

Guide to Choosing

DIGITAL CONTENT and **CURRICULUM**



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INTRODUCTION

THE PATH TO DIGITAL TRANSFORMATION

The adoption of digital content and curriculum is a top priority for U.S. school districts. Ninety percent of districts in a Center for Digital Education (CDE) survey said they were either planning to or already had implemented personalized learning programs utilizing digital content. But while digital content and curriculum has been a hot topic for some time, few districts have successfully adopted it in all grade levels and subject areas.

While districts have largely used software applications to supplement text-based instructional resources, digital resources are now rigorous and robust enough to be used in place of traditional textbooks. But how do districts move from selecting print content to identifying and obtaining high-quality digital content appropriately aligned with state-adopted standards?

Digital curriculum can certainly be more engaging to students than print curriculum; however, in many instances it can also be difficult for districts to review and select proper digital resources. In the print review process, publishers bring samples for teachers to review over a period of weeks. In the digital review process, publishers offer demo accounts but reviewers don't always see the fully functioning tools. In the print review

process, teachers look at the textbook and all of the supplemental materials associated with the text. In the digital review process, they can see a sample account but not necessarily how the tool integrates with enterprise systems or other software. All of these factors make it more challenging to review and select digital curriculum. Even when districts have plans to select content and improve technology infrastructure to ensure all students have access to the instructional materials they need, the foundation of a successful implementation depends on teachers' ability to effectively utilize these resources within the learning environment.

This guide is intended to help districts address some of the challenges of moving from a print-based to a digital-based curriculum. It provides context, effective practices and resources for districts and is divided into three sections: planning for success, understanding digital content and curriculum options, and implementing with fidelity. The appendix features case studies of districts already implementing digital content or setting up the infrastructure to do so. We hope you find it useful and informative as you begin or continue implementing digital content and curriculum.

SECTION 1:

PLANNING FOR SUCCESS

DIGITAL CONTENT

is a single learning object or lesson created with a selection of learning objects.

DIGITAL CURRICULUM

is a series of lessons representing units of study aligned with a curriculum map or standards.

All districts have some kind of strategic plan in place to guide their work. The district strategic plan is the place to start your digital transformation. A best practice is to start with your 'why.' Know why this work is important to your district and articulate your anticipated measurable outcomes. Be sure you can communicate the why, the what and the how so your community is aware and engaged. The plan should be inclusive and contain clear and measurable goals. Developing a successful digital content and curriculum plan requires the following steps.

1 Establishing a Common Vision and Understanding

Before taking the digital leap, it is essential to establish a common vision. That vision should be the foundation for all decision-making, policy development, classroom practice and digital content selection. This should go beyond the low-hanging fruit of increasing engagement and look at how to prepare students for college and the modern workplace.

The vision for college and career readiness will be unique to each district. Creating it will require the collaboration of all stakeholders. Such a vision must account for academic and cognitive outcomes, as well as non-cognitive skills such as the ability to work in a team. This vision

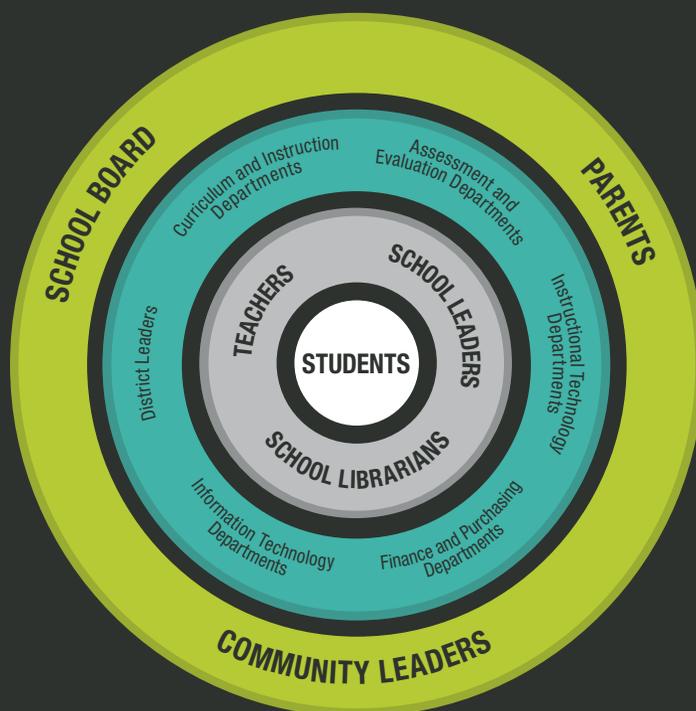
then drives changes in teaching and learning and the associated changes in content and curriculum.

2 Involving Stakeholders

No plan is successful without full engagement from key stakeholders. During the digital transformation process, districts should include both internal and external stakeholders. For example, teachers, principals and instructional coaches should have a clear understanding of the goals and take ownership of the movement. This ownership is essential to the transformation and requires them to be involved in the planning from the beginning. They should help define the role they will play in the implementation and outline their responsibilities for the process within their respective schools and classrooms.

Departments outside of curriculum and instruction are critical as well. A digital transformation is impossible without a strong partnership between the information technology department and the instructional technology department in collaboration with instruction, assessment, data quality, operations and human resources. Students, their parents and the greater community must also recognize the significance of this change and support it vocally. This new way of using digital instructional resources is much different than how parents and

DIGITAL CONTENT and CURRICULUM STAKEHOLDERS





Students, their parents and the greater community must recognize the significance of the shift to digital content and support it vocally.



community members were educated. Many of them may not be familiar with digital resources, so it will be important to make sure they understand the value in this decision and include them in the planning process.

3 Shifting the Mindset

Adopting digital content and curriculum requires a profound change in mindset. Technology offers students the opportunity to take ownership of their learning, and enables teachers to accommodate a more student-centric learning environment. Digital content, tools and curriculum support this shift by allowing students to collaborate, work at their own pace, access various resources and extend their learning beyond the four walls of the classroom.

The most difficult part of this mindshift is the gradual release of control required for students to take ownership. Change needs to start at the top. Dr. Dan Lawson, director of schools at Tullahoma City Schools in Tennessee, says the biggest challenge for his school district — which has been developing open educational resources (OER) for four years — looked at him in the mirror every morning.

“I think the biggest challenge we faced was me,” he says. “It’s about leadership and a willingness to embrace the fact that you’re not going to have all of the right answers from the state. You’re not even going to know all of the questions that you’re going to deal with, but you just have to plunge in with a good heart, with a good faith effort to make this happen with the best of people and put those best of people to work.” (To learn more about Tullahoma City Schools, see page 29.)

Part of this transformation is helping teachers become comfortable acting as coaches rather than conveyors of academic content. To give teachers the freedom to adapt and hone their practice, administrators must relinquish control as well.

Shifting the mindset also includes establishing an environment of collaboration among schools in a district to identify, develop, curate and share digital instructional resources. Teachers sometimes have a tendency to protect their intellectual property instead of making it available through Creative Commons or OER Commons. But the benefits of sharing instructional resources can be powerful.

For example, imagine you have a magnificent math teacher in one of your schools. You wish you could replicate her, but you haven’t been able to hire anyone quite like her in years. Now imagine that math teacher creates amazing digital content for her students, who in turn earn higher scores on math assessments than other students in the school. Wouldn’t it be terrific if you could use her instructional resources and video one of her lessons so other teachers could benefit from her expertise? That’s powerful! But it requires a shift in mindset.

A photograph of a teacher and students in a classroom. The teacher, a Black woman with curly hair wearing a blue sleeveless top, is leaning over a table and smiling as she looks at a tablet. A young girl with blonde hair, wearing a white shirt, is also looking at the tablet. Another student's hand is visible on the right side of the frame. In the background, there is a world map on the wall and some papers on a desk.

SECTION 2:

**UNDERSTANDING
DIGITAL CONTENT
AND CURRICULUM
OPTIONS**

Once districts decide to go digital, they face several options. The burgeoning #GoOpen movement (see "Districts and States #GoOpen" on page 12) is creating a growing volume of openly licensed digital resources that educators may share and curate to produce digital content and curriculum. Districts may also choose to purchase digital resources from commercial providers or from other districts. For many districts, this won't be an either/or decision. Digital content and curriculum strategies likely will include a mix of free and paid resources.

In this section, we'll examine the general attributes of good digital content and explore the benefits and nuances of free and paid content options.

Recognizing Good Digital Content

Digital content should engage students and be easy to navigate. Here are some qualities you should look for:

- » **Graphics** – The content should include images and graphics that are clear with crisp colors and edges. Select images and text that are complementary and not cluttered.
- » **Learning paths** – Students should be able to embark upon individual pathways of learning based on their level of mastery on embedded formative assessments.
- » **Interactive elements** – Students should be able to easily interact with the content by clicking on it, scrolling through it, mousing over it and more.
- » **Assessment elements** – The digital content should include assessments that feature multiple choice and fill-in-the-blank queries, as well as those that measure

higher-order thinking. Opportunities to reflect on learning and interactive skill assessments should be incorporated as well.

- » **User interface** – The content should be highly visible with intuitive navigation for an optimal user interface.
- » **Adaptive engines** – Learning management tools should utilize data collected through student interaction with the software and assessments to create a personalized learning path that adapts to the student's needs.
- » **Interoperability** – Data should flow between applications seamlessly. Adopting standards for interoperability such as those from the Ed-Fi Alliance or the IMS Global Learning Consortium will establish protocols to maximize integration and increase data quality.
- » **Cognitive load** – Be aware of the types of activities and assessments in each learning path. Too much stimulation and too many activities can become overwhelming for the learner.
- » **Data collection** – Capture data via assessments or other user interface features so you have a 360-degree view of the learner's capabilities.
- » **Self-paced** – Students should be able to work through the material as they master content knowledge and skills at their own pace.
- » **Universal design for learning** – Universal design for learning (UDL) is the best practice and incorporated into the National Education Technology Plan. To learn more, visit http://www.udlcenter.org/sites/udlcenter.org/files/updateguidelines2_0.pdf.

CONTINUUM of DIGITAL TRANSFORMATION

For many school districts, the shift from print to digital may not begin in the classroom, but rather in the school library where students interact with databases, eBooks and software subscriptions.

As teachers and students become familiar with these resources, the school district may graduate to more purchased and subscription-based digital materials as a supplement to adopted texts. At this point, districts also may start creating and curating their own digital content.

You can see a common pathway to digital content adoption in the graphic below.

Software subscriptions, eBooks and other digital resources are offered in school libraries.

Subscription-based materials start to supplement textbooks; teachers start developing content.

Districts begin adopting digital content for intervention curricula and other supplemental needs.

Districts begin adopting digital curriculum, typically one subject area at a time.

Teachers begin creating and curating OER curriculum, usually one subject area and grade level at a time.

The Importance of Assessment and Evaluation

One thing to keep in mind when selecting or creating content or curriculum is assessment and evaluation. When choosing or developing instructional materials you need to be confident that high-quality and validated assessment is part of your solution. The shift to digital content has had a profound impact on the way we assess student performance. Paper and pencil assessments featuring multiple choice, true and false, and short answer questions typically are not effective at evaluating higher-order thinking skills and student performance. Paper assessments make it difficult to provide timely feedback, are time consuming to grade and reduce instructional time.

At one time, assessments were largely summative with districts providing reports to the state on large group performance at the end of instruction. Now assessments are a more formative process, providing teachers with just-in-time data that can inform day-to-day instruction for individual students. Digital tools provide options for assessment in multiple media formats that can better measure problem solving and reasoning.

Going Open with Open Educational Resources (OER)

Teachers have long created and curated their own content to supplement district-adopted curriculum. Now digital resources make it possible for teachers to develop their entire curriculum from OER — but this path does take

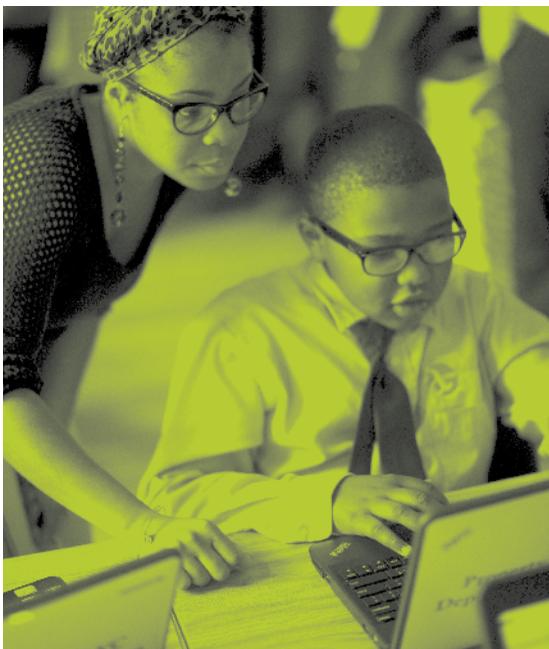
understanding and work. This section outlines what open educational resources are, how they can benefit districts and how districts can curate their own curricula for any grade level or subject area.

What are Open Educational Resources?

According to the William and Flora Hewlett Foundation, "Open educational resources are teaching, learning and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and repurposing by others. OER include full courses, course materials, modules, textbooks, streaming videos, tests, software and any other tools, materials or techniques used to support access to knowledge." Additionally, these resources follow the 5R framework developed by Lumen Learning. (See "The 5Rs of Openness" at the bottom of this page.)

How Will They Benefit My District?

Equity and Accessibility. OER have two things in common: free access to the content, resource, journal article, data, knowledge artifact, software or standard, and a formal grant of rights and permissions giving the user many of the rights and permissions that a copyright normally reserves exclusively for the creator or other rights holder. OER provide equitable access to all students, teachers and administrators because they can be distributed freely to anyone. Students and teachers are no longer limited by their school budgets or procurement practices to access quality learning materials.



DAVID KIDD

THE 5 Rs of OPENNESS

- » **Retain:** The right to make, own and control copies of the content
- » **Reuse:** The right to use the content in a wide range of ways
(e.g., in a class, in a study group, on a website, in a video)
- » **Revise:** The right to adapt, adjust, modify or alter the content itself
(e.g., translate the content into another language)
- » **Remix:** The right to combine the original or revised content with other open content to create something new
(e.g., incorporate the content into a mashup)
- » **Redistribute:** The right to share copies of the original content, your revisions or your remixes with others
(e.g., give a copy of the content to a friend)

SOURCE: LUMEN LEARNING, [HTTP://LUMENLEARNING.COM/ABOUT-CER/](http://lumenlearning.com/about-cer/)

COPYRIGHT, FAIR USE and FREE USE for EDUCATORS

Copyright is something everyone is challenged to abide by in today's information era. Specifically, copyright provides legal protection for original creative works. Persons who hold copyright to their creative works are able to authorize the use of the works. Oftentimes there is a misconception around copyright and fair use. Copyright holders have several rights afforded to them regarding use of their creative work, including using their work for public display or performance, reproducing the work, distributing copies of the work, or translating and dramatizing the work, also known as derivative works.

Fair use allows copyrighted materials to be used without permission from the copyright holder, but only following these four parameters: purpose and

character of use, amount of work to be used, nature of the work and effect of any use on the market for the work. Even though you may use creative works under fair use as an educator, it does not give carte blanche to use creative works in your creation of instructional materials and then distribute those instructional materials to others. For more information, visit http://mediaeducationlab.com/sites/mediaeducationlab.com/files/CodeofBestPracticesinFairUse_0.pdf

Free use. Some things fall under "free use." These include federal government works or public domain works (i.e., a 19th-century painting). The best way to avoid any copyright confusion when creating your own content is to use OER Commons or Creative Commons.

The impact of this can be dramatic. A shift to OER transformed learning for students in Mississippi's Columbus Municipal School District. When the district's superintendent, Dr. Philip Hickman, arrived over a year and a half ago, he cancelled his predecessor's \$700,000 order for traditional textbooks, and instead began investing in OER — both print and digital — and teacher professional development. For the long-struggling district, the move was a game-changer.

"We've done a lot of adaptive assessments, and we've shown that when our kids walk through our door — and after they've had our instruction for months — they're actually growing at an exponential rate," says Hickman. "The students are setting goals to what they want to achieve and how fast they want to grow. It's a lot of personalization and ownership." (To learn more about Columbus Municipal School District, see page 25.)

Relevance. Traditional textbooks are perpetually outdated, forcing districts to continually invest significant portions of their budgets to replace them. The terms of use for OER allow educators to maintain the quality and relevance of their materials through continuous updates.

This is a key advantage for Kansas' Lawrence Public Schools, which has teachers on special assignment working to curate OER. "A textbook is stagnant for maybe 5 to 10 years," says Kristl Taylor, a teacher on special assignment for social studies. "With OER available at your fingertips, you can change the lesson plan based on a current event that happened last week. It's so important for kids to have

that immediate and real-world application right now." (To learn more about Lawrence Public Schools, see page 26.)

Bristol Tennessee City Schools is also seeing the benefit of updated and relevant OER content. Gary Lilly, director of schools for the district, says, "Unlike a traditional textbook where you've got this adoption for seven years, we're able to go in and say, 'You know what? We used this resource with this class, but these things didn't work out as well as we had hoped. So we're going to update them.' That's a huge benefit of OER." (To learn more about Bristol Tennessee City Schools, see page 29.)

Cost Savings. Districts that have adopted OER say the move lets them shift funds traditionally spent on textbooks toward other priorities. Tullahoma City Schools, a small district nestled between Nashville and Chattanooga, Tenn., launched an OER initiative four years ago, and it currently uses OER for social studies, math and English language arts. Director of Schools Lawson says growing use of free and open content gives the district greater latitude in how it uses budget dollars. "Funds that previously were expended on resources that we had little choice about now are expended on professional development for teachers, on modest stipends for teachers and on digital devices for our kids." Lawson adds that the district's goal isn't to spend less, but to spend differently. "We're not saving money, nor are we intent on doing so, but we're intent on spending our money more wisely and putting it to better use."

Ultimately, Lawson says OER will provide as much as 85 percent of the district's educational content. There will still be



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DISTRICTS and STATES #GOOPEN

The U.S. Department of Education is helping school districts and educators adopt OER through its #GoOpen campaign. The initiative brings together state and district leaders, education technology companies and non-profit organizations to share ideas and build new tools that help educators find, create and curate open content.

Fifty-one #GoOpen Launch Districts have committed to replacing at least one textbook with OER over the next year. These districts will work closely with 10 #GoOpen Ambassador Districts — chosen for their experience with OER deployment — to sustainably implement OER.

In addition, 14 states have launched #GoOpen initiatives aimed at supporting districts and educators as they transition to OER. The state programs will work with #GoOpen districts and innovative platform providers in setting a vision and creating the environment where educators and students can access open content, along with tools and expertise necessary for using it. For more information, visit <http://tech.ed.gov/open-education/go-open-districts/>

areas where paper and pencil or subscription content is the right choice — Lawson points to developmental activities in primary grades and high school-level career technical education as examples — but use of OER will grow steadily as the district strives to improve the effectiveness of its curricula.

“When I think about reallocating millions of dollars and putting it in the hands of kids who couldn’t otherwise have the equipment, it’s a pretty compelling case. When I think about the relevance of the curriculum, it’s pretty darn compelling. When I think about involving my kids instead of reading something on page 17 that’s been published thousands of miles away, that’s pretty darn compelling,” says Lawson. “So for me, it’s almost a no brainer.” (To learn more about Tullahoma City Schools, see page 29.)

Teacher Empowerment. A high-quality teacher is the most essential resource in any classroom. Open educational resources enable teachers to ensure instructional materials are selected to personalize student learning. They also empower teachers as creative professionals by giving them the ability to adapt and customize learning materials to meet

the needs of their students without breaking copyright laws. Some teachers will become proficient in developing digital content and district officials should consider implementing policies defining intellectual property both for the teacher and the district.

Cara Bosler, a sixth-grade science teacher with North Kansas City School District in Missouri, has been involved in the district’s adoption of OER over the past two years. She says creating and curating her own course content is uniquely rewarding. “I feel that I am more involved,” says Bosler. Before the OER program, the curriculum was handed to teachers who had little to no say in its creation. That’s all changed. “Now I am more empowered. I have that sense of pride that comes with creating something. We know where we want students to go.” (To learn more about North Kansas City School District, see page 27.)

Collaboration Opportunities. Vista Unified School District (VUSD) in northern San Diego County has embraced the use of OER for several years — now the district is building partnerships to create even more opportunities for

its approximately 25,000 students, says Dr. Devin Vodicka, the district's superintendent.

VUSD already collaborates with Mentor Public Schools in Ohio and Kettle-Moraine in Wisconsin in a partnership known as COW (California-Ohio-Wisconsin). "It's an inter-disciplinary, digital learning, competency-based approach where students collaborate with one another across states," Vodicka says. "It's been a tremendous opportunity."

The districts focus on developing and curating OER and can share more easily now that each of their states has adopted the Common Core State Standards. They also all use the same communication platform. "With those commonalities, we can extend collaboration in some very interesting ways and bring in other open resources," says Vodicka. (To learn more about Vista Unified School District, see page 28.)

Leveraging Purchased Content

Some districts may choose to purchase their digital content due to time limitations, limited content area expertise or limitations of OER. Even the most comprehensive curated collections may require districts to purchase at least some supplemental content.

Digital content can be purchased from other districts or commercial enterprises. Purchased content allows the district to own the digital content and therefore have rights to modify it as needed. Purchased content will have a higher upfront cost but can be cost effective if there are

large numbers of students using it. Commercial content can also be leased, which is especially valuable in the first years of shifting to digital content and for courses that have low student enrollment. However, in this model the content is proprietary and may be difficult or impossible to modify.

Just as curating or creating content requires significant thought, you also need to carefully consider your selection of content to purchase. When procurement becomes an option for digital resources, districts must weigh the level of quality and cost of the investment. There are several other items to consider prior to purchasing digital content, too, including license structure, renewal expenses, interoperability with existing enterprise or other software solutions, alignment with standards and district initiatives, and usability that can impact rate of adoption.

Will Purchased Digital Content Save Money?

To determine the cost savings of purchasing digital content over traditional textbooks, a district can calculate the content cost per student. A \$125 Algebra book used for 7 years has a content cost of \$17.86 per student. Purchasing a classroom set of 30 books would make the course content cost approximately \$3,750. Four hundred textbooks would cost the system \$50,000 for the 7-year period.

Purchasing digital content is a great value with larger numbers of students. Purchasing an online digital algebra course for \$17,000 for 400 students that will be used for 7 years would cost approximately \$6 per student. Leasing

ORGANIZING DIGITAL CONTENT

Whether you create or curate OER or decide to purchase content, it is best to provide one central platform, such as a learning management system (LMS). With an LMS, teachers can access OER and content from different publishers in one place.

For instance, Baltimore County Public School's (BCPS) LMS allows teachers to grade assignments, connect with parents, monitor students' needs and personalize learning by pushing unique materials to selected groups of students. The district's interactive curriculum is integrated into the platform, allowing teachers and administrators to make real-time adjustments to instruction or curriculum as needed. Educators can track students' challenges and successes, while administrators gain a high-level picture of individual school and district performance. (To learn more about BCPS, see page 26.)

Key capabilities to look for in an LMS include:

- » Ability to work offline
- » Data tracking functions
- » Compliance with accessibility mandates
- » Support for standards such as IMS LTI 2.0 and IMS Caliber
- » Issues notifications
- » Gradebook functionality
- » Support for formative assessments
- » SIS integration
- » Ability to measure the effectiveness of content

digital content at \$15 per seat for 400 students per year for 7 years would cost approximately \$42,000.

There are certainly other costs that need to be considered with digital content such as a system to distribute the content, just as textbooks have a number of associated costs such as bookroom clerks, distribution, storage and replacement. The most expensive way to deploy your digital content is to add it on top of all of the other content outlays in a classroom. Maintaining the expense of textbooks plus digital content is budget prohibitive. Schools should strategically consider all associated expenses and potential savings. Eliminating textbooks, workbooks, handouts, paper assessments, copiers, flip charts, markers and supplies can help schools quickly cut costs.

Successful Practices in Purchasing Content

Before developing a request for proposal (RFP) to buy digital content, you must first know what you are trying to accomplish. Are you planning to use it in all schools? All grade levels? All subject areas? For special education? For English language learners? These items need to be outlined in the RFP so vendors will have the information they need to develop a clear proposal. It's often helpful to establish a formal committee to oversee the RFP process and ensure all digital content needs are being met.

For example, Houston Independent School District (HISD) created an RFP process for purchasing supplemental materials that includes four categories: instructional software (digital resources), non-digital supplemental materials, non-instructional software and consulting services (contractors). Each category has its own committee composed of voting members who hold strategic positions, and non-voting members representing highly specialized subject matter experts. All members contribute toward the RFP's specification requirements and scoring sheets. After proposals arrive, the entire committee participates in



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the reading process, with non-voting members providing expert opinion and voting members providing scores and justification aligned to the district's digital strategy. Committee members can only vote on the specific proposal areas where they have expertise. HISD has 283 schools, each of which has unique populations and needs, so the committee often approves more than one product — and in some cases several — in each category. (To learn more about Houston Independent School District, see page 33.)

You also must know the scope of the project prior to writing the RFP. If the scope is all grade levels and all subject areas, then you may want to conduct a request for information (RFI) instead of an RFP. Conducting an RFI gives you the opportunity to see how companies can support your initiative before you enter the bidding process.

Districts may rush to RFP without realizing they could take a more economical approach. By reaching out to other districts in their region or state, districts can find what solutions they may already have on contract and determine if there are consortia contracts available. Consortia contracts, such as the National School Board Association's BuyBoard, collect contracts for schools to take advantage of pricing and terms.

Districts need to note the timeframe for the contract so there is a reasonable amount of time to install, test and provide professional development to teachers prior to using digital content in the classroom. The onramp timeline must

A HYBRID APPROACH to DIGITAL CONTENT

Districts may end up with a mixed-media approach where some content is purchased and some is OER. This format can work nicely and it doesn't matter if the OER is supplemental to the purchased content or if the purchased content is supplemental to the OER. This offers a good blend of digital content resources and a great amount of flexibility to teachers.



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be well mapped when implementing purchased content and all parties should be aware of it and held accountable for moving it forward. One misstep can delay implementation for weeks or months and create chronic challenges for teachers and student learning.

A project implementation plan designed with the content partner is the best approach for purchased content implementations. Involve all parties — including IT, curriculum, human resources, professional development and instructional technology — in the implementation process to avoid any pitfalls.

What to Look for in Purchased Digital Content

- » **Standards:** Is the curriculum developed based on state and national standards such as the Common Core State Standards?
- » **Research:** What role has the established body of learning research and best practices in teaching played in developing the curriculum?
- » **Engagement:** How does the vendor address varied learning styles and ensure students are actively engaged with — and motivated by — the instructional content?
- » **Flexibility:** Does the vendor meet the needs of the district's current programs? Is the vendor capable of helping the district expand existing programs or start new programs?
- » **Academic Integrity:** What is the vendor's approach to ensuring academic integrity in a digital environment, and what features are provided to enforce district policies?
- » **Assessment:** Does the curriculum employ multiple methods to assess student performance, including teacher- and computer-scored assessments? Are test banks randomized to provide a new test for each assessment attempt?
- » **Comprehensive Solution:** Is the LMS and formative assessment integrated with the digital content? Does the solution allow for a variety of implementation models (e.g., from virtual to in-classroom instruction, from complete courses of study to modular content to enhance classroom instruction)?
- » **Ease of Implementation and Integration:** How much effort is required by district technical staff for implementation? What impact will the solution have on existing network infrastructure?
- » **Professional Development:** How will the vendor ensure programs are set up for success on day one? What type of professional development and ongoing support is provided to the district?
- » **Cost:** How does the cost of the vendor's proposed solution relate to the value the solution will bring to the district?



SECTION 3:

**IMPLEMENTING
WITH FIDELITY**

Regardless of whether you curate OER or purchase digital content (or a mixture of both), you need to make sure you have the processes in place to successfully implement it and the infrastructure to support it.

Putting Students First

Above all else, decisions about digital content and curriculum should consider the impact on student outcomes. Making sure students have the right skills to thrive in digital learning environments is an important consideration as districts go digital. It is a commonly held myth that since digital natives can easily navigate Facebook, Twitter, Instagram, Snapchat and more, they automatically have the skills they need to be successful in a digital learning environment. However, that is not often the case. Digital content and curriculum should provide a more convenient and efficient way to introduce the concepts and skills students will need in college and in their careers.

Education leaders at Beaverton School District in Oregon put students first when they decided to purchase a digital curriculum solution. Their main priority was to ensure middle school students were performing at grade level and prepare for them for success in high school and on high-stakes exams. A data-driven, self-paced digital curriculum solution helped the district meet its goals.

By enabling teachers to provide just-in-time remediation, the curriculum prevents students from falling behind and enables them to pass their courses on time and enter high school prepared for success. Beaverton students also have access to real-time data and formative feedback, and are motivated by seeing their own pathway to success. They are visibly taking responsibility for their own learning, gaining confidence and achieving at higher levels. On average, student performance has increased by 20 percentile points from pre-test to post-test. (To learn more about Beaverton School District, see page 28.)

Identifying Instructional Models

It's important to identify which instructional models will create the outcomes you are trying to achieve. There are numerous student-centered pedagogies that can support both cognitive and non-cognitive outcomes, including inquiry, making, project- and problem-based learning, design-based learning, game-based learning and culturally responsive teaching. What all of these have in common is the ability to activate intrinsic motivation and drive both student ownership and deeper learning. All become scalable through the use of technology and digital resources.

You will also need to choose the instructional model that supports your desired learning environment such as

blended learning, mobile (situated) learning, personalized learning and/or competency-based learning. Once you've identified your model, you can determine which materials to use:

- » Individual supplemental pieces of content
- » Full digital courses
- » Digital curriculum with traditional materials
- » Software application licenses
- » Subscription-based services
- » eBooks
- » Mobile and interactive hardware (tablets, laptops, boards, cameras, clickers, etc.)

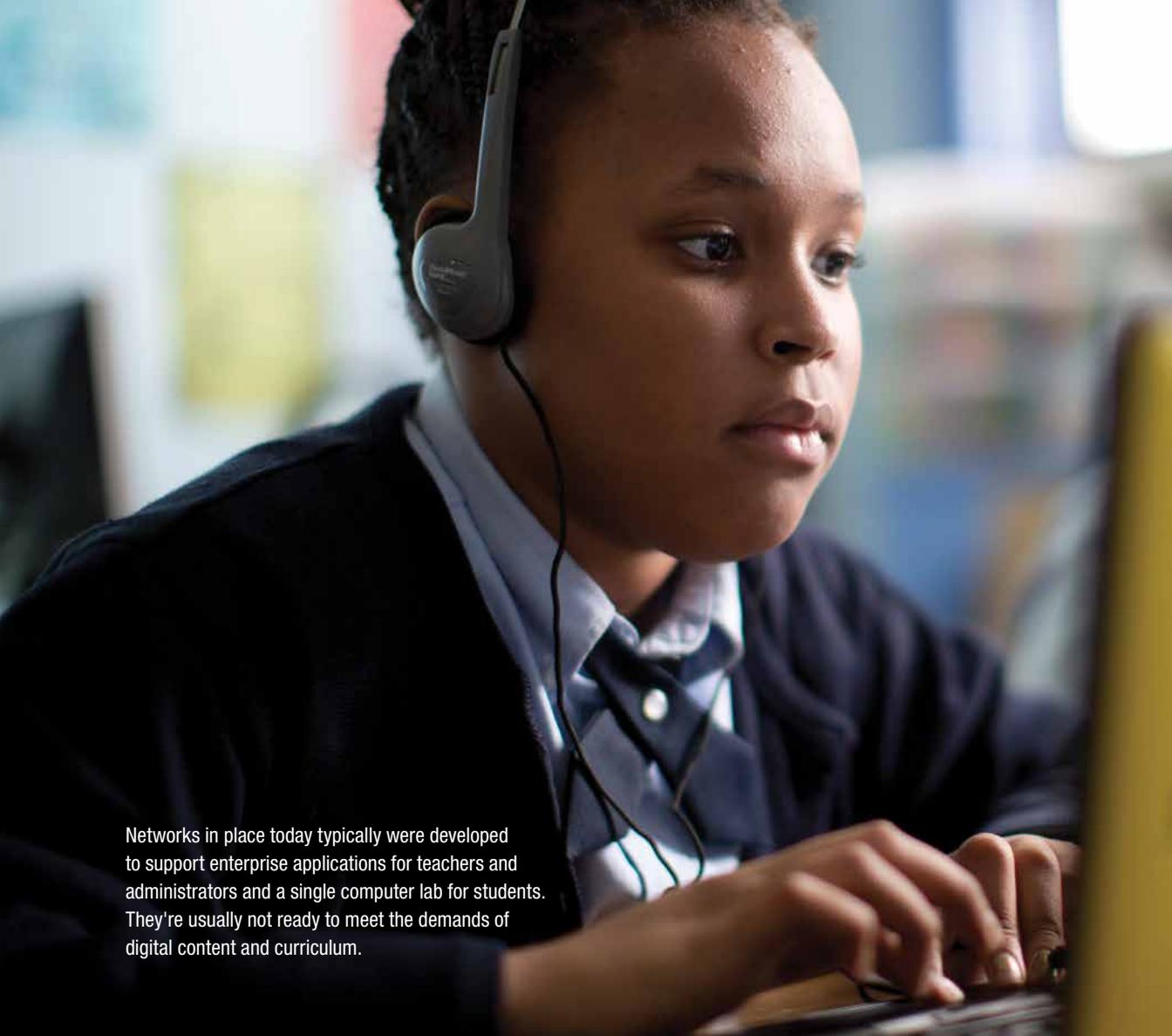
Ensuring Teacher Readiness

A significant benefit of adopting digital content is that teachers have the flexibility to choose the most appropriate materials for their lessons and for individual student needs. You should ensure teachers are ready for this shift as early as possible in the implementation. One best practice is to identify early adopters and involve them in the development of cohorts of teachers, which is what happens at Gwinnett County Public Schools (GCPS). A longtime model for other school districts on digital and blended learning, each Gwinnett school boasts at least one technology coach to guide teachers. Principals also enlist teacher leaders at each campus they identify as early technology adopters. Those innovators support fellow teachers and help them feel more comfortable during the transition.

The district offers other helpful resources, including a digital guide featuring Web 2.0 tools and related use strategies. "We've also built out course pages for 130 courses. So a first-grade teacher can, for example, find a whole year of blended learning activities within a menu in the LMS. By clicking on a link, users can easily copy those strategies into their own course pages," says Tricia Kennedy, executive director of eCLASS, a digital content, learning assessment and support system designed to provide all Gwinnett teachers and students with access to digital content. (To learn more about GCPS, see page 30.)

Online professional learning can also help introduce teachers to the digital resources and instructional models the district will adopt. Districts that model the type of learning environment they expect to see in student classrooms by demonstrating it through professional development report higher adoption rates for digital content.

Preston Middle School in Colorado is thriving in its new digital content and curriculum environment. Several of its classrooms have interactive whiteboards and devices that support collaboration between students and teachers. The school also uses project-based and



Networks in place today typically were developed to support enterprise applications for teachers and administrators and a single computer lab for students. They're usually not ready to meet the demands of digital content and curriculum.

blended learning instructional models, and applies everything taught to real-world experiences.

One key to success in implementing this new teaching and learning environment is ongoing professional development. Preston offers “lunch and learn” sessions and provides instructional coaches. Additionally, consultants come into the school to provide professional development to teachers during planned training sessions. School leaders say professional development should be delivered in a way that is meaningful to teachers. They also strongly believe in a sharing culture — the school often invites groups from other districts or educational organizations to visit and share their best practices. This culture of shared resources and collaboration has helped the school in its digital transformation. (To learn more about Preston Middle School, see page 32.)

Building Out Infrastructure

Independent of using OER or purchased content, a digital transformation requires a robust infrastructure. For the purpose of this document, infrastructure includes maintaining network access, selecting the right devices, ensuring interoperability and safeguarding privacy.

Maintaining Network Access

A robust infrastructure is the foundation for supporting digital content, tools and curriculum. Networks in place today typically were developed to support enterprise applications for teachers and administrators and a single computer lab for students. They're usually not ready to meet the demands of digital content and curriculum.

It is not uncommon for districts to experience 60 percent year-over-year growth in demand for capacity



DAVID KIDD

once they implement digital content and curriculum. At the same time, access to the internet becomes mission critical to the classroom — networks that could once afford several days of downtime during the year now need to be available nearly 24/7. Additionally, students need ubiquitous access to their digital content and tools — at school, at home and all the places in between.

At school, districts need to account for the capacity and reliability requirements of their network. The FCC and ConnectED national goals are 1Gbps per 1,000 students, or 1Mbps per student of internet capacity by the 2017-18 school year. To meet these requirements, you have to consider both the amount of internet capacity you purchase from your internet provider and also the capacity of your network to support this bandwidth. Can your routers, switches, firewalls, security appliances and access points support 1Mbps per student?

You also need to consider the reliability of your network. Leading chief technology officers say their principals and teachers demand near zero downtime, even at night or during the summer. What happens if a cable is cut in your wide area network (WAN)? Does your WAN have multiple paths to route around such a breakage? What about a failure of the internet provider — is there an alternate path to the internet available to your network?

Another key consideration is the number of devices that are going to be on the network. Even in districts that provide devices to students, policies often allow students to bring their own devices as well. This can easily result in three or more devices per student. Can your network accommodate all of these devices? What about firewalls and security appliances — are they scaled to manage this quantity of devices?

It is much more difficult and expensive to provide equitable access outside of school. Some students have no access outside of school; some have access in their homes; and some have access everywhere they go using cellular data. In many communities, school leaders, students and community members are working together to ensure digital equity after the school day ends. For instance, Coachella Valley Unified School District in California installed WiFi on buses which are parked overnight in areas where students live to provide internet access. The CoSN Digital Equity Toolkit offers other case studies and insight on how schools and communities can work together to provide out-of-school access. For more information, visit <http://cosn.org/digital-equity-toolkit>.

No matter the route your district takes, the new requirements on school networks are expensive and complex, and many districts don't have the resources to upgrade everything at once. Instead, districts should develop a technology plan that takes into account these new requirements and have a roadmap to evolve the network over time.

Selecting the Right Devices

Devices are in many ways the least important, most fluid and changeable aspect of the system. That's not to say that the requirements for managing devices don't differ or that there isn't increased complexity in managing more than one type of device, but from a user perspective it is the functionality of the device and its ability to support digital content that are key.

The conversation about the type of device should always come after much consideration of what students and teachers need to support the teaching and learning process. Consider whether the device needs to have a touchscreen or a keyboard and determine the minimum screen size. Above all, consider the performance of the



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When using online digital tools and content, authentication — or establishing user identity — is the key to data security and privacy.

device in your environment. Is the device responsive to the user? Does it require an internet connection for full functionality? Try testing multiple potential devices with end users in a configuration that's as close to a real classroom setup as possible to determine which devices work well under which circumstances.

Laptops aren't the only type of devices that districts should consider when implementing digital content. Seventy percent of districts report moving to more active learning environments, which means leveraging interactive surfaces, tablets, digital cameras, video cameras, 3D printers and other tools that students can use to explore and create.

When it came time to renew its computer equipment, River Dell Regional School District in New Jersey took a unique approach. Instead of engineering the refresh on their own, district officials involved educators and students in the decision-making process. The result was remarkable.

To kick off the effort, a group of teachers and students formed a committee and made a list of what they wanted from new technology. Their answer: a mix of touch- and pen-enabled tablets and laptops to maximize interactions and facilitate collaboration. "All the teachers wanted to be wireless; they wanted to be untethered in the classroom; they wanted digital inking capabilities; and they wanted 24/7 access to all of their files," says Marianne Williams, the district's director of technology. Students also wanted the ability to pen, along with the full functionality of a touchscreen laptop.

The district invested in the new devices simultaneously — 1,700 devices in a matter of weeks. Immediately upon rollout, students and teachers found numerous benefits. The tablets freed teachers from their posts in the front of the room and empowered them to roam the classroom. "You have a very strong pulse of the class when you can walk around," says Dawn Rivas, a U.S. history teacher. "I

can write on the tablet, and it goes up immediately on the projector and kids will see that.”

The device’s collaborative software enabled students to work together on projects in ways they’d never done before — whether they’re collaborating on a shared writing project or gathering data for a science lab report. What’s more, because all of the new devices automatically save material to the cloud, both students and teachers can view their data from any device at any time, online or off. (To learn more about River Dell Regional School District, see page 31.)

Ensuring Interoperability

The digital content user experience is highly dependent on the interoperability of digital resources with district systems. The last thing students, teachers and administrators want is to log into separate systems to use specific content or tools, or go to different places to see data and results. The ideal scenario is for a student to log in once using single sign-on, then click through to any digital resources. Students should be able to go to one place to see their performance data from each assessment or tool. Teachers should be able to see performance data aggregated and rolled up for all students in the class with the ability to drill down to any level of detail. Administrators should have the same functionality on a whole school or district basis.

Fortunately, single sign-on and click-through are available today, though depending on the standards used by content providers they may require additional coding to make the content compatible with internal systems. There are open standards available, such as the Shareable Content Object Reference Model (SCORM) and IMS Common Cartridge (CC), as well as the Question and Test Interoperability (QTI) and Learning Tools Interoperability (LTI) standards intended for integrating content, assessments and tools with district systems such as the LMS and student information system (SIS).

There also are data interchange standards such as the Schools Interoperability Framework (SIF) that make it possible to transfer data from content and tools into a data warehouse. From there, a district can create dashboards for each student, teacher, parent and administrator. This can become unmanageable, however, if the content providers are not using open standards.

Houston ISD addressed this problem by obtaining an LMS that is compliant with open standards and only purchases content from providers that also are open standards compliant. As a result, the district has interoperable content both from their providers and from teachers developing content for the district.

Safeguarding Student Privacy

When using online digital tools and content, authentication — or establishing user identity — is the key to data security and privacy. School districts across the country have experienced breaches in privacy and have implemented solutions to reduce their vulnerability. Organizations such as Common Sense Education (www.commonsense.org/educators) have partnered with districts to design tools for teachers and district leaders to identify online resources for learning and evaluate the privacy and security practices of educational software.

Districts need to ask themselves some key questions before they provision access to student data outside the district:

- » What can users access online?
- » What are users allowed to do online?
- » How will digital resources be managed?
- » What data about students is shared and how is it controlled?

Districts also need to ask online service providers the following questions to ensure student privacy is being protected:

- » What data is collected by the provider or third parties?
- » How is the network operations center managed and secured?
- » How is data stored and accessed?
- » What is the policy for data and meta-data retention?
- » What happens if there is a data breach?

For more information about questions to ask your online service provider, see CoSN’s Security Questions to Ask of An Online Service Provider at http://www.cosn.org/sites/default/files/03_SecurityQuestions.pdf.

Planning for Sustainability

Like any ongoing initiative, we must think of digital content and curriculum as the new normal and not a one-time activity. Ensuring the plan is fully implemented and the mindset of the entire district has shifted to this way of thinking are essential to sustainability.

It’s also important to incorporate a continuous improvement cycle to monitor and assess where you are in relation to your desired outcomes. Continually update your goals and outcomes so you are always moving in a positive direction rather than becoming stagnant.

Spending the time and resources to support teachers as they learn this powerful way of teaching also add to the overall sustainability of the plan. When you prioritize and properly finance the strategic plan, then it becomes something the district and community will sustain over time.

The background of the page is a grayscale photograph of a desk. On the desk, there are several sheets of paper, some with diagrams and text. A pen is visible on the right side. A laptop is partially visible in the lower right corner. The overall scene suggests a workspace or office environment.

CONCLUSION

BECOMING FUTURE-READY

The journey to digital transformation shouldn't be taken lightly. This guide provides you with the tools to develop an intentional plan and understand the importance of managing expectations within the implementation. Involving key stakeholders and providing clear communication are important elements of both planning and implementation. Defining the 'why' of your transformation and adopting strong instructional models supported by standards-based curriculum aligned with robust instructional resources are the keys to success. The districts with initiatives underway can be a resource as you embark upon your journey. Take advantage of this community of innovators and the education community at large, including nonprofits and industry partners. Your students will benefit tenfold from your district's commitment to be future-ready!



Resources

Organizations and companies that supported the development of this guide are demonstrating their commitment to digital content and curriculum adoption by providing rich resources available on their respective websites. Please see the following list of recommended links to support your transformation.

OER Commons is a dynamic digital library and network. Explore open educational resources and join our network of educators dedicated to curriculum improvement.
www.oercommons.org

Creative Commons licenses provide a flexible range of protections and freedoms for authors, artists and educators.
www.creativecommons.org

CK-12 Foundation provides a library of free online teacher resources, including textbooks, worksheets, group activities and more.
www.ck12.org

Project Gutenberg (PG) was started in 1971 by Michael S. Hart. The purpose of the project is to collect and make available cultural works.
www.gutenberg.org

MIT OpenCourseWare (OCW) makes the MIT course materials used in almost all undergraduate and graduate subjects available on the web.
www.ocw.mit.edu/courses/find-by-department

Khan Academy is a nonprofit organization that designs free lessons for math, art, computer programming, economics, physics, chemistry, biology, medicine, finance, history and more.
www.khanacademy.org

PBS LearningMedia™ provides educators with strategies, tools and professional development resources.
<http://pbslearningmedia.org>

Organizations

Common Sense Education improves the lives of children and families by providing independent reviews, age ratings and other information about all types of media.
www.commonensemedia.org/educators

The Office of Educational Technology (OET) provides leadership for maximizing technology's contribution to improving education at all levels.
<http://tech.ed.gov>

ISTE is a not-for-profit organization dedicated to supporting the use of information technology to aid in learning and teaching of K-12 students and teachers.
www.iste.org

CoSN is a nonprofit organization that provides timely resources, materials, publications and information on technology and learning issues.
www.cosn.org

The State Educational Technology Directors Association (SETDA) is a not-for-profit membership association launched by state education agency leaders in 2001 to serve, support and represent their emerging interests and needs with respect to the use of technology for teaching, learning and school operations.
www.setda.org

CASE STUDY

Columbus Municipal School District: Transforming Student Learning Without Textbooks

When Dr. Philip Hickman started his new job over a year and a half ago, he immediately spotted a big problem. The school district he was brought in to run had very little technology, and what it had was terribly outdated. Making matters worse, his predecessor had ordered thousands of dollars of textbooks the district couldn't use.

Hickman started on July 28 as superintendent of Columbus Municipal School District (CMSD) in Columbus, Miss. School started August 5. "I told my board, 'I cannot use any of those textbooks — we need to return them. Whether we get our money back or not, we need to return them.'"

Needless to say, Hickman ruffled a few feathers. "People were very upset," he recalls. "Parents wanted textbooks to go home with their students. Teachers didn't understand."

Raising Expectations

Mississippi's public education system is consistently rated at or near the bottom nationally, a product of years of low funding and indifference. Two key issues at Columbus Municipal exemplified these woes: The new

textbooks didn't meet Common Core State Standards and the PCs they had were a decade old, complete with hulking desktop monitors and mismatched keyboards. "The brand of computer we had was actually eliminated in 2005," says Hickman.

One of Hickman's first changes was to embed OER content, both print and digital, in the lesson plans. As teachers and students grew comfortable with the new approach, the district added more OER materials and worked with consultants to develop the program further.

"They worked with our group of teacher leaders to develop content, to start to research it and to expand our lesson plans — and voila!"

The results were positive. "We've done a lot of adaptive assessments, and we've shown that when our kids walk through our door — and after they've had our instruction for months and months — they're actually growing at an exponential rate now," says Hickman. "We see it. Our teachers have a little more swagger to them. Because everybody wants to do the right thing for kids."

Digital Hurdles to Climb

Implementing technology is a challenge in a school district where disadvantaged students don't have access to smartphones, tablets or laptops at home, much less WiFi. In addition to letting high schoolers take school-issued digital devices home, the district made a concerted effort to encourage the use of WiFi.

"We looked at a digital map of our city, which showed everywhere there's a hotspot and free technology resources, like a library, to use a computer," Hickman says. "We also put WiFi on the (school) buses, so we now have a mobile study lab."

While CMSD is making great strides, there's much work to be done in preparing its students to compete in the global economy.

"When I talked to parents, they wanted their child to be able to compete with the next county," Hickman recalls of his early discussions. "I had to tell them that they're no longer competing with the next county — they're competing with the next state and the nation for jobs."

CASE STUDY

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Copper River School District: Overcoming Logistical Challenges with Digital Content

Sometimes the biggest challenges for school districts are logistical in nature. Case in point: Copper River School District (CRSD) in Alaska. The district spans 24,663 square miles and is home to 450 students in three combined grade level schools. Often the only way to access the region is a highway system covered in ice, which means district officials have to get creative with the way they deliver curriculum to students.

For years, this meant supplementing lessons with digital material. In 2013, the district took the approach one step further, signing up with a digital content provider for state standards-aligned online courses for high school and middle school students.

With the new content available, CRSD teachers built an instructional model designed to leverage student supports such as video, online assessments, note-taking tools and more.

The first component to the new model: whole-group instruction. After a warm-up activity, teachers project an instructional video to the entire class, summarize the content and ask students questions to determine whether or not they have mastered the material.

Small-group rotations come next. In these, students break into two groups — one works with the teacher to practice skills while the other completes online assignments and quizzes independently.

Educators then use data from the LMS

to monitor student progress and address individual needs.

Summative assessment data indicates that CRSD students show significant gains on reading assessments, mild gains on language usage assessments and minor improvements on math assessments. Even more notable: CRSD seventh graders were performing below national norms for math in fall 2013, but by the spring of 2014, they were performing well above the norms.

For CRSD, customized and personalized digital education proves that interactive, blended classrooms with digital content work. Also of note: The importance and performance of formative assessments, particularly in a blended environment.

Lawrence Public Schools: Overcoming Cultural Resistance to OER

It's human nature to resist change. Educators are no different, of course, and the promise of OER may seem daunting to many who are comfortable with the old way of doing things.

But two forward-thinking teachers at Lawrence Public Schools (LPS), the seventh-largest school district in Kansas with approximately 11,000 students, have great advice for educators who aren't sold on the benefits of OER.

OER isn't a fad, says Kelly Hart, a seventh-grade language arts teacher at South Middle School. "Probably the same thing was said about a lot of other great innovations we've had in education," she says. "I know teachers are always saying, 'Well, this is just the next thing. It's a cycle and it will be gone again soon,' but I don't see this going anywhere. This is the sea-change moment for us as educators, and I think we need to get in on it now, or we're going to regret it later."

Better Education for All

Hart notes that cost savings are a key benefit of OER, particularly as a solution that helps level the playing field between the haves and have-nots.

"I think it's advantageous in a state like Kansas, where we have some districts that can afford to buy all sorts of textbooks and others that can't afford to update or replace what they have," says Hart. "It's really important — at least on a state level — that every kid has access to a great education with timely and correct materials, and to get those materials in the hands of teachers at no cost to the district."

Better for Current Events

The timeliness of OER-generated content is a huge advantage as well, says Kristl Taylor, a K-12 teacher at LPS. Currently on special assignment in the social studies department, Taylor is working on a two-year project to

help teachers find educational resources and establish their curriculum.

"A textbook is stagnant for maybe 5 to 10 years," Taylor says. "With OER available at your fingertips, you can change the lesson plan based on a current event that happened last week. It's so important for kids to have that immediate and real-world application right now. Instead of buying a textbook that will go out of date next year, this is a great opportunity for teachers to keep (their content) up to date, as we are constantly curating materials," Taylor says.

In short, OER is all about helping students learn — and that's what truly matters. "There are just so many great opportunities to do what's right for kids," says Hart. "OER is great for kids and for our school districts. Yeah, it's a bit more work, but we didn't get into this field because we thought it would be easy. It's what we signed up for."

Baltimore County Public Schools: Building a One-Stop Shop for Personalized Learning, Management and Assessment

Baltimore County Public Schools (BCPS) in Maryland is in the middle of a multi-year transformation where the goal is to provide a modern learning environment that prepares the district's 111,000 students to be globally competitive. To do so, BCPS needed a comprehensive learning management and assessment system to serve as a one-stop shop for students, teachers, administrators, parents and other stakeholders.

A Single Platform Provides Consistency for all Stakeholders

The district's previous approach to technology was piecemeal, with each school using a hodgepodge of digital curricula, LMSs and other technologies. There was no uniformity to the students' learning experience as they moved among schools.

BCPS selected a single solution that could be used by all stakeholders across the district's 180 buildings. The single sign-on "home" for instruction, learning

and results created a learning environment where:

- » Teachers access and differentiate the curriculum
- » Students use personalized learning resources
- » Parents see every step of their children's progress
- » Administrators analyze the results
- » Data helps guide instruction to personalize learning

The Power of Real-Time Data

The district's learning management and assessment system allows teachers to grade assignments, connect with parents, monitor students' needs and personalize learning by pushing unique materials to selected groups of students. The interactive curriculum is integrated into the platform so teachers and administrators can make real-time adjustments to instruction or curriculum. Educators can track successes and challenges in

the classroom while administrators gain a high-level view of school and district results.

The power of the district's platform is that it leverages teaching, learning and documenting progress, says Ryan Imbriale, the district's executive director of innovative learning. "For instruction, it can be used as a formative assessment tool," he says. "And for performance assessment, it can provide fixed feedback that translates to the gradebook, which can then be tied to instruction for a seamless personalized process for the students. The assessment platform offers a tremendous opportunity for our teachers to make adjustments to what they're doing in the classroom, student-by-student."

North Kansas City School District: Empowering Teachers with OER

With nearly 20,000 students, North Kansas City School District is the fourth largest school district in Missouri. And as a participant in the Department of Education's #GoOpen program, it's actively working to find OER that meets the needs of its learners.

The district began exploring the potential of OER two years ago with a focus on its five middle schools. "We decided to begin to curate our own textbooks — or FlexBooks, as we call them," says District Instructional Coordinator Todd Hinnenkamp.

Getting Started

Middle school science classes were the first to receive the OER treatment. The effort was spearheaded by district Instruction Coordinator Mitsi Nessa and Online Learning Coordinator Sean Nash.

Their first step was to explore OER materials created by the CK-12 Foundation, a California-based nonprofit that provides free and customizable K-12 OER that aligns to state curriculum standards.

"We started this in sixth-grade science," Nessa says. "Sean and I took a couple of

units and generated our own textbooks, using primarily what CK-12 had already generated. We chose CK-12 because they had a substantial base of science and math work already curated and published."

A team of four sixth- and eighth-grade teachers then expanded the project, generating their textbooks online and working collaboratively. One of the project's greatest benefits: It got teachers more engaged in creating learning tools for their students, rather than relying on textbooks.

"I feel that I am more involved," says Cara Bosler, a sixth-grade science teacher in the district.

Before the OER program, the curriculum was handed to teachers, who had little to no say in its creation. That's all changed. "Now I am more empowered," Bosler says. "I have that sense of pride that comes with creating something. We know where we want students to go."

The program later expanded to middle school math. "In our middle school math classrooms, we're hoping to provide the foundational information and resources so teachers know where to begin," says

Hinnenkamp. "And they will seek out other engaging and appropriate resources as well."

The Benefits to Students

The migration from textbooks to staff-generated content is benefiting students too. The use of FlexBooks has been a big hit. "When you see the interaction kids are having — it's just different than we ever interacted with a textbook," says Nash. "The kids are taking these FlexBooks and marking them up, annotating all over them. Even that subtle shift from a textbook — we're still in paper, but it's ours and the kids can treat it as their own. That's been a shift in and of itself."

Bishop Heber High School: Solving Storage Shortages

The benefits of digital curriculum are hard to ignore. One of the unintended challenges, however, is massive files and amounts of data that need to be stored. Large corporations can address this conundrum easily by buying bigger and better gear. For public high schools, however, where budgets and resources are limited, resolving the situation can present a bigger challenge.

Such was the case at Bishop Heber High School in Cheshire, UK. To modernize lessons, educators began incorporating more multimedia components. Additionally, as the school started archiving more emails, IT leaders found themselves needing more bandwidth to move them and more places to keep them — both before and after emergency backups. In all, the institution saw storage needs rise to 7 terabytes from 1 terabyte in 6 years, which

put a tremendous strain on its existing data storage infrastructure.

School leaders knew they needed to make a change. The first step: engineering a site survey to assess storage needs. The next step: identifying scalable solutions that could handle increased bandwidth, store more files and duplicate data automatically with minimal manual intervention.

Finally, after months of evaluating options, Bishop Heber selected a solution with more than enough storage for the future — a capacity of up to 180 terabytes. The solution also automates backups, and offers the option of restoring files that are deleted accidentally — all without having to go through back-up software.

Today, the district's storage constraints are a distant memory, and staff members can

easily save and share files without emailing them or transferring them via USB drives.

Another benefit: Bishop Heber IT staff members have more time to focus on other aspects of their jobs. Instead of spending hours scanning and deleting duplicate files to free up space, these professionals can spend their workdays troubleshooting other issues, or actually innovating.

Vista Unified School District: Collaborating and Building Partnerships for Better OER

The internet has made real-time communication significantly easier, and its collaborative powers are clearly evident in an innovative partnership between three U.S. school districts: Vista Unified in North San Diego County; Mentor Public Schools in Mentor, Ohio; and Kettle Moraine in Wales, Wis.

Dr. Devin Vodicka is superintendent of Vista Unified, a 25,000-student district that has embraced OER for several years. Vodicka calls OER “an interesting intersection between collaborative opportunities and innovation,” one enabling his district to expand its educational efforts in innovative and creative ways.

Collaborative COW

The school district partnership is known as COW, which stands for California, Ohio and Wisconsin. “It’s an inter-disciplinary, digital learning, competency-based approach where students collaborate with one another across states,” Vodicka explains. “It has been a tremendous opportunity.”

The districts focus on developing and curating OER and can share more easily now that each of their states have adopted the

Common Core State Standards. They also all use a common communication platform. “With those commonalities, we can extend collaboration in some very interesting ways, bringing in other open resources,” says Vodicka.

A COW setting isn’t your average classroom. At Roosevelt Middle School, the Vista Unified facility implementing the program, the non-traditional setting includes couches, large screens and students toting portable devices. Real-time video chats are popular too.

“You’ll see students working in small groups,” says Vodicka. “And as they’re on their devices working with one another, they might also be doing a video chat with students in Wisconsin, emailing their teacher in Ohio or getting feedback from students in other states.”

Interstate Interaction

While digital communications enable students and teachers to collaborate across vast distances, COW is still very much a work in progress.

“To pull this off, we have relied on some old school methods to bring teams together,”

Vodicka explains. “We’ve sent teachers to Ohio, and teachers from Wisconsin have come to California to build relationships and facilitate these projects. That’s been really critical.”

The challenge, however, is learning how to scale this program to thousands — or perhaps even a million — teachers nationwide.

Having a 1:1 digital infrastructure — essentially each student using a digital device — is an essential step, as is having school districts share Common Core State Standards. Transitioning to OER has been a major plus too.

“We brought teams of teachers together to curate and create units of study, which we’ve been using for a couple of years now in our district,” says Vodicka. “There’s something powerful about bringing educators together in the decision-making process. It’s very empowering.”

Beaverton School District: Adjusting Instruction in Real Time to Improve Student Outcomes

Educators at Beaverton School District in Oregon needed an efficient, engaging method to help middle school students perform at grade level and prepare for success in high school and on high-stakes exams. They wanted to integrate digital curriculum into the district’s core instructional approach, and they were looking for a personalized learning solution that complied with standards and assessment requirements.

The Difference of Engaging Content

The district selected a digital curriculum solution designed for use on tablets, laptops, netbooks and desktops. To build the required knowledge and skills, it incorporates elements of interactive media and popular games and apps to engage and motivate

students with meaningful instruction, practice, review and assessment.

Because the curriculum is self-paced, students learn at their own speed, and multiple entry points allow them to choose the learning paths that best meet their individual needs.

Real-Time Data Enables Just-in-Time Remediation

Data-driven personalized instruction is at the core of the curriculum. The solution gives educators access to real-time data that allows them to take the pulse of their classrooms, determine whether students are grasping a concept and provide struggling students with extra support on the spot. “Now, as soon as our teachers see the formative [data], they know where they have been successful and how to adjust their teaching to improve student

outcomes,” says Paul Ottum, the district’s online learning specialist.

By enabling teachers to provide just-in-time remediation, the curriculum prevents students from falling behind. Beaverton students also have access to real-time data and formative feedback, and are motivated by seeing their own pathway to success. They are visibly taking responsibility for their own learning, gaining confidence and achieving at higher levels. On average, student performance has increased by 20 percentile points from pre-test to post-test.

“[The curriculum captures] our students’ interest,” says Ottum. “Students have even asked if they could use them at home on their own time. Think about that: a student asking permission to study more from home!”

Tullahoma City Schools: Using Curiosity to Promote OER

When embarking on an OER program, it's a given that teachers and students need to be on board. But administrators often need to also sell the concept to skeptical school boards, city officials and concerned parents.

Dr. Dan Lawson, director of schools at Tullahoma City Schools in Tennessee, devised a solution to meet this challenge. When it came time to demonstrate the benefits of OER to parents, administrators and city officials, district leaders took a clever and timely approach: They made their pitch just as NASA's Curiosity rover was landing on Mars in 2012.

The district quickly updated a social studies FlexBook — a customized textbook created in house — and passed out copies to interested parties. "Within 18 hours of Curiosity landing, we updated the FlexBook," Lawson says. Each member of the school board and the funding body — as well as the mayor, alderman and other notable officials — received a copy. "We shared curricular content that was less than 18 hours old."

The reception was overwhelmingly positive from officials and students alike. A local angle made a big difference: A major component of the Curiosity mission had been tested in the Tullahoma area.

"The curricular content was enriched by videos from NASA," says Lawson. "One of the illustrations in the video showed the parachute that slowed the descent of Curiosity. For most people, that doesn't mean anything. For those in my community, that parachute was tested there. So our kids were able to look at that testing facility and say 'My uncle works there or my mom works there.'"

The benefit: An instant connection with subject matter, something a traditional textbook couldn't provide. In Lawson's words: "Suddenly, relevance is attained."

The OER Advantage

When the district started developing OER four years ago, outside of wanting to provide students with more relevant, timely content, it also wanted to reallocate its resources in more productive ways.

Lawson says growing use of free and open content gives the district greater latitude in how it uses budget dollars. "Funds that previously were expended on resources that we had little choice about now are expended on professional development for teachers, on modest stipends for teachers and on digital devices for our kids." Lawson adds that the district's goal isn't to spend less, but to spend differently. "We're not saving money, nor are

we intent on doing so, but we're intent on spending our money more wisely and putting it to better use."

Ultimately, Lawson says OER will provide as much as 85 percent of the district's educational content. There will still be areas where paper and pencil or subscription content is the right choice — Lawson points to developmental activities in primary grades and high school-level career technical education as examples — but use of OER will grow steadily as the district strives to improve the effectiveness of its curricula.

"When I think about reallocating millions of dollars and putting it in the hands of kids who couldn't otherwise have the equipment, it's a pretty compelling case. When I think about the relevance of the curriculum, it's pretty darn compelling. When I think about involving my kids instead of reading something on page 17 that's been published thousands of miles away, that's pretty darn compelling," says Lawson. "So for me, it's almost a no brainer."

Bristol Tennessee City Schools: Finding a Way to Avoid Reinventing the Wheel

One of the daunting challenges of launching an OER program is the sheer ambition of it. Creating customized educational materials for your students is both empowering and intimidating.

The OER process enabled Bristol Tennessee City Schools, a preK-12 district with 4,000 students in Northeast Tennessee, to glean two valuable lessons:

1. You can't create everything from scratch.
2. You may not have to — there's a good chance someone already has made what you need.

Bristol's OER effort began in early 2016 when Tennessee gave its school districts a choice in how they teach high school math: the traditional approach with separate courses — algebra, geometry and so on — or

an integrated mathematics curriculum.

"We surveyed our math teachers and, overwhelmingly, they thought that integrated mathematics was the best way to go," says Gary Lilly, director of schools. "Lots of other countries approach math that way. But as we started looking at resources available for integrated math, we soon realized there was nothing available that was perfect for us."

However, it can be daunting to start with a blank page, says Lilly. "And if we wanted a usable resource in a fairly short amount of time — working within a six-month window — it would be impossible to create everything ourselves."

Luckily, the district didn't need to reinvent the wheel. "There's a tremendous amount

of really high-quality material out there we could curate," says Lilly. "We did create some (content) ourselves, but we supplemented with all these great things we found."

District administrators and teachers carefully vetted the new material, making sure it met their standards.

"It was a collaboration," Lilly says. "Any of our math teachers would still say today that it remains a work in progress, which is really one of the nice things about it. Unlike a traditional textbook where you've got this adoption for seven years, we're able to go in and say, 'You know what? We used this resource with this class, but these things didn't work out as well as we had hoped. So we're going to update them.' That's a huge benefit of OER."

Cabarrus County Schools: Creating a Strategic Plan for Content

Cabarrus County Schools in North Carolina counts itself among the state's largest school districts with 30,000 preK-12 students. Progressive, innovative and student centered, the district infuses classrooms with the technology and tools needed to help youngsters reach their full potential.

Based in Concord, the district relies on the Understanding by Design (UbD) framework to guide curriculum, assessment and instruction. The framework emphasizes teaching and assessment for understanding and learning transfer. It also recommends designing curriculum "backward" to achieve those goals.

When it comes to acquiring content, Cabarrus focuses on four key areas, says Tara Natrass, the district's director of elementary schools. "We're looking at what type of tools you need to personalize

the curriculum and have a mastery-based environment," she says. "We don't purchase textbooks except for some AP classes."

Resource and content planning — The district procures hands-on resources, such as science kits and maker space resources. It also buys digital content for lessons geared to schools using the UbD framework for math, science, social studies and other subjects. In addition, Cabarrus uses free, quality OER, such as from Khan Academy.

Tools that allow differentiation controlled by teachers — Cabarrus looks for resources that allow teachers to, for example, assign students their own virtual libraries that contain eBooks. Instructors can customize reading assignments using virtual Post-it notes and highlighting, Natrass says.

Adaptable software and lessons — Such resources can allow a third-grader

who is ahead of his or her class in math, for example, to receive lessons at the fourth- or fifth-grade level. And when teachers pull those students into small group instruction, they can find related lessons and results in the tool.

Learning management system capabilities — The LMS provides a hub where Cabarrus teachers compose their own content; differentiate lessons; and provide opportunities for all students to collaborate, create, discuss, develop critical-thinking abilities "and do all the 21st-century skills that we want them to be able to do," Natrass says.

"We want to provide those authentic experiences for students with their peers, and cooperative learning where they are solving problems together," she says. "We think about what technology tools we can use to make that happen."

Gwinnett County Public Schools: Constantly Striving to Impact Student Learning

Located just outside of Atlanta, Gwinnett County Public Schools has long understood the importance of going digital, hiring dedicated technology coaches as far back as 2000. Today, the district is well down the path to a fully blended learning environment for its 170,000 students, and has become a model for other districts.

"The walls are coming down at our schools," says Tricia Kennedy, executive director of eCLASS, a digital content, learning assessment and support system designed to provide all Gwinnett teachers and students with access to digital content anytime, anywhere. "Learning now truly happens at all times of the day and night."

The district began its digital journey officially in 2010. School leaders saw the need to improve IT infrastructure, increase use of digital tools and provide professional development for teachers. Since then, it has added many digital learning and infrastructure resources, including an LMS hub. But it has focused as much effort on providing professional development and other support to teachers as they transition to the digital classroom.

Supporting Teachers and Coaches

Today, each Gwinnett school boasts at least one technology coach to guide teachers. Principals also enlisted teacher leaders at each campus they identified as early technology adopters. Those teachers now support fellow teachers, and help them feel more comfortable during the transition.

The district offers other helpful resources, including a digital guide featuring Web 2.0 tools and related use strategies. "We've also built out course pages for 130 courses. So a first-grade teacher can, for example, find a whole year of blended learning activities within a menu in the LMS. By clicking on a link, users can easily copy those strategies into their own course pages," Kennedy says.

A Digital Transformation Path

Kennedy says the district's efforts to bolster its digital transformation fall within a matrix comprising elements that provide schools with direction on: professional development plans, instructional strategies, and IT infrastructure and tools guidance. It addresses how individual schools can best

take advantage of early adopters, and how individual campuses and leadership can model the practices desired by the district. By following steps and guidance, schools can transform more successfully.

Still, while others look to Gwinnett as a model, district leaders see themselves on a long path, sometimes stumbling, as they strive for glory. "We're on a continuum," Kennedy says. "We're feeling good about the trajectory we're on, but we're not there yet."

A big challenge is acquiring digital content the district really wants and making it work within their systems as a true one-stop hub for all content and information. "We've got all this data, all these resources, and some of the digital content," Kennedy says. "But we really want to put it together to create the greatest impact on personalized and custom learning for students."

Tustin Unified School District: Changing the Game with a Learning Management System

In 2012, the voters of Tustin, a city in Southern California, approved a \$135 million bond measure that allowed its K-12 school district to begin the journey to 1:1 learning and digital content.

It quickly became a magnet for educators from other districts who wanted a closer look. In 2015, educators welcomed 170 visitors from campuses across the state to a day-long open house to show how one of the state's most tech-savvy districts is transforming education. Tustin goes well beyond the 1:1 standard, deploying up to 30,000 tablets and laptops to its 24,000 students. Its schools also feature many high-tech tools and software solutions.

However, amid all the other bells and whistles, the big game changer for the district was the addition of an LMS as a curriculum hub, says Robert Craven, the district's senior director of technology.

"That's key, because as teachers become less reliant on textbooks, students become much more reliant on the great content resources available to them through the LMS," which extends classroom learning beyond walls, Craven says. "It's the first stop they make each day to find their content. It's the first stop when they go home at night. It's the first stop where we want parents to go. What homework was assigned, and what resources are available?"

And Tustin teachers say it creates a great collaborative environment for students, allowing them to communicate via online discussions, and quickly access supplemental material and videos while working on projects. An additional benefit is the ability to share and reuse content among all schools very easily, Craven says.

Tustin's instructional coaches can work with teachers to author content, and share

the results across the district when appropriate. For example, coursework created for sixth-grade math classes can be easily posted and reused by sixth-grade classes at other district schools.

The school's LMS also delivers professional development. The district spends much time training teachers on what good online curriculum is and what works best. Craven sees the district investing more in outside content and curriculum in the near term, as additional state money becomes available for textbooks.

"We'll soon be in a good spot to pick online curriculum to roll into the classes and help with the supplemental materials that are already available." But, he says, "We're holding off until we see everything out there."

River Dell Regional School District: Transforming Collaborative Learning by Rethinking 1:1

Technology refresh is a great way to seed a school district with the latest technology. Sometimes, it also offers districts another opportunity: to rethink the approach to technology completely.

Administrators at River Dell Regional School District in New Jersey recently learned this fact first-hand. The 1,700-student middle- and high-school district had utilized a 1:1 laptop program for a decade until last year when it came time to renew the equipment all at once. Instead of engineering the refresh on their own, district officials involved educators and students in the decision-making process. The result was remarkable.

To kick off the effort, a group of teachers and students formed a committee and made a list of what they wanted from new technology. Their answer: a mix of touch- and pen-enabled tablets and laptops to maximize interactions and facilitate collaboration. "All

the teachers wanted to be wireless, they wanted to be untethered in the classroom, they wanted digital inking capabilities and they wanted 24/7 access to all of their files," says Marianthe Williams, the district's director of technology. Students also wanted the ability to pen, along with the full functionality of a touchscreen laptop.

Justifications for the new devices were simple. They were easy to use, intuitive and lightweight. Perhaps most important, they were current, whereas the laptop technology the district had been using was, well, tired. (For starters, the old laptops in the 1:1 program were not touch-enabled.)

The district invested in the new devices simultaneously — 1,700 devices for the district in a matter of weeks. Immediately upon rollout, students and teachers found numerous benefits. The tablets freed teachers from their posts in the front of the room and empowered them to roam the classroom.

"You have a very strong pulse of the class when you can walk around," explains Dawn Rivas, a U.S. history teacher. "I can write on the tablet, and it goes up immediately on the projector and kids will see that."

The device's collaborative software enabled students to work together on projects in ways they'd never done before — whether they're collaborating on a shared writing project or gathering data for a science lab report. What's more, because all of the new devices automatically save material to the cloud, both students and teachers alike can view their data from any device at any time, online or off.

For the district, the device choices were all about inspiring students and teachers through using tools that ignite their passions.

Preston Middle School: Bringing a New Dimension of Learning to the Classroom

Preston Middle School, a STEM-focused campus in Fort Collins, Colo., has plenty of the latest technology in its classrooms.

But educators say it's all for naught if not used "authentically," notes Tracey Winey, a teacher-media specialist at the school.

"We invest a lot in the digital tools of collaboration," Winey says. "But we really want people to walk away with an understanding that technology should be used to enhance or elevate the lesson in some way; if not, there's no reason to use it. At Preston, we're trying to do things we'd never be able to do without the technology."

To school leaders, collaboration means helping youngsters learn with their heads — and their hearts — to prepare for success in the 21st century. Students involved in the school's Engineering Brightness program, for example, are helping solve the real-world problem faced by 1.3 billion people who live without reliable access to electric light. Preston's young engineers contribute by designing, building and field testing actual hand-held lights they assemble using circuit boards and other materials. By communicating

via videoconference, they go deeper by collaborating on the projects with fellow students in Canada, England and at a Uganda orphanage. The teamwork helps them build bonds with each other and foreign students, while also learning about the very different lives of young African students. When completed, the units they create are sent to the children in Uganda.

"Our kids are learning engineering concepts in a way we could never teach them in a traditional classroom," Winey says. "Our kids see the kids on the other side. They know the kids. They know their interests. They know their dreams, their struggles and their successes. That's the learning that technology is making possible that wasn't possible before."

Likewise, Preston is using technology to support collaboration in an expanded math classroom called a "collaborative class" that includes 60 students and two teachers. During class, students start by raising their hands to talk. A teacher calls on someone to present an idea or opinion, who then calls on another student, and it continues from there. Also thrown into the mix are 10 interactive

whiteboards that allow students to jump up and perform computations and show their peers a specific idea or approach to solving a problem. Students say the approach helps with everything from making them feel more comfortable with school to feeling more engaged and finding many ways to solve a problem. They also hone the collaboration skills they'll need in their future work lives.

One of the school's keys to success in implementing this new teaching and learning environment is ongoing professional development. Preston fosters teaching innovation by offering "lunch and learn" sessions and providing instructional coaches. Additionally, consultants come into the school to provide professional development to teachers during planned training sessions. School leaders believe professional development should be delivered in a way that is meaningful to teachers. They also strongly believe in a sharing culture — the school often invites groups from other districts or educational organizations to visit and share their best practices.

Learning new teaching techniques excites the teachers. And their enthusiasm helps Preston's budding young minds absorb subject matter from a whole different perspective. "They tie everything they do back to the real world," says Winey.

Hostos-Lincoln Academy: Helping Teachers Extend their Reach with a Web-Based Writing Tool

Based in South Bronx, N.Y., Hostos-Lincoln Academy (HLA) serves as a college prep school for about 550 students in grades 6 through 12. TC Niemann, the teacher in charge of HLA's writing program, was challenged to provide the individualized instruction and feedback required to help students develop writing skills. He needed a digital writing tool that would allow him to extend his reach.

Immediate, Personalized Feedback

Niemann selected a web-based writing program that provides immediate, specific feedback to students while they are engaged in the writing process. The program gives teachers the tools to engage students in writing and revision, provide personalized feedback, and

view and assess student progress over time and across drafts.

Students organize and structure their initial drafts and submit them into the system where they revise their drafts supported by in-line feedback delivered by the program. If they have questions about the feedback, they can reach out to Niemann, who is responsible for reviewing the final draft and assigning a grade.

Putting Students in Control of the Revision Process

The students demonstrated strong levels of engagement with the system and reacted positively to the challenge of trying to increase their signal checks, a non-numerative measure of the progress of their writing. "[The program is] a real extension of my reach in that [the

students are] in control of their own revision," Niemann says.

In addition, Niemann found that more students took greater effort and care in reviewing their work before submission. And because they received feedback immediately, they could act on it right away. He also observed that students applied the skills they developed when using the program to other tasks outside the system.

Niemann says the web-based curriculum changed the dynamic of his relationship with his students. Instead of being an authority figure that enforced the rules and established measures, Niemann became the students' partner in "beating" the program. "[The writing tool] makes me an advocate, instead of an opponent, and that's worth its weight in gold," he says.

St. Vrain Valley School District: Stepping Carefully Along a Digital Education Path

In 2012, Colorado's St. Vrain Valley School District scored a major windfall: Voters passed a \$2.3 million annual measure to help the district take its students, teachers and curriculum digital.

It was a great boon for the district, which in prior years had laid a strong foundation for digital education by developing, implementing and providing a guaranteed and viable curriculum for its students.

With the new funding, St. Vrain Valley officials wanted to provide its diverse student body of more than 32,000 students with standardized online learning and digital content to ensure each pupil received a quality education, and make sure everyone had digital access.

Mapping Out a Course

"The key is ongoing funding," says Kahle Charles, the K-12 district's executive director of curriculum, of the annual levy. "We want our teachers to have tools they need to investigate, communicate and collaborate," while also allowing students to explore concepts and content in an authentic context.

Officials also explored whether to use OER. They ultimately chose to procure core content to help ensure quality and free teachers from the responsibility of developing and curating that primary material themselves. At the 6th- to 12th-grade level, St. Vrain Valley committed to purchasing all digital instruction materials and programs.

"You can save a lot of money going open source. However, we're not convinced we have the manpower to vet all that material," Charles says. Officials do use open content as supplemental material.

Pursuing New Directions

Educators also wanted to take teachers off the "lecturing island," and help them act as one-on-one learning facilitators. Turning out great problem solvers well-equipped for the ever-changing 21st-century job landscape was a priority. And educators wanted to ensure the approach didn't reduce students to using devices as defacto "electronic worksheets."

Only after addressing these and other higher-level questions did educators move to the question of which devices and other technology to purchase.

Houston Independent School District: Making Sure Technology and Curriculum Work in Tandem

In 2014, Texas' largest school district launched a district-wide initiative dubbed PowerUp to transform its classrooms into personalized digital learning environments.

Serving 170,000 students in 282 schools, Houston Independent School District (HISD) also shook up the way it procures textbooks and other content. Today, the selections are made in tandem by curriculum and technology experts.

"Tech now has a much bigger role in the vetting and selection of content," says Lenny Schad, the district's chief technology information officer. "If you're going to embrace digital transformation, the curriculum and instruction department can't be the only one driving anymore."

To that end, the curriculum and IT department work in partnership through the procurement process, focusing on areas where each possesses the greatest expertise to choose the most beneficial content for students.

Working Together for the Greater Good

When procuring primary content, HISD receives a proclamation from the state on which subject areas to focus on, and announces those priorities to vendors. It provides related

criteria, restrictions and requirements for interoperability and alignment with standards. Educational vendors are then invited to showcase those solutions at a "fair" within the district's central office where teachers, parents, students and other stakeholders can check out the apps, content and materials.

Afterward, the district's central selection committee goes to work. The team comprises members from various roles throughout the district who come together to vet and evaluate content offered by vendors — but only in areas where each member possesses expertise. The evaluation also ensures that content and related apps and other materials comply with standards the district adheres to, such as IMS Global interoperability. The committee dispatches its top three recommendations for each category to the district Cabinet, which can approve or send them back. After the board of education signs off, the content is approved.

Letting Experts Take the Lead at Every Turn

When procuring supplemental digital content, the district relies on an RFP and bid process that includes four categories: instructional software (digital resources), non-digital supple-

mental materials, non-instructional software and consulting services (contractors). Each category has its own committee composed of voting members who hold strategic positions, and non-voting members representing highly specialized subject matter experts. All members contribute toward the RFP's specification requirements and scoring sheets.

After proposals arrive, the entire committee participates in the reading process, with non-voting members providing expert opinion and voting members providing scores and justification aligned to the district's digital strategy. Committee members can only vote on the specific proposal areas where they have expertise. All of HISD's schools have their own unique populations and needs, so the committee often approves more than one product, and in some cases several in each category.

Throughout the process, curriculum and IT work closely at every step. "For HISD, that partnership between TechEd and Curriculum & Instruction is in place from the beginning to the end of the procurement process, when content is loaded in the system," Schad says. "It never goes away."

To make the approach work, he says the roles and responsibilities of each department must be well defined at every phase of the selection process, and continually be revisited and redefined.

"It's an evergreen process," he says. "As the district evolves, and the vendors evolve and publishers evolve, those roles will continue to evolve. It's not just one and done."

Acknowledgments

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