but should not be the exclusive method used. Groff says an adaptive learning program is helpful if used for acquiring new skills, remediation or practice, "but that should not be the full learning experience all the time because that doesn't necessarily support the social construction of knowledge — a central hallmark to how we learn."

Instructors can also use digital tools to meet students' differing learning styles and attainment levels. For example, some students may be more action oriented and will do better with a game-based tool, while others may prefer reading and can use leveled readers on e-books where nobody can see from the outside what they are reading. This avoids potential stigma of being at a different reading level, which can be especially important for ELLs and students with learning disabilities.

A flexible digital curriculum is open to students' desires, allowing students to explore topics they are excited about, which enhances engagement.

Interactive. Digitally based learning can be interactive in several ways:
- Instructor to student, or student to instructor (for example, when an instructor drops video feedback into a student's online paper)
- Student to student (for example, a Google doc or other cloud-based resources that multiple students can review simultaneously or at different times)
- Student to content (for example, game-based learning, adaptive apps or even clickable videos and charts within a digital textbook)

- Student to classroom (for example, sharing content via interactive whiteboards or having students participate in Twitter or text polls)

According to the CDE survey, 48 percent of respondents said the most important feature of digital content is its ability to encourage interaction among students and between students and teachers.

Some digital content has a social media focus — where students create blogs or wikis or connect with peers on Twitter, Facebook, YouTube and other social media outlets. These types of activities connect students not only to other students, but to subject matter experts and others. This authentic audience allows for a broader exchange of information, creates a real-life relevancy to the learning and helps build a sense of community. However, social media comes with challenges as well — one of which is maintaining student privacy and safety, especially for K-12 institutions.

Assessments are a way to create a feedback loop, either between a single student and instructor or between the whole class and the instructor. Quizzes can be shown on an interactive whiteboard for a quick evaluation; instructors can then redirect learning, either with the whole class or a small group, depending on response. Within certain applications for younger children, auditory prompts are also an important tool to move a child forward or to assess comprehension.

Project-based or problem-based. When students work in a hands-on way with real-life projects, it makes learning seem more relevant and meaningful — and therefore more engaging. Without relevancy to their daily lives, students are more likely to disengage. Students might also engage in digital simulations where they work to, say, save a virtual city from a flood, or collaborate via video with other students to address a community problem.

Aurora University in western Chicago created the John C. Dunham STEM Partnership School, which provides third-through eighth-grade students with a unique STEM education experience.

New STEM School Fueled by Digital Content is a Community-Wide Partnership

Aurora University is a small, private university in the western Chicago suburbs. Several years ago, it began an initiative examining what the local community needed from its graduates. In speaking with business, civic and education leaders, the answer that kept bubbling up was STEM, says University President Rebecca Sherrick.[19] So, the university began doing what it could to foster STEM learning.

As a result, a new STEM-oriented school serving third through eighth grade, located on the university grounds, was created. The John C. Dunham STEM Partnership School opened in August 2014 to 150 students who were chosen by interest, academic qualification and lottery (there were more than 1,000 applications for 150 seats).

The school serves not only these students, but also operates as a professional development center for STEM educators — about 1,000 of whom are expected to use the campus at some point.

Students learn via an all-digital, Web-based curriculum developed collaboratively by Aurora faculty; teachers from the three adjacent public school districts that are partners in the school; representatives from six local, national and global corporations; and six nonprofits that include two national laboratories.

The corporate and nonprofit representatives helped create STEM-based units of study and provided insight as to what businesses need from future graduates.

"Our curriculum focused on answering essential questions through myriad experiences, not only those the university and school district can provide, but those the corporate and nonprofit world can provide," says Sherry Eagle, executive director of Aurora University's Institute for Collaboration.

Using a digital curriculum instead of print-based materials was "truly a given," says Sherrick, citing advantages such as flexibility, malleability and the ability to tap into real-time, current information, which is especially important for STEM fields. The curriculum was aligned with Next Generation Science and Common Core State Standards, among others, and was designed to be Web-based, real-time and driven by research.

Inviting corporate leaders into the educational process and listening to their insights has resulted in all partners having more respect and understanding for one another, says Eagle.

Businesses contributed interactive displays for students to use, such as an exercise bicycle that shows electricity generated via pedaling or a scale model of a $5 million piece of Caterpillar equipment that lets students collect data concerning forces in motion. Employees are encouraged to make classroom visits as well as be available in real time for video chats and email correspondence as students have questions.

"The corporate sector traditionally looks at the education sector and says your education program is not leading to success in the careers that we need," adds Sherrick. "We've changed the pronoun to 'we' and are understanding that we share this responsibility. The corporate sector has developed mutual trust and respect that has grown immensely."

Engaging. Personalized, interactive and project-based curriculum is almost by default engaging. But other aspects that can enhance this include multimedia elements and material that is well written and understandable.

Agarwal says edX makes its content engaging by providing instant feedback, flexibility, gamification and online peer support. EdX video lectures are delivered in short segments that students can rewind and rewatch as often as they need, mute and read with a printed transcript, or review at 1.5 times the normal speed.

EdX courses are broken into segments to keep student interest. Rather than an hour-long lecture, students see a short video, complete an interactive exercise and then take a quiz. The emphasis is on active learning and instant feedback, which Agarwal says has been proven to improve subject mastery.

What are the most important features of digital content to improve student learning?

Enables interaction among students or between students and instructors

44%

Is adaptive or personalized

22%

Is project- or problem-based

16%

Is game-based

12%

Includes video

6%

Source: CDE Digital Curriculum Survey, 2014

Preferably low cost. While cost shouldn't be the only thing that steers an institution toward digital content, every education institution must watch its bottom line. And, with so much low-cost or free digital content, there is no reason institutions shouldn't consider digital content as a viable option.

At Brigham Young University, Professor David Wiley worked with Utah educators to develop science textbooks built around state standards using open educational resources (OER) — free materials available online from a wide variety of sources, such as government and education institutions — as the primary material.[20] These books can either be downloaded in color with links for free or printed in black and white using an inexpensive print-on-demand service for $5. About 20 percent of Utah's high school science students have chosen the lower-cost option since it was offered two years ago, says Wiley.

Similarly, Tidewater Community College in Virginia now offers its associate degree in business administration with an OER alternative, says Wiley. The two-year program costs students $6,000 in tuition. Commercial textbooks cost another $3,100; the OER option costs students nothing.

At Salt Lake Community College, a developmental math course offered an OER alternative that saved students $170 on textbooks; those students were more likely to finish with a "C" or better than students using a textbook or commercial online math platform, says Wiley.

One reason for the improved performance: According to one study, 75 percent of college students don't buy required textbooks because they can't afford them,[21] so giving them a free option means more students are likely to actually use the text.

"Ensuring every single student in class has complete access to materials on the first day of class with no roadblocks can make a huge difference," says Wiley.

Massachusetts Institute of Technology (MIT) has been an OER pioneer, offering text
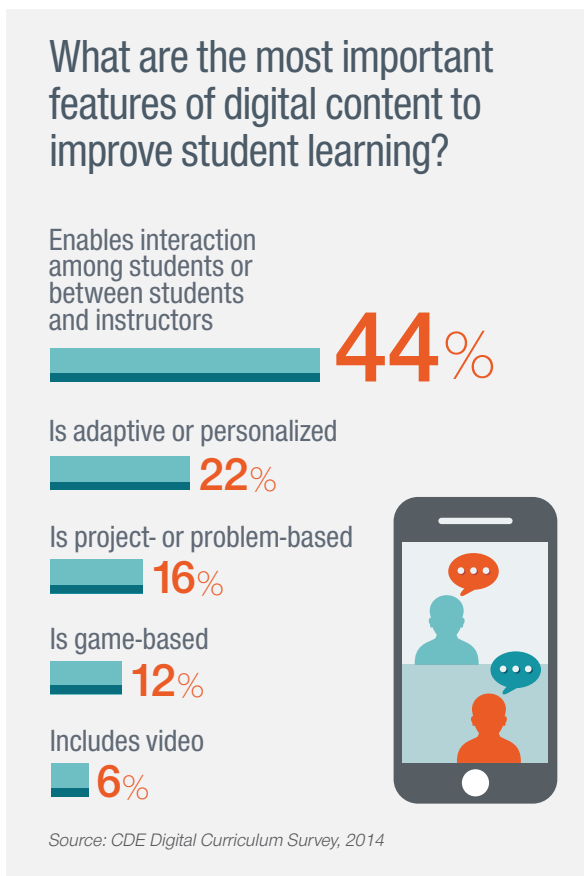
> "Ensuring every single student in class has complete access to materials on the first day of class with no roadblocks can make a huge difference."
>
> **David Wiley,** Professor, Brigham Young University

and video courseware by instructors since 2002 through its OpenCourseWare initiative, which inspired many other top universities to follow suit. Also, organizations such as Khan Academy offer free, shareable courseware in the form of instructional videos.

Content repositories hold video lectures, textbooks, learning objects, lesson plans, assessments and a wide variety of other tools. Anyone can access digital files through content repositories and use or modify content for classes as they see fit. While many of these resources are instructor generated, some publishing companies also offer vetted digital content for classroom use. For example, the CK-12 Foundation is a nonprofit collecting primarily K-12 materials, while OpenStax College works to provide free digital college texts.

Vail Public School District created its own digital content "store." The district stopped purchasing print textbooks in 2008, choosing instead to create its own digital curriculum. Instructors in the 12,500-student district, as well as partner districts, contributed so much content that today there are more than 26,000 standards-aligned learning objects in the repository, says District CIO Federoff. The district's digital learning program, Beyond Textbooks, attracted the attention of other districts in the state. Today, more than 100 other districts participate in the Beyond Textbooks initiative. According to Federoff, pricing is very competitive compared to other providers and is intended to cover costs, such as staffing and back-end hardware maintenance. Beyond Textbooks serves more than 10,000 teachers and 100,000 students in Arizona, Idaho and Wyoming.

"We never set out to get into the digital content business and now ironically Vail School District is the largest provider of digital content in Arizona. We didn't see that coming," says Federoff.

Publishing companies are beginning to recognize the positive impact of digital content and are working toward their own digital curriculum solutions. Content developed by publishing companies is often thoroughly vetted by professionals and courses are created by education experts. When weighing the options for low-cost digital content, it is important to consider the unique, trusted solutions publishers offer.

Considerations When Developing Digital Curriculum

Consider content formation standards. When putting together a digital curriculum that will be used across platforms, formation standards (such as IEEE and Common Cartridge) can help ensure interoperability. What if you build tools that use Flash, which can be incompatible with some types of tablets? What kind of navigation and support do you anticipate — and will this work with all of the devices, current or prospective, in your institution?[22]

Have a flexible learning management system (LMS) or platform. New LMSs are designed to incorporate content repositories, student data analytics and other elements of a digital curriculum. Keep in mind, as you set up your digital curriculum, you may need to update your LMS for best results.

Teach students how to annotate digitally. Research shows that digital text is processed differently in the brain than print-based material, with more skimming and less attention to detail. Students need to learn how to annotate digital texts to improve retention.

Implement classroom printers. Because digital text is processed differently in the brain, some activities may call for printed materials. Implement wireless classroom printers as a low-cost way to access printed materials on demand. ∎

CHALLENGES IN THE
DIGITAL CONTENT ADOPTION PROCESS

You've put together your digital curriculum — now what? What do you need to know to best implement it? What challenges do you face, and how can they be overcome? CDE survey respondents reported lack of training on new technologies, integrating new technologies with existing technology and a general lack of faculty interest in technologies as their primary barriers.

The old model of curriculum and content adoption has been in place for many years and in some states is codified by law. As you transition to digital learning, you may face challenges on many fronts — from funding hurdles to faculty resistance to policy considerations. While the benefits of digital curriculum are compelling, you need to be aware of potential issues affecting adoption.

Keeping Educators Top of Mind

One of the biggest considerations in adopting digital curricula is the educators. Having instructors help choose or develop digital curriculum can increase acceptance. But professional development is also critical. A recent survey by the Software Information & Industry Association, for example, found educators at both K-12 and post-secondary levels want to integrate technology at a much higher level than they currently are, but need support and assistance to do so.[23]

To be successful, professional development needs to be thought of as a process. A two-day summer seminar isn't enough. Instead, support needs to be ongoing, ideally with technology mentors on site. The forward-thinking CIO recognizes the shift to digital not only impacts students but educators as well. If it is good to have personalized learning environments for students, then instructors would also benefit from professional development presented in the same environment.

The forward-thinking CIO recognizes the shift to digital not only impacts students but educators as well.

One strategy: Once school starts, let professional development consist of something quick and useful, for example, a five-minute lesson on a practical tool. Save the comprehensive sessions for longer breaks, such as summer, when instructors have more time to focus on them.

Metropolitan Nashville Public Schools, as part of its digital transformation, required its 5,200 teachers and principals to complete online training modules before the fall 2014 semester began. The district also offered an incentive: Free laptops upon completion of the training (well, $1 laptops — teachers and principals could use the laptops immediately, both at home and at work, and then keep them after three years with the district for the price of $1).

One-to-One Institute's CEO Wilson says some teachers need to "unlearn" former practices and "re-learn" habits of teaching and learning to activate a student-centered, personalized classroom, where learning takes place at a student's pace. "It's a big challenge," she says. "It takes time, focused work and practice."

After all, educators are being asked to shift roles and in some cases change teaching strategies they've held their whole careers. Some hesitation, at the very least, is understandable.

Other faculty concerns include:

- **Too much data, unexplained:** This is an issue for educators as adaptive apps and other sources of student analytics inundate them with information. Karen Cator, CEO of Digital Promise, an organization whose mission is to improve the opportunity to
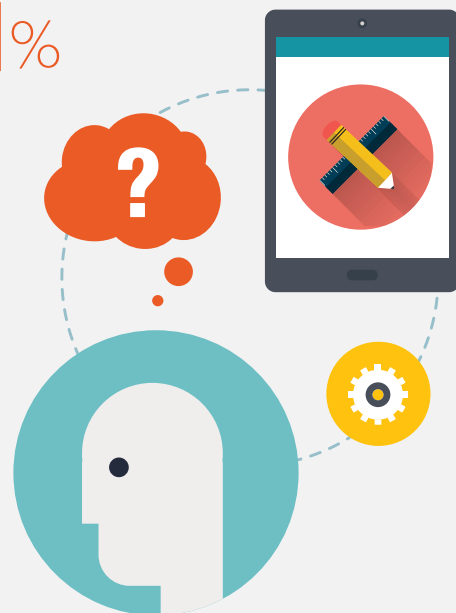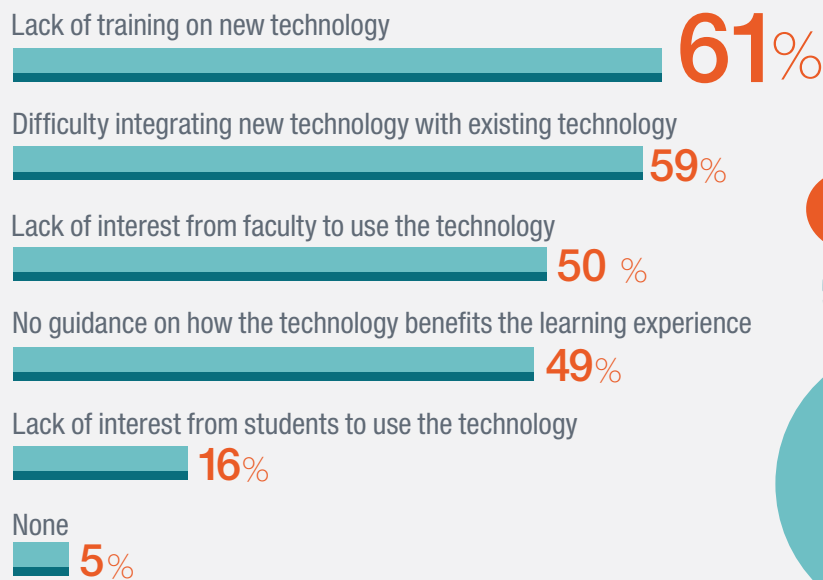

FutureStructure Insight:

Silos hurt professional development efforts, which makes technology integration more difficult. On many campuses, educators receive curriculum professional development one day and technology instruction another. The most successful approach is to treat both as an interconnected lesson — curriculum and technology are dependent on each other.

learn through technology and research, says many vendors need to provide better data dashboards. Programs that only provide raw data are more difficult for educators to use. "Systems using data need to improve the intelligence of the teacher or student and include recommendations for the next appropriate action as a result of that data," says Cator.[24]

CDE survey respondents reported the following as their biggest challenges in implementing digital curriculum:

Lack of training on new technology
61%

Difficulty integrating new technology with existing technology
59%

Lack of interest from faculty to use the technology
50 %

No guidance on how the technology benefits the learning experience
49%

Lack of interest from students to use the technology
16%

None
5%

Source: CDE Digital Curriculum Survey, 2014

In early 2014, California Gov. Jerry Brown signed the Student Online Personal Information Protection Act into law — perhaps one of the most stringent digital student privacy laws in place.

WIKIPEDIA.ORG

- **Too much digital content, unsorted:** Instructors and faculty members spend large amounts of time they don't have searching for digital resources. One way content is rated is by social networking tools. Content may appear in a repository that gives users the ability to rate it along a scale. However, it is still important to spend time researching content you intend to include — whether it's OER, educator-created or from commercial sources.

- **Copyright and fair-use issues:** When instructors do find content, how much of it can be fairly used? Is the item published under Creative Commons licensing, or is it protected by an instructor's copyright? It's not always easy to sort through these issues. Not all faculty agree to share the content they create, which remains their intellectual property; yet, the course materials can sometimes be found online and re-used by other instructors who may not realize it is protected. This can result in judgments against education institutions.[25] Be mindful of the legal minefields surrounding digital content.

Ensuring Privacy and Safety

Collecting student content and data raises fears about privacy and security. While data may be collected for benign purposes — to help education institutions with planning, for example — student information that isn't properly protected can wind up in the hands of commercial entities, subcontractors and others.

In response to concerns about student data privacy, a number of states have enacted laws regulating what can be kept. In 2014, California signed into law the Student Online Personal Information Protection Act (SOPIPA) — perhaps the most stringent student data law in place. SOPIPA prohibits operators of online education services from selling student data and using that information to target advertising to students or to "amass a profile" on students for non-educational purposes. It also requires online service providers to delete student information at the request of a school or district.[26]

Student safety is also a concern when accessing content. Institutions are expected to provide a safe environment in which students can learn, which means the information they

FutureStructure Insight:

Educators and technology departments need to work directly with curriculum experts. Oftentimes, educators report that IT can be too slow, causing instructors to access or purchase digital curricula, which may not be compatible with current devices or bandwidth capacity. Curriculum experts can provide educators with the content they need while IT departments ensure the content meets the technical requirements.

access should be appropriate. Content filtering can sometimes be too stringent, as schools seek to meet federal guidelines requiring them to protect students from Internet dangers. Social media sites are frequent targets of filters — but can also have educational value.

Metropolitan Nashville Public Schools at one time blocked YouTube and Twitter, but as part of the district's digital initiative, Chief Academic Officer Steele changed this, allowing students to access sites in the classroom under instructor guidance so students could have those resources available.

On the other hand, says Steele, "Students live in an online world and too often they are too trusting. School districts have to take that very seriously and protect students in an online environment." Digital citizenship programs need to be part of a digital curriculum, showing students how to behave responsibly online and avoid potentially perilous situations.

Vetting Content

Who examines instructor-created content or material found online to make sure it is student worthy and factually correct?

Vail uses a method Federoff calls "curation in parallel." Educators can post content immediately, but once they do, a link is sent to staff content reviewers. If reviewers have concerns about the item, they discreetly email the teacher who posted it and it's quietly taken down. This

prevents spirit-zapping delays while panels of reviewers go over material, says Federoff. Instructors also receive incentives for posting material — not only name and school recognition, but also entry into a sweepstakes for cash and prizes.
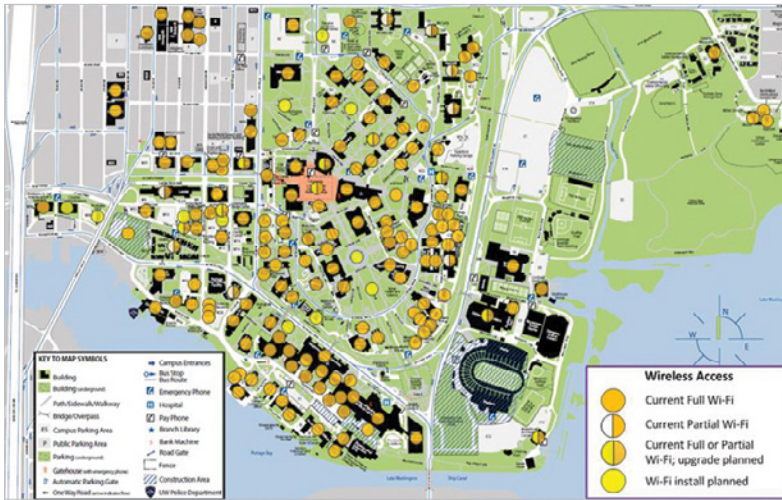
Other institutions have different vetting methods. Wiley, for example, notes that Utah high school content is pre-vetted by him before it goes to the teachers, who vet it again. The state review board then goes through it for a final review.

Another way to see which content passed muster is by crowdsourcing — having users rate which content they like. Most repositories, such as Beyond Textbooks, have this feature. The more raters, the higher the credibility of the content.

Improving Infrastructure and Bandwidth

Connectivity is always a key concern when making a digital transformation. Can the current network handle an increased traffic load? Adaptive software requires constant connectivity; devices such as Chromebooks depend on Wi-Fi, and video streaming and other memory-intensive activities take up bandwidth. Filtering can also strain the connection.

Before introducing new digital curriculum, institutions need to ensure the proper infrastructure is in place to handle at least one device per student and faculty member, if not more, who may be accessing the Internet at the same time. Many institutions are building

KEY TO MAP SYMBOLS

Wireless Access
- Current Full Wi-Fi
- Current Partial Wi-Fi
- Current Full or Partial Wi-Fi; upgrade planned
- Wi-Fi install planned

Some institutions have implemented creative solutions to ensure students have Internet access even when out of class. The University of Washington created an online map indicating Wi-Fi availability on campus, including outdoor hotspots and planned installation areas.

Wi-Fi networks to allow for three devices per student or faculty member — some are even looking to Wi-Fi solutions that allow for five devices per student or faculty member.

Finding Funding

Identifying resources to pay for infrastructure upgrades, devices and content is an ongoing struggle for both K-12 and higher education. At the K-12 level, the E-rate Modernization Order will provide $2 billion in additional funding for Wi-Fi services in 2015 and 2016. Additionally, varying state laws may impact funding resources. For example, some states allow the purchase of digital content or mobile devices out of textbook funds while others don't.[27]

While shifting to digital content can cost more on the IT side, in other respects it can save a significant amount of money — and not just when comparing the price of a $100 printed textbook versus a freely created, open source text. For example, discipline referrals often drop significantly; this means fewer staff hours spent in detention halls or counseling sessions.

Project Red calculated project savings nationwide if all K-12 institutions were to switch to 1:1 digital solutions, arriving at a staggering $3.1 trillion (most of that in dropout prevention, given

the costs to society when students don't graduate). Other cost savings can be found in paperwork reduction and less use of copy machines.[28]

For colleges and universities, offering more digital alternatives is a brand differentiator in a crowded field. If students don't have to pay costly textbook fees or tote heavy books, they may look more favorably on an institution.

Other creative funding options range from fundraisers to crowdsourced donations to selling naming rights to classrooms or buildings to slipping ads into digital content.

At some districts and colleges, parents and students are asked to pay for mobile devices — and often, these costs are less than what they would pay for textbooks. For example, at New Trier High School in suburban Chicago, students can buy tablets for $350 to $450, depending on the model they prefer; this compares with typical textbook fees of about $500.[29]

Bridging the Digital Divide

The digital learning gap is real and multi-faceted, says Digital Promise CEO Cator. Adoption of digital content and curriculum varies widely, from 1:1 on some campuses to a couple of computers in a classroom or computer lab. Roughly 27 percent of students lack broadband access at home[30] and, according to the 2010 census, 20 percent of American homes lack any Internet connection — due to choice, geographic location or socioeconomic status.[31]

There are three gaps to consider in digital learning:
- **Access divide:** Students don't have equal access to learning devices or Internet connectivity at school or at home.
- **Participation gap:** Though many campuses and homes have access to the Internet, decision-makers choose not to take advantage of it or do not have the digital skills to fully participate.

- **Use gap:** Some schools use technology in low-level ways, such as skills drills, while others use it in more challenging, powerful ways, such as solving a complex problem.

What causes the use gap? It's not just money or availability of resources, though that's certainly a component. More important, says Cator, is "the personality and the focus of the institution." Well-funded institutions may have simple uses of technology while lower-funded institutions may offer rich digital learning experiences. There doesn't seem to be a clear regional or economic pattern, but rather "pockets of excellence" scattered throughout, existing mostly due to the vision and focus of their leaders.

"It's great if students have access at home, but we know not every student will have that. Setting up the classroom so students can work while they are at school is more important."

Jay Steele, Chief Academic Officer, Metropolitan Nashville Public Schools

Institutions that want to transition to a digital environment should ask: Do we have the means to offer 24/7 connectivity for students who may not have it? Metropolitan Nashville Public Schools made mobile devices available to students, however, they are kept at school. About 76 percent of students in the district live in poverty, with about half lacking Internet access at home, says Steele. He believes access at home isn't as important as what happens in the classroom. "It's great if students have access at home, but we know not every student will have that. Setting up the classroom so students can work while they are at school is more important."

One-to-One Institute's Wilson thinks students need devices they can use 24/7 — and that includes at home. "What we're after is anytime, anywhere learning, so it's not just confined to nine months of the year

and within four walls of a building," she says. Being able to work from anywhere is part of the personalization process.

While the answer to bridging the digital divide is not always clear, some institutions have implemented creative solutions:
- Providing MyFi cards to students to create their own wireless networks at home
- Working with providers to promote low-cost services for lower-income families
- Publishing maps of Web access points in the district, including businesses, libraries and other sites where students are welcome to use free Wi-Fi
- Setting up sheltered outdoor spots on campus where students can use Wi-Fi after hours
- Providing more offline materials, which sacrifices interactivity but ensures access to content

Addressing Seat Time Versus Competency-Based Learning

Another concern are the "seat time" rules that can hamper blended and self-paced digital learning in some states. Many states are shifting to competency-based instructional models or have devised waiver systems for districts to make it easier to award credits based on achievement instead of physical presence in the classroom. For example, New Hampshire became the first state to do away with so-called "Carnegie units" in 2005, allowing for mastery-based learning instead. To find out where your state stands, visit the Carnegie Foundation's list of state credit policies.[32]

This remains an issue at the college level as well, particularly for public colleges that rely on state or federal funding support. The U.S. Department of Education has encouraged colleges to offer competency-based programs and has awarded federal student aid to support such programs.[33] ■

MAKING DIGITAL CURRICULUM A REALITY:
WHAT LIES AHEAD

Education researchers Charles Fadel and Jennifer Groff run the Center for Curriculum Redesign and are working to rethink the "why" of education. Their work centers on strategically rethinking and redesigning the general curriculum or standards structures covering 21st-century framework skills such as collaboration, creativity and communication, as well as how to build character.

Fadel and Groff work with a variety of countries that are highly touted for their educational systems, including Singapore, Finland, Australia and Canada.

"Digital tools may affect and inform some of the things we think are valuable and necessary," says Groff. "Much of our work is thinking about what curriculum in the 21st century should look like to support how we learn and the skills and demands of our world today; then we can help jurisdictions adapt these frameworks to their local contexts and identify digital tools to support their goals."

What changes can we expect to see in the next 5 to 10 years as new tools, systems and strategies emerge? One education element that has begun to transform already, according to experts, is the library.

Already, some universities are shifting to bookless libraries, offering only digital texts. Florida Polytechnic University in Tampa recently opened a futuristic new campus with a digital-only library. Students can request print books on loan from other libraries, but the library itself does not shelve any.[34]

Libraries will continue to manage information, in a role that is becoming more valuable than ever. After all, without print versions, if digital content isn't tagged, organized and managed properly, how will it survive? Curators will be needed to run the library's knowledge repositories and provide access to this information to students, teachers and faculty.

Librarians and media specialists can help guide the purchase of digital content at their institutions and can serve as tech-info guides for students and educators navigating the digital landscape. Libraries can offer space for student collaboration, videoconferences, professional development activities or even booths for virtual reality sessions.

As curriculum and content continue to be transformed, it's likely other aspects of education management and structure will change as well. For example, departmental organizational structures may shift, with content and training embedded into course design. IT and curriculum departments may see more overlap, as instructional technologists work with curriculum experts to design learning materials.

New jobs likely to rise in prominence include those focused around digital data, such as digital curators, content managers and content developers. These jobs are already rising in demand. Forty-four percent of the CDE respondents said they were already employing someone who focused specifically on digital content. Another 14 percent said they planned to employ someone in this position in the near future.

Additional Shifts and New Assessment Models

Traditional degree and diploma paths are changing. Thanks to online learning, students have more choices about which institution to attend. And assessment models are changing with a shift toward competency-based measures and badges that reward mastery.
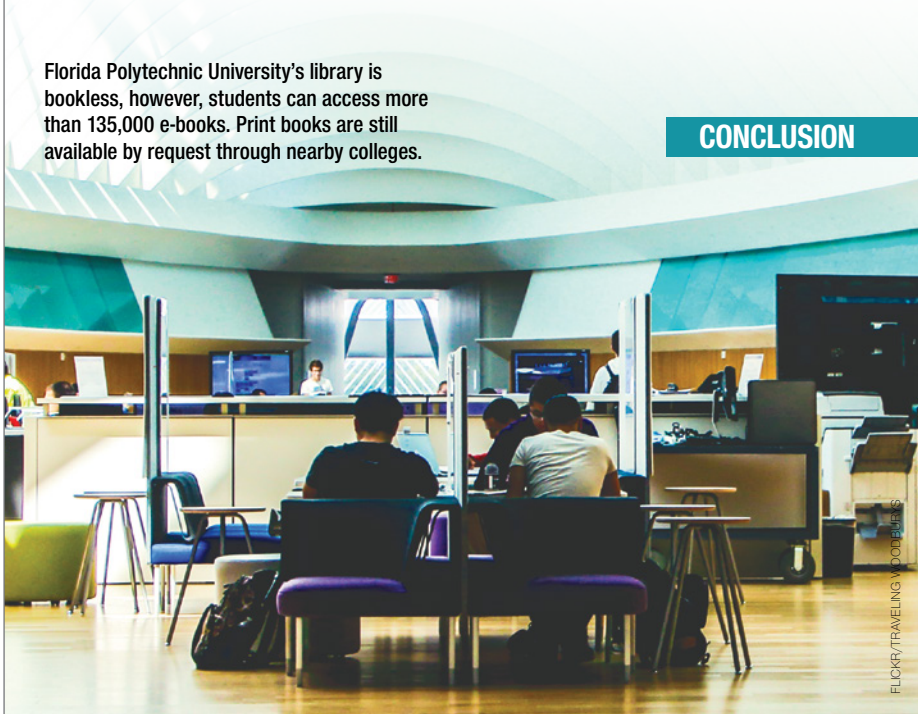
Mozilla's Open Badges project allows students to set up a digital backpack in which their digital badges can reside — presumably for life. A student may earn badges from various entities and institutions throughout his or her life, but the digital backpack is where they can be displayed.

At Purdue University, students who pass an eight-week, no-credit nanotechnology course can still earn recognition for this accomplishment via badges. Purdue's nursing program also uses badges to highlight specific skills students have attained.

Cator expects to see the development of personal profiles and learning maps — personalized learning plans that follow students throughout, and beyond, their academic careers. "Every person could move through that map with the necessary supports, moving their personal learning forward," suggests Cator.

It's likely that flipped, blended and virtual learning will continue to grow. The quality and quantity of digital content required by these education models will also increase, gradually replacing print textbooks, which is particularly helpful at the higher education level where students more directly bear the cost burden.

Federoff believes the concept of digital content repositories such as Beyond Textbooks could be replicated in other districts or perhaps regional collectives hosted by nonprofits, universities or state education departments. According to Federoff, educators are now at a crossroads. One path points to the purchase of digital textbooks alone, with pre-canned curricula. Or, institutions can travel down the other path — the one Federoff hopes they will take: Truly providing dynamic, flexible digital learning, attuned to the needs of 21st-century learners. ∎

Florida Polytechnic University's library is bookless, however, students can access more than 135,000 e-books. Print books are still available by request through nearby colleges.

FLICKR/TRAVELING WOODBURYS

CREATING A VISION FOR 21ST-CENTURY CURRICULUM

Technology will advance new tools and strategies for learning. We will continue to have instant access to information and connectivity to others worldwide, using increasingly affordable mobile tools, with all of the promise — and occasional perils — this provides.

The power of these innovations can be realized inside and outside the classroom through a thoughtful, creative digital curriculum — one that lets students connect with learning as relevant to their daily lives. Such learning offers greater promise that students will be prepared for college and careers, including new jobs that may appear in the coming decades.

However, as Cator points out, whether or not institutions make use of the promise of digital learning depends on their leaders having the vision, focus and motivation to fight for these implementations. ∎

LEADING THE SHIFT TO
21ST-CENTURY CURRICULUM

❝ *I think flexibility and dynamism are absolutely critical to digital content and digital curriculum for tying into the best kind of learning, knowledge and skills for the 21st century.”*

Leslie Wilson, CEO, One-to-One Institute

❝ *It's great if students have access at home, but we know not every student will have that. Setting up the classroom so students can work while they are at school is more important.”*

Jay Steele, Chief Academic Officer, Metropolitan Nashville Public Schools

❝ *The ability of teachers, schools and districts to create their own digital, online, interactive lessons, exercises, quizzes and district benchmark assessments, while taking advantage of third-party resources for reinforcement, is what makes for good digital curriculum.”*

Jackie Deluna, Vice President Marketing & Business Development, Jupiter Ed

❝ *Digital content is dynamic and can respond to environmental changes much easier, providing the student with the latest information available.”*

Roger Crisman, Senior Director Product Management, Cox Business

❝ *In today's ever changing digital world, it is more important now than ever for students to have a printer within their classroom. Having the ability to create crafts and school projects to further develop their skills and showcase their work for all to see will create a sense of pride and accomplishment.”*

Rita Dubey, Senior Manager, Marketing Canon U.S.A, Inc. ITCG Printer/ Consumer Prod Mkt Division

❝ *There's no shortage of good ideas, technologies or software — the question is: 'Where do you fit this into the curriculum?' Often, it's seen as an add-on that educators have to implement in addition to the things they were doing before, instead of replacing something. Educators are already overburdened and can get overwhelmed by new technologies when not provided with the proper tools or professional development to implement them.”*

**Dr. Lisa A. Frumkes,** Head of Language Learning Products, Rosetta Stone

❝ *A great digital curriculum connects students with a broader audience. When students publish their work online, it encourages them to see their efforts through a different lens, envisioning how people beyond their peers and teachers will react to their work.”*

Eric Patnoudes, K-12 Specialist, CDW•G

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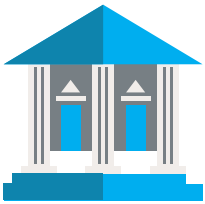
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Building the
CURRICULUM OF THE FUTURE

As American cultural anthropologist Margaret Mead once said, "We are now at a point where we must educate our children in what no one knew yesterday, and prepare our schools for what no one knows yet." She likely said this in the early 1970s, a time when mobile devices, apps and the Internet as we know it today didn't exist — yet her comment seems to be truer now than ever before. The curriculum of the future is unknown. Educators must build lesson plans that engage students beyond their often short attention spans, make the most of new and sometimes foreign devices, and ensure students are ready for the future — an arduous, but not impossible task.

For many, the learning process begins through a mix of trial and error and conversations with their peers. Our educators offer three of their favorite methods for building the curriculum of the future:

1. BRING ON THE TECHNOLOGY.

As new state standards become commonplace among districts, many are bringing in devices to help redefine the classroom learning experience, while aiding state-level testing. Val Verde Unified School District in Perris, Calif., a Southern California district with roughly 20,000 students, rolled out more than 4,600 Chromebooks to its students in grades 3–12. Then it empowered its educators to "power up" instruction. Every teacher or student who enters the system gets a Google account, which helps teachers make the most of device sharing and build useful apps, such as Newsela, Lego Builder and Prezi, into their lesson plans.

2. DEVELOP YOUR PROFESSIONALS.

New tools can make or break a classroom. Just as Val Verde USD trains its teachers, Chad Stevens, CDW•G K–12 strategist, encourages schools to consider how an investment in professional development maximizes the return on education. "It is critical to success that 'teaching the teachers' is part of districts' plans," said Stevens. "It doesn't matter how many apps a certain platform has; what matters is that those apps are aligned with your education goals."

3. GET CREATIVE.

Jeff Jakob, world affairs teacher at Joliet West High School in Ill., decided to reach his students with a new writing platform: blogging. With the assistance of Eric Patnoudes, CDW•G K–12 specialist and former educator, Jakob registered the class for quadblogging.net, which connected his students with three other classes around the world. "The blogging experience had a tremendous impact on these students," said Patnoudes. "We watched some quiet and timid students blossom into confident writers, ready to tackle the blogosphere." Blogging is a great avenue, but Patnoudes and Jakob note the main takeaway is that it's not about the technology, but rather the learning opportunity the technology affords.

CDW•G is dedicated to helping districts and institutions find the best resources to aid learning — whether that be implementing a strong Wi-Fi network to make sure all your devices are up and running, helping you determine the best devices for your classrooms, or sharing other districts' and institutions' experiences to help make yours a success. Give us a call at (800) 808-4239.

CDW•G
PEOPLE WHO GET IT

For more information, visit: cdwg.com/k12

Learning Analytics Support Personalized Education

Personalized learning is proving to be a key aspect in student success, and learning analytics are helping educators provide individualized instruction by leveraging the power of data.

Real-time analysis allows educators to predict or discern a pattern in data so they can adjust their teaching style on the fly, ensuring the needs of each student are met. Instant feedback also enables educators to assess the gap between what students know and what they are expected to know, identifying where students and educators should focus their efforts.

To support the shift to personalized learning, Jupiter Ed offers Jupiter iO, an all-in-one solution for improving student academic achievement and helping K-20 education institutions operate more efficiently. The Jupiter iO solution includes:

- **Adaptive testing, tracking and reporting.** With progress as the focus of each individual student, class or defined group, Jupiter iO generates summaries, class goals reports and progress reports over multiple grading periods. Parents can

even monitor student learning and teachers can evaluate when personalized learning will best serve the student.

- **Early alerts, intervention and collaboration.** The Jupiter iO analytics tool tracks student performance by integrating data collected from a variety of sources, including the gradebook, student information system and learning management system. This data enables educators to assess student achievement, identify at-risk students, initiate early interventions and support collaborative learning.

- **Analytics for efficiency and effectiveness.** Analytics can be used to measure and improve school or college initiatives, including drop-out prevention, resource management and financial planning.

As the need for personalized learning increases, so too will the need to collect, discern and act on valuable education data. Jupiter Ed can help prepare your institution for this shift — ensuring all students learn in ways that help them excel.

Jupiter Ed

To learn more, please visit: www.jupitered.com/jupiterio

Higher Culture for
Higher Education

Rosetta Stone Helps Prepare Students for Global Success

Education is no longer confined to the classroom. Technology empowers students across the globe to connect, collaborate and communicate. The growth of the global marketplace and workforce makes it imperative for higher education institutions to foster interest and mastery in language learning.

The Rosetta Stone® Language Learning Suite for Higher Education offers online solutions that meet the needs of beginner through advanced level learners. Students and faculty can access online learning anywhere, anytime, spurring language development inside and outside of class. Studies show that flexible virtual learning helps language learners achieve mastery and maximizes instructors' time.[1] One study even showed success in hybrid classes that balance online work and face-to-face time.[2]

The Rosetta Stone Language Learning Suite offers:
- Administrator tools that enable educators to track and measure real-time usage as well as assess progress of individual learners
- Assessments built across all levels to include placement, progress and achievement tests
- A number of languages with content for beginner to advanced learners that can be tailored to department guidelines and curriculum
- 24/7 access to the Web-based learning platform
- Training, implementation and support services to ensure successful deployment of your language learning program

Because Rosetta Stone's language solutions are Web-based, there is no hardware investment required from the institution. These solutions provide instructors with a classroom supplement to support blended learning environments and reinforce students' self-led study habits. Colleges and universities can implement these solutions easily, institution wide, providing an ideal opportunity for language exploration and global exposure for students, faculty, staff and even alumni.

Secondary education institutions are charged with equipping students with the necessary skills to enter the workforce. Language learning helps ensure that as students graduate, they have the language skills needed to compete in the global economy and are prepared to communicate with potential colleagues and employers around the globe.

Rosetta Stone has helped 22,000 education institutions meet their language program goals. With more than 20 years of experience, we continue to support educators with interactive language program solutions, professional development and training, and robust administrator support tools.

1 Language Learning Technology Helps Build Global Competence Infographic, Rosetta Stone
2 Ibid.

Competition in the global economy:

16% of language learners and nearly **14% of instructors** use their smartphones for education purposes.
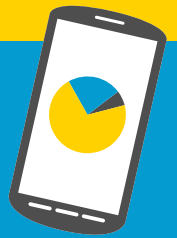
93% of surveyed educators said grads should be prepared for multilingual work environments.

96% of surveyed executives said language skills are critical to success in today's economy.

76% of employers are not currently satisfied with the foreign language skills of graduates.

Source: http://resources.rosettastone.com/CDN/us/pdfs/brochures/higher-education/ EDU-LLSuite-HED-BRO-1406_web.pdf

RosettaStone® | Education

To learn how **Rosetta Stone** solutions can complement your language program, visit: rosettastone.com/highered

Maximizing Printers for the Digital Classroom

As education becomes more digital — with advances such as e-textbooks, mobile devices, big data and more — the need for efficient and secure printers increases. Schools and districts are finding that enabling access to printers for all students, teachers and faculty supports their digital strategies and enhances learning. In order to maximize the use of printers, however, schools and districts need cost-effective solutions that allow them to improve back-office efficiencies. Canon is a leading provider of innovative digital imaging solutions, including top-of-the-line inkjet printers. When schools and districts purchase Canon printers, they can expect the following advantages.

Ease of Use

- **Intelligent Touch System:** Intelligent Touch provides for the intuitive navigation of all printer menus and functions. The light will guide your fingers, so only the buttons you need at any given moment are illuminated.

Cost Savings and Eco Friendly

- **Auto Duplex Automatic Document Feeder:** Work with multi-page documents and copy/scan/fax two-sided originals without having to turn the pages over.

- **Two-Sided Printing:** Save up to 50 percent of plain paper.

- **Individual Ink Replacement:** Reduce waste by replacing each color as it runs out.

Connectivity

- **AirPrint:** Easily print from iPads, iPhones and iPod Touches without installing any drivers.

- **PIXMA Printing Solutions (PPS):** PPS makes it easy to print and scan photos or documents directly from your compatible mobile device. With the cloud printing function you can print directly from select online cloud services, such as, Facebook, Twitter, Dropbox®, OneDrive™, Google Drive™, and more, either right at the printer itself or from just about anywhere with your mobile device and the free PPS app.

- **Google Cloud Print:** Print from anywhere using everyday applications. Print attachments from Gmail and Google Docs.

- **Wireless PictBridge:** Print photos without cables from Wi-Fi enabled cameras.

Service and Support

Canon offers award-winning U.S.-based customer service and support.

Visit: http://usa.canon.com/cusa/consumer/standard_display/cso_home for more information.

To learn more about the critical role of printers in today's digital classroom, download the Center for Digital Education's white paper, "Printer Access in a Digital World," at www.centerdigitaled.com/paper.

For more information, contact the Canon Education Department at educationsales@cusa.canon.com or visit us at usa.canon.com/educationsales.

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Acknowledgements:

ENDNOTES

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