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SPOTLIGHT

— Maddie McGarvey for Education Week

Both printed texts and digital readers have their places in a 3rd grade classroom at Indian Run Elementary School in Dublin, Ohio.

DIGITAL READING & LITERACY

EDITOR'S NOTE

As the nation enters an unprecedented digital learning era due to COVID-19, the need to examine digital reading and literacy becomes more crucial. In this Spotlight, learn about ways educators can use ed-tech in English classes, how online reading has changed, and how teachers are maintaining reading practices during the pandemic.

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Published on November 8, 2016, in Education Week's Special Report: The Changing Face of Literacy

How Should Reading Be Taught in a Digital Era?

By Liana Heitin

With the many enhancements to mobile devices, multimedia websites, e-books, interactive graphics, and social media, there's no question that the nature of reading has changed during the past decade.

But has the way reading is taught in elementary schools changed as well? And what should teachers be doing to get students ready for the realities of modern reading?

For now, there's no consensus on exactly how digital skills should be incorporated into literacy instruction. Practitioners have few guidelines, and many are simply adapting their lessons as they see fit. But many literacy experts do agree on at least one thing: that all students should be learning with a mix of print and digital texts—even the very youngest.

"Just like we teach nonfiction and fiction at a very young age, I think we can talk to preschoolers and kindergartners about different kinds of texts—this is one where we turn the pages, and this is one where we click on the different pages," said Kristen Hawley Turner, an associate professor of English education and contemporary literacies at Fordham University.

Exposing students to both print and digital reading early on in school is a way of reflecting what authentic reading looks like, many said.

"It is the way people read, write, communicate, and learn in the world, so kids should be learning it from the beginning," said Bridget Dalton, an associate professor of literacy studies at the University of Colorado at Boulder. "You don't wait till they're proficient in one to do the other. It's a simultaneous development."

But unfortunately, experts said, the transition to that way of instruction has been slow going in many places. The word "reading" in elementary classrooms often still refers mainly to print.

According to survey data from the 2015 National Assessment of Educational Progress, only about 1 in 10 4th graders use computers to access reading-related websites on a daily basis or nearly every day at school. About 30 percent of students in 4th grade classrooms never, or hardly ever, use computers to access such reading material in school.

—Maddie McGarvey for Education Week

Teacher Franki Sibberson works with one of her 3rd grade students on a reading assignment this fall at Indian Run Elementary School in Dublin, Ohio.

"Think about what happens in the real world, and school is not there, regrettably," Turner said.

Brenda LeClerc, an elementary reading specialist in Lincoln, R.I., who attended a digital-literacy institute at the University of Rhode Island this past summer, said students in her classes have generally read "really only print-based materials." She is working to expand her own digital skills because "everything outside of school is not print-based for the most part," she said. "I feel like I need to be more comfortable with it."

Print Skills Plus

Adding digital reading to the already-tough task of teaching elementary students foundational print skills can be daunting, though.

Even students born in a digital age need to learn a host of new skills, including how to operate the devices, navigate online tools, manage distractions, and maintain their own safety and privacy.

"It's challenging. As teachers, we're just realizing how much our own reading and writing lives have changed," said Franki Sibberson, a 3rd grade teacher in Dublin, Ohio, and the vice president of the National Council of Teachers of English.

One of the best ways to teach technical skills is through modeling, many said. Teachers can show students how to use technology by using it themselves and talking out the process.

"This week, we might be reading a pa-

per book [for a read aloud], and next week, I might read something off my Kindle," said Kristin Ziemke, a 1st grade teacher at the Academy of St. Benedict the African in Chicago, who also consults with other urban schools as a learning-innovation specialist. "I want them to see what it looks like to turn the page, to go back."

Students, especially the youngest ones, don't each need their own device to do that, either. "One device and the projector changes everything for kids and for teachers," she said.

The transition from looking at words and text in print to viewing it on screen isn't hard at all for young students, said Karen Pelekis, a 1st grade teacher in Scarsdale, N.Y. "It's just a natural extension of how they already see the world. It's what they're already exposed to."

Teachers can also use modeling to show young children how to navigate an online space, such as a web-based article with hyperlinks and multimedia.

"We talk about text features in books—indentation, the big first letter at the beginning of a chapter, what a chapter means," said William L. Bass II, the innovation coordinator for instructional technology, information, and library media for the Parkway district in Chesterfield, Mo. "But what about those text features that are inside of web pages? What is this underlined blue thing? Why did the author choose to make that a link?"

Nonlinear Texts

Perhaps the biggest difference between print and online reading is that the latter introduces decision-making.

"Print reading is very much there's a dead end—it's isolated reading," said Katharine Hale, the instructional-technology coordinator at Gunston Middle School in Arlington, Va. "Digital reading is more like a 'choose your own adventure.' You can click on something else and continue on again."

In other words, reading goes from being a linear experience in print to being a nonlinear one online. Teachers need to be direct about that difference, experts said, showing students that sometimes it's OK to stop and click on a link or watch a video in the middle of an article if it will help them understand the content better.

"We need to teach young children digital text is hyperlinked and networked, and you go from one place to another, and it's not left to right," said Turner. "I've had students successfully do that in early elementary by having them click on hyperlinks and talking about, where did that take me? The idea is being very explicit and not just assuming they have the knowledge."

At the same time, students need to see that, while the format is different, the purpose of reading remains the same. "When you think about comprehension strategies, they work whether you're reading a blog post or watching video or reading a print book," said Sibberson, who co-wrote a book with Bass in 2015 called *Digital Reading: What's Essential in Grades 3-8*.

Some studies have shown that students struggle more with comprehension on digital devices than print materials. A 2012 study by the Joan Ganz Cooney Center at Sesame Workshop, a research organization for children's digital media, found that 3- to 6-year-olds who read interactive e-books with their parents "recalled significantly fewer narrative details than children who read the print version of the same story."

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>
> **KATHARINE HALE**
> GUNSTON MIDDLE SCHOOL, ARLINGTON, VA.

But some educators chalked that up to students not getting explicit instruction on how to navigate online text and transfer those print comprehension skills. "I once had a kid say, 'I didn't know we were allowed to think when we read online,'" said Sibberson. "They need to see it's the same thing—sometimes with online stuff, they think of play."

Young students also need instruction on how to self-regulate and manage distractions in the online world—when to ignore links, close tabs, and stay on one text or app rather than jumping around to others, for example.

"If you don't start thinking early about managing distractions, you're going to be building bad habits," Fordham's Turner said.

Search for Texts Online

Just as young students learn to choose books from the library, many experts said they should also learn to search for texts online. But, of course, surfing the web is rife with safety and privacy issues, so elementary students will need to do that in a more limited environment.

Pelekis sets up wiki pages with links related to whatever her 1st graders are studying—for instance, students can go there to get more information on chicks during a unit on the egg-to-chicken life cycle.

She avoids search engines altogether. "I know some people do [use them] but ... I did once, and it's a bad mistake I'm not making again," she said. Even YouTube's education channel can turn up inappropriate content, she said. (And don't even think about having students Google the word "chicks," she mentioned offhandedly.)

That said, some teachers want to maintain authenticity in how students search for information online, both because they will need those skills later and because giving students a choice can motivate them to read.

"So often we say, go to National Geographic Kids, open the article on giraffes, and read it," said Ziemke, who co-wrote a 2015 book called *Amplify! Digital Teaching and Learning in the K-6 Classroom*. "I noticed I wasn't giving students that same choice piece with digital reading [as with print]."

Ziemke now recommends introducing 3rd graders and up to a half-dozen or so vetted educational websites, such as Wonderopolis and Tween Tribune, and giving them free time to search within those for texts they'd like to read.

By 5th grade, though, Bass says students should have opportunities to really search the web on their own.

Authentic Reading vs. Games

There are countless online games and apps available to help students practice their foundational reading skills—phonics, sight words, vocabulary, among them—and teachers have been using them for years. But digital-literacy experts caution that there's a difference between using games and having students do authentic online reading.

"People ask me what's the best sight-word app for 2nd grade, and I say I don't

DEEP READING

WITH DIGITAL TEXTS

Daniel Willingham, a University of Virginia psychology professor and author, studies the brain science of reading. In an op-ed for the New York Times, he states that students' understanding of text depends more on their background knowledge and vocabulary than actual reading skills and techniques.

When students read for knowledge acquisition, they are gathering valuable background and contextual information necessary to more deeply understand the text they're currently using and texts they'll read later. And digital texts make that easier. In fact, a landmark study of reading comprehension, digital texts and prior knowledge from the University of Rhode Island found that reading online has other benefits to support deep reading.

With screen reading, students have more opportunities to interact with text — highlighting, word look-up, links and, in some cases, audio and video. And with digital content, they build critical thinking skills by deciding how to take advantage of additional resources embedded in the text, such as definitions and other supporting contextual information that sheds light on the story itself.

The easy access to more information creates a deeper understanding of what students are reading, which boosts background knowledge, encourages progress and instills a feeling of success. These factors combine to help students learn more from reading and get more enjoyment from it, too. ■

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know, I don't use tech like that," said Ziemke. "I'm not against games by any means, but when I look at where we need to start, we can do so much with modeling daily work and authentic ways of using tech."

Many games and apps aren't much more than "souped-up worksheets," according to Hale, the instructional-technology coordinator in Virginia.

More-authentic digital-literacy instruction would have students working with the technology that readers and writers use all the time—blogs, social media, movie-making apps, bookmarking tools, audio recorders, virtual bulletin boards, and annotating tools, educators said.

"There are isolated skills you can learn nicely on the computer, but overall for me, reading is all about thinking, and the more I can get them to think, explore, be curious and interested, and have a desire to read and learn, the technology helps you be able to capture that and extend what they can do in the classroom," said 1st grade teacher Pelekis.

Classroom Barriers

Needless to say, incorporating digital skills into early reading is easier in some situations than others.

For starters, there's the issue of access to digital devices. Many teachers said they simply don't have the internet-connected tools they need to get going with online reading.

"We do have iPad carts and laptop carts, but teachers have to sign up to use them, so you have to work around everyone else's schedule," said Lisa Maucione, a reading specialist for the Dartmouth public schools in Massachusetts, who also attended the digital-literacy institute at URI. "And if there's testing, testing is the priority."

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>
> **LISA MAUCIONE**
> READING SPECIALIST, DARTMOUTH PUBLIC SCHOOLS IN MASSACHUSETTS

But Turner said devices are the least of teachers' problems. "Almost everybody can get at least one device in the classroom whether through grants via DonorsChoose or from the district," she said. And students can learn the basics they need when a teacher projects the device on a screen and models how to use it.

A bigger issue is that teachers feel hamstrung by policies that don't necessarily promote digital reading, some said. Standardized tests do take place on computers now in most states, but they don't measure authentic digital skills, such as navigating websites and using search engines. And in many cases, because authentic online reading tasks aren't being assessed, teachers in tested grades may not prioritize teaching them.

In addition, many elementary teachers are uncomfortable with their own technology skills, which makes them hesitant to start digital reading with students.

"For the most part, we were not trained as educators to teach kids who are reading in digital spaces—that's not part of most teacher-prep courses," said Bass, the innovation coordinator in Chesterfield. "We fall back and rely on the way we were taught, and that's a barrier."

There are also some mindsets that hold teachers back from teaching digital reading. "I've been in classrooms where it's not happening at all," said Ziemke, the 1st grade teacher and consultant. "There are people that are waiting it out [until they leave teaching] or saying, 'I'm going to go to a school that's not as techy.'"

And some educators are—understandably—still attached to the idea of falling in love with print books.

"There's still something very magical about holding a book and being able to flip the page in your hands," said Hale. "But reading isn't just reading print text anymore. Reading is reading the world." ■

Published March 30, 2020, in Education Week's Teaching Now Blog

Reading to Students Online Provides a Sense of Normalcy, Teachers Say

By Madeline Will

Every day, Hannah Haskell reads a chapter of *Harriet the Spy* to her 3rd graders. She used to read the book to students during snack time. Now, she reads the chapters online, as her students tune in from their own homes.

Haskell reads the book live on Google Hangouts, but saves the recordings in her Google Classroom so students can listen whenever it fits into their schedules. One student told her that he listens to it before he goes to bed at night.

"I thought that would help them maintain some type of classroom culture, even though we're online now," said Haskell, who teaches at Trumansburg Elementary School in Trumansburg, N.Y. "[Daily read-alouds have] been something we've established as a community, as a part of their routine every day—it gives them some sense of structure. ... It's been a nice way to be in communication with them and see each other, because I know I miss them so much."

As schools across the country have closed their doors for weeks, months,

or through the end of the school year due to the coronavirus outbreak, more and more teachers are reading to their students from afar. As school districts scramble to get online learning systems up and running, virtual reading sessions are a way for educators to provide a sense of normalcy and connection to their students.

"This is precisely the kind of reassuring connection most needed right now," tweeted researcher and professor Leslie Siskin. "And a bit of a break for family carers."

Here are some tips on how to implement a successful virtual read-aloud.

1. **Consider copyright concerns.** If a book isn't in the public domain (meaning, published before 1924), experts typically recommend that teachers and librarians obtain permission from publishers before reading the book online. However, publishers—including Simon & Schuster, Harper Collins Children's Books, Disney Publishing, and Scholastic—have relaxed the usual required copyright permissions during the coronavirus pandemic.

   The School Library Journal has rounded up the new policies from publishers, most of which ask teachers to note that they are reading with permission from the publisher at the beginning of the video and to delete the recording by the end of the school year. Even J.K. Rowling has granted an open license for teachers to post videos of themselves reading the *Harry Potter* books on their schools' secure networks or closed educational platforms through the end of the school year.
2. **Let your students interact with the story from afar.** Many of the video platforms that teachers are using to record themselves reading allow students to comment, ask questions, share thoughts, or submit responses to a prompt. (But make sure you are carefully evaluating these platforms first to ensure they will not lead to any student data privacy problems.)

   Janeen Spradlin, an elementary school principal, tweeted that her teachers have set up private Facebook groups for their classes, where they are doing read-alouds, phonics lessons, and other reading instruction via Facebook Live and videos. The teachers will ask open-ended questions about the story, and parents will record their students' answers and post them in the group.

   Teachers could also ask students to draw a picture or write a response to the story, and then photograph their work and upload it to the school's online platform.
3. **Invite a "mystery reader" to read to your students, too.** Some teachers have added some extra excitement to the daily readalouds by inviting a surprise guest.

   In addition to school staff members, some teachers have also tapped parents to serve as mystery readers—including their own.
4. **Point students to read-alouds by celebrities and children's book authors.** If your students are eager for even more stories, many children's book authors are reading their books online. Celebrities from Oprah to Josh Gad (who voices Olaf in

Frozen) have gotten in on the fun, too. For more videos of read-alouds, check out lists from We Are Teachers, author Kate Messner, and the Indianapolis Public Library.

5. **Let read-alouds be a chance for students to reconnect with their teachers and classmates.** Many students are missing their friends, teachers, and daily routines. Having a regular read-aloud gives them "a sense of normalcy or consistency," one parent tweeted.

And some video platforms, like Zoom, let students see their classmates who have logged on, too.

"You can tell that the kids are so excited when they see their teacher log on or their friends log on because their face lights up and they start waving or they'll point to their mom like, 'Look, they're right there,'" 5th grade teacher Kristin Gainer told the news site PennLive. "You can definitely see that they're loving it." ■

—Maddie McGarvey for Education Week

Ava reads at Indian Run Elementary School in Dublin, Ohio. The school integrates iPads, laptops, and books into reading time.

Published November 8, 2016, in Education Week's Special Report: The Changing Face of Literacy

What Is Digital Literacy?

Digital Literacy: An Evolving Definition

By Liana Heitin

While the word "literacy" alone generally refers to reading and writing skills, when you tack on the word "digital" before it, the term encompasses much, much more.

Sure, reading and writing are still very much at the heart of digital literacy. But given the new and ever-changing ways we use technology to receive and communicate information, digital literacy also encompasses a broader range of skills—everything from reading on a Kindle to gauging the validity of a website or creating and sharing YouTube videos.

The term is so broad that some experts even stay away from it, preferring to speak more specifically about particular skills at the intersection of technology and literacy.

The American Library Association's digital-literacy task force offers this definition: "Digital literacy is the ability to use information and communication technologies to find, evaluate, create, and communicate information, requiring both cognitive and technical skills."

More simply, Hiller Spires, a professor of literacy and technology at North Carolina State University, views digital literacy as having three buckets: 1) finding and consuming digital content; 2) creating digital content; and 3) communicating or sharing it.

Finding and Consuming

In some formats, "consuming" digital content looks pretty much the same as reading print. Reading a novel on a basic e-reader requires knowing how to turn the device on and flip pages back and forth, but other than that, it isn't so different from reading a book. A PDF of a New York Times article looks a lot like the page of a print newspaper, except that it appears on a screen.

Donald Leu, an education professor at the University of Connecticut and a recognized authority on literacy and technology, describes this sort of digital reading as "offline reading."

"It's not interactive, ... there's one screen, and you just have to read it," he explained. "It's the same as reading a [paper] page."

The added skills needed for this kind of reading take just a few minutes to teach.

In comparison, what Leu calls "online reading," in which a digital text is read through the internet, requires a host of additional skills. For instance, a New York Times piece viewed on the web may contain hyperlinks, videos, audio clips, images, interactive graphics, share buttons, or a comments section—features that force the reader to stop and make decisions rather than simply reading from top to bottom.

"The text is designed so that no two readers experience it in the exact same way," said Troy Hicks, a professor of literacy and technology at Central Michigan University.

The reader determines, among other things, when to click on videos or hyperlinks, how long to stray from the initial text, and whether and how to pass the information along to others.

The process of finding digital content

to read also necessitates different skills than finding print texts. In seeking print materials, students might flip through magazines or head to the library and search through stacks of books. They learn to use a table of contents and an index to locate information within a book.

But part of digital literacy is learning to search for content in an online space. Students have to query a search engine using keywords and navigate those results, including assessing the reliability of particular authors and websites.

Creating Content

Digital literacy also refers to content creation. That includes writing in digital formats such as email, blogs, and Tweets, as well as creating other forms of media, such as videos and podcasts.

Renee Hobbs, a professor of communication studies at the University of Rhode Island, talks about digital authorship as "a form of social power." At a weeklong professional-development institute on digital literacy held at URI this past summer, she showed examples of student activists sharing their messages about the Black Lives Matter movement through YouTube videos.

Creating digital content is a "creative and collaborative process that involves experimentation and risk-taking," she said. There's more risk-taking than in print writing because digital writing is so often meant to be shared.

Sharing and Communicating

While traditional writing can be a personal endeavor, digital writing is generally intended to be communicated with others. And digital-writing tools are designed to make that easy to do.

As North Carolina State's Spires and her co-author, Melissa Bartlett, wrote in a 2012 white paper about digital literacy and learning, "Web 2.0 tools are social, participatory, collaborative, easy to use, and are facilitative in creating online communities."

That makes digital writing a potentially powerful lever for social good, allowing students to "actively participate in civic society and contribute to a vibrant, informed, and engaged community," as the ALA notes.

It also makes digital writing a potentially dangerous tool—decisions about when and what to share online can have repercussions for a student's safety, privacy, and reputation.

—Maddie McGarvey for Education Week

For that reason, learning about appropriate internet behavior is also a part of digital literacy, many say.

"We need to help kids see they can use digital tools to create things and put things out into the world, but there's responsibility that comes with that," said Lisa Maucione, who attended the URI institute and who is a reading specialist for the Dartmouth public schools in Massachusetts.

Evolving Technology

Because the term "digital literacy" is so wide-ranging, it can cause confusion. What exactly is someone talking about when he or she refers to digital literacy? Is it the consumption, creation, or communication of digital material? Or is that person discussing a particular digital tool? Do technology skills like computer coding fall under the digital-literacy umbrella as well?

Some experts prefer the term "digital literacies," to convey the many facets of what reading and writing in the modern era entails.

"The concept should instead be considered plural—digital literacies—because the term implies multiple opportunities to leverage digital texts, tools, and multimodal representations for design, creation, play, and problem solving," Jill Castek, a research assistant professor with the Literacy, Language, and Technology Research Group at Portland State University, wrote in an email.

> "I read on my iPad when I'm in a car, or when I'm on a plane when I'm going to a trip. When I'm at home, I read regular books," says Shota, a 3rd grade student at Indian Run Elementary School in Dublin, Ohio.

Leu of UConn avoids the term altogether.

"Is someone who is 'digitally literate' equally literate when searching for information, when critically evaluating information, when using Snapchat, when using email, when using text messaging, when using Facebook, or when using any one of many different technologies for literacy and learning?" asked Leu in an email. "I think not."

He prefers the term "new literacies," which he said better conveys how rapidly technology is changing. Other experts have used terms like "literacy and technology," "multiliteracies," and "21st century literacies."

But for now, digital literacy seems to be the prevailing term among educators. "I understand this is the term that is popular today," Leu said, "just as I understand a newer term will appear in the future that will replace it." ■

Published on August 1, 2017, in Education Week's Curriculum Matters Blog

What We Still Don't Know About Digital Reading

By Stephen Sawchuk

Every day, students consume hundreds of words on their iPads, mobile phones, Chromebooks, and Kindles. Increasingly, educational publishers are delivering curriculum on these devices, including several start-ups focused on getting informational texts and news stories into students' hands. But fundamentally, is reading online different from using the old class copies of *Ethan Frome or The Federalist Papers*?

As it turns out, what we don't know outweighs what we do know about how people comprehend texts on a digital screen rather than on the printed page, a new research review concludes.

There's some good evidence that readers seem to process longer texts for understanding better in print than digitally, but beyond that there are a lot of question marks, concludes the review, which was published online in July in the *Review of Educational Research*.

For example, does this pattern show up across genres? How does the age range of the reader affect the equation? And how aware are students of the fact that they may not grasp as much when reading online versus in print? And what about differences across the various types of digital devices? What about pared-down online texts, versus those with bells and whistles?

It's not so much a question of a "horse race" between reading in print or reading digitally that needs exploration, said Patricia A. Alexander, a University of Maryland professor in the department of human development and quantitative methodology and one of the review's authors. Rather, knowing "when it matters, for whom, and under what conditions is the question that constantly needs to be examined, again and again," she said.

A Small Pool

The research review, by Alexander and her graduate student, Lauren M. Singer, takes an exhaustive look at what scholars have written on the topic for the past 25 years. The two researchers combed databases and journals for research using the terms "reading," "reading in print," "digital reading," and "online reading."

From an initial pool of nearly 800 studies, the researchers set four criteria to whittle down the list: The studies had to investigate both print and digital reading. They had to be empirical, objective studies—so that meant theoretical or philosophical publications and anecdotal research were out. The studies had to use data beyond just self-reported survey results, and they had to employ a gauge of reading comprehension.

These criteria narrowed the number of studies in the pool down to just 36, something Alexander called "a shock."

"There's been an assumption that digital reading is just going to be digital, and there's no reason to compare it to print. A lot of the studies on digital literacy just looked at the digital environment, not the consequences of that" on how students process text, she said.

And there were plenty of methodology issues, too. Only nine of the 36 studies laid out a definition for reading, and only five crafted one for the term digital reading, for example. Some of the measures of reading comprehension they used were flawed: More than 60 percent of the studies used reading measures that were developed by the researchers, who didn't sufficiently specify their tests' technical validity and reliability.

The studies often weren't very detailed on the type of text students were asked to read or its length. And finally, many of the studies only looked at fairly simple gauges of reading comprehension—for example,

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>
> **PATRICIA A. ALEXANDER**
> PROFESSOR, UNIVERSITY OF MARYLAND

factual recall as measured on multiple-choice tests, rather than more cognitively demanding tasks.

In all, the research seems to suggest that, when reading only for superficial purposes, and at very early ages, format doesn't seem to matter much.

"If all you care about is the gist, generally speaking, [format] doesn't matter; you can read it fast and get it. But it seems that when you go into more detailed types of comprehension questions that demand careful attention to things—like issues of accuracy and justification—you see the effect coming in," Alexander said.

She said researchers need to spend more time teasing out all of the interrelated factors that might play into comprehension differences by format. This would include textual aspects, like text length and type; individual student differences, such as vocabulary level or topic knowledge; type of digital device used; and also, how students interact with and process texts as they read. (There's evidence that people have more difficulty understanding texts that require them to scroll extensively on a screen, for example.)

And those will mean scholars will have to craft more sophisticated study designs and pay more attention to how they're collecting data, she said.

There's a lot here that reflects what my colleagues found in an extensive report on digital reading put out last year.

One problem, they reported, was that the term "digital literacy" itself tends to confuse more than enlighten. People use it to mean everything from merely sticking print text online without a lot of modification, to online text that requires students to sort through all manners of hyperlinks, multimedia, and other sensory enrichment (or distraction, depending on your point of view). ■

Published on September 25, 2018, in Education Week's Special Report: Literacy for the Workplace

Jobs at All Levels Now Require Digital Literacy. Here's Proof.

By Benjamin Herold

Newark, Del.

It's no secret that American workplaces are becoming more reliant on technology.

But what may surprise the country's K-12 educators and policymakers is how work at nearly every rung of the employment ladder is becoming more digitized. Often, the skills needed to succeed have less to do with computer programming than what experts call "digital literacy"—the ability to interpret, create, and strategically use digital information.

"Everyone's job is changing," said Mark Muro, a senior fellow and policy director at the Brookings Institution, a think tank. "The ability to read and then conduct first-order analysis of digital information is highly valued in almost all work environments."

To better understand the central role of digital literacy in the workplace, Education Week took a deep look at four occupations in the Christiana Care Health System. It's the largest private employer in Delaware, with 11,600 employees and an expected 1,500 new hires this year.

The newspaper got to know: Bobbie Wells, an entry-level service assistant responsible for cleaning and disinfecting patient rooms; Dante Pozzi, a production supervisor in the hospital's massive kitchen, which churns out 2,500 meals a day; Brianna Buzzuro, a registered emergency-room nurse; and Stefanie Brumberg, who helps oversee the health system's massive flow of digital data from her perch as corporate director of health-information-management services.

Across the board, said Neil Jasani, Christiana Care's chief people officer, digital literacy is critical to getting your foot in the door—and advancing.

"The ability to create digital content, consume it, act on it, communicate it, share it, find it—all that is tied to patient care," Jasani said. "Those skills are emphasized more as one rises up the career ladder."

How can schools build a strong foundation for the digital-literacy skills that are required in real jobs?

Following are profiles of the four employees visited.

Bobbie Wells, 28

Service Assistant, Environmental Services

Bobbie Wells' workdays start at 7 a.m., when she begins cleaning patient rooms according to a detailed plan designed to stop the spread of infection.

Her entry-level job requires only basic digital-literacy skills, centered on using mobile apps for communications and task management.

"I work off the iPhone," Wells said. "I get phone calls from management, and that's how I know which room to go to, which patient has been discharged, and what needs to be cleaned."

—Nate Pesce for Education Week

Bobbie Wells wipes down a bedside tray in a hospital room in the Christiana Care Health System. Wells and her co-workers use a high-tech, ultraviolet-light cleaning system, which is digitally operated and requires extensive training.

Learning the apps was easy, she said, akin to what she sees her older two children, ages 10 and 6, already learning on their school-issued iPads.

"I think they're preparing them at least for the simple stuff we do," Wells said.

But even at the beginning rung of Christiana Care's environmental-services department, new technology is becoming more prevalent. Wells and her colleagues now regularly use a high-tech, ultraviolet-light cleaning system, which is digitally operated and requires extensive training.

And for entry-level workers who want to advance, digital literacy is key.

For service assistants like Wells, the most common next step is becoming a patient-care technician. That position involves interacting with patients and taking their vital signs, and it requires an expanded comfort level with comput-

ers and software, as well as the ability to enter and read digital information.

For Muro of the Brookings Institution, that reality holds a vital lesson for schools.

It's not enough to assume that so-called "digital natives" are developing the digital-literacy skills they'll need in the workplace by surfing YouTube and playing video games, he said. Nor should schools assume that every student will need to learn to code in order to have a good-paying job.

"What is needed is broad exposure to basic office and productivity software," Muro said. "It's the difference between being able to get a job in a stable industry and make it into the middle class, or being locked into the truly bad strata of American jobs."

—Nate Pesce for Education Week

Dante Pozzi works with some of the newer digital cooking equipment at Christiana Hospital in Newark, Del. The amount of computer-based work his occupation requires has increased nearly 700 percent since 2002.

Dante Pozzi, 43

Production Supervisor, Food and Nutrition Services

What's the most efficient way to make hundreds of gallons of gravy a week?

In the lower levels of Christiana Hospital, Dante Pozzi initiates the process via technology, using a digital touch screen to program a massive kettle.

"Food service is no different than any other industry," he said. "Tech is changing everything."

That sentiment is backed up by Brookings' recent nationwide analysis of the digitalization of work. Looking at federal data, researchers sought to determine the extent to which the day-to-day tasks required for hundreds of occupations are performed digitally. They assigned each occupation a "digital score" of 1 to 100, then tracked how much that score changed over time.

Between 2002 and 2016, the amount of computer-based work required of cooks in institutional cafeterias increased nearly 700 percent, with the occupation's score rising from 4 to 31.

In Christiana Hospital, patients place thousands of meal orders a day via iPads. Software aggregates the information into a report for the kitchen. Adjusting recipes is done by software. So is purchasing, plus processing the massive orders that are delivered to the kitchen each day.

Production supervisors even have to review some basic predictive analytics—for example, if the software suggests the hospital should order 300 pounds of turkey for the following week, does that make sense?

Fortunately, Pozzi said, he has some background in technology. About a decade ago, he took classes to become certified by Microsoft and Cisco, leading him to work for several years installing computer systems at area restaurants.

And now, Pozzi said, his future plans revolve as much around computers as food: He's currently taking online classes at Wilmington University, hoping to earn a bachelor's degree in business administration and move up into management.

"I think there's a connection between food and technology," Pozzi said. "Being able to do both is really exciting."

Brianna Buzzuro, 26

Registered Nurse

In Brianna Buzzuro's four years as a nurse, her job has changed dramatically.

"All of our documentation used to be on paper," Buzzuro said. "Now, every moment I'm not with a patient, I'm on the computer."

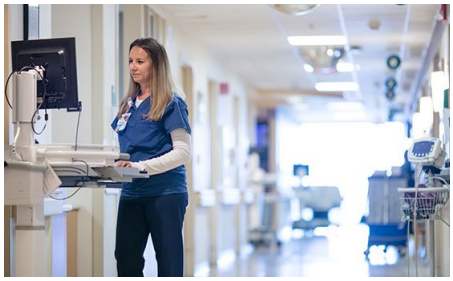
In the bustle of the Wilmington Hospital emergency room, that means interacting with multiple software programs at a time: Buzzuro uses one system to enter notes and patient assessments. Two separate software systems are used for moving and locating patients. Others control ordering medications, entering blood work, and examining X-rays.

And it all could change again soon.

"I'm the chair of the [Nursing] Technology and Innovations Council" at Christiana Care, Buzzuro said. "We're looking at what we have now and how to improve it."

High on the priority list: a hands-free option for managing communications, such as a smartwatch, that would add a new interface and information dashboard for nurses to become familiar with.

The fast-paced digital work environment, combined with the rapid pace of change, can be difficult for some nurses, said Buzzuro. Recent college graduates who grew up using laptops and smartphones tend to grasp the new systems more quickly than their more veteran counterparts, she said. But even for millennials, there's still a lot of on-the-job software training.



—Nate Pesce for Education Week

Brianna Buzzuro and other nurses in the Christiana Care system must contend with numerous dashboards and information flows that are constantly changing.

That's why part of K-12 schools' responsibility now is to teach students to read and discern text, images, data, and other digital information in a variety of online environments, said Hiller Spires, a professor of literacy education at North Carolina State University.

"The whole mindset has to be developing the capacity to adapt and learn and relearn constantly evolving technologies," Spires said.

Jasani, who oversees the hiring and training of Christiana Care's employees, agreed.

"If I were to give advice to high school students," he said, "it would be to get very comfortable finding your way around various digital platforms."

—Nate Pesce for Education Week

Administrator Stefanie Brumberg works with an iPad in her office at Christiana Care. Sixty percent of the 4,200 discrete health-record forms the medical center uses are now administered digitally.

Stefanie Brumberg, 47

Corporate Director, Health Information Management Services

Stefanie Brumberg views herself as a "hub," connecting Christiana Care's direct-care providers and information technology staff.

"I'm on conference calls most of the day, usually about the best way to capture the information we need to capture,"

SmartFocus on Reading Instruction

A SmartBrief Update

SPONSORED BY OverDrive Education

WINTER 2019

ENGAGING STUDENT READERS THROUGH DIGITAL TOOLS

How to equip students with the right options to enhance enjoyment of reading and boost comprehension.

According to National Assessment of Educational Progress data, approximately 70% of students in grades four, eight and 12 read at or above the basic level. That means 30% of US learners are performing below grade level and proficiency.

Part of that is attributable to poor reading skills, but some experts say that the bigger culprit for most students is insufficient background knowledge. Once students have mastered the crucial skill of decoding, reading comprehension depends almost entirely on underlying understanding. This creates a catch-22. Knowledge is required for successful reading, and reading is one of the best ways to acquire knowledge.

That's the big advantage to digital content like ebooks and audiobooks. For struggling readers, these formats provide quick, in-context access to relevant background knowledge, like definitions, translations and Read-Alongs, which offer young readers a chance to listen as a story is read, focusing more on comprehension and less on anxiety surrounding the reading process. For reluctant or uninspired readers, digital content brings a huge range of titles and topics to any classroom, ensuring that even the pickiest students will find a text that resonates with them.

CULTIVATING READING ENJOYMENT

Research shows that students who enjoy tasks like reading are more persistent and more likely to stick with them over time. They pay closer attention, focus more keenly, acquire more knowledge and feel more successful.

Here are four ways to use digital content to meet students' reading needs, foster enjoyment and get them reading more:

1. MAKE IT ACCESSIBLE.

"Digital reading increases access to books," asserts Tiffany Bem, librarian and media specialist at Rio Rancho Middle School in Rio Rancho, N.M. "Students are very comfortable with technology, and many seem to feel that reading on a device is 'cooler.'" This creates more opportunities for students to read outside of school. Customization also drives accessibility. Students can adjust font style and size for easier reading. Some digital content even includes visual cues and word matching, audiobook options for expressive reading and titles in native tongues. Screen reading also provides privacy for students who may be reading below grade level. Reducing self-consciousness and fear of judgment empowers students to read appropriate texts while they build skills and stamina.

2. APPEAL TO DIGITAL NATIVES.

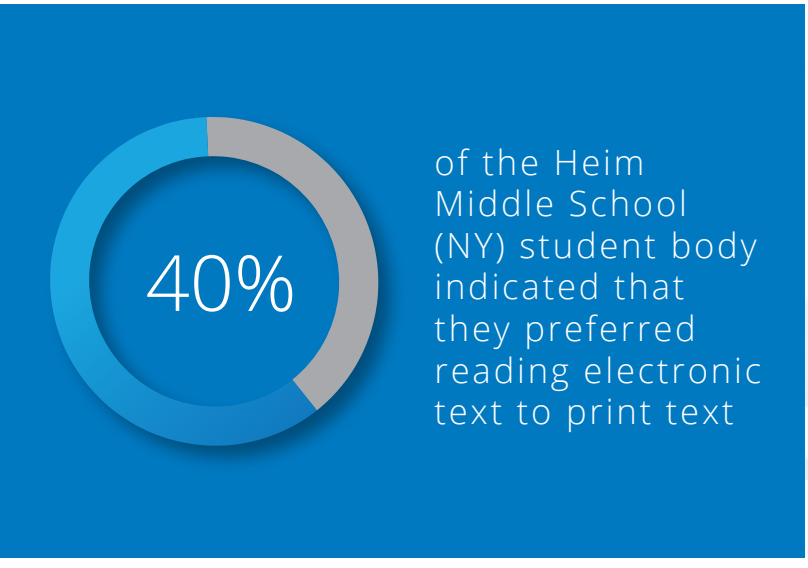
"Digital content builds on many students' love of technology by allowing them to incorporate technology into their reading," says David Saia, librarian at Heim Middle School in Williamsville, N.Y. "I recently surveyed our student body and nearly 40% indicated that they preferred reading electronic text to print text."

3. DELIVER RELEVANT TITLES.

Nobody enjoys reading something they're not interested in. Digital libraries make it possible to guide students to appropriate high-interest texts in various formats: ebooks, audiobooks, Read-Alongs and graphic novels. "Students take ownership of understanding the piece and relating it to their own lives or to something else they are familiar with, which increases the personal relevance of what they read and also helps them to remember," says Bem, who was the first in her district to promote digital reading on a school-wide level.

4. PERSONALIZE YOUR INSTRUCTION.

Teachers can monitor how long and how often students are reading and make sure the books on their virtual shelves are sufficient for assignments and appropriate for their reading levels. Some platforms, like OverDrive Education's Sora app, enable teachers to review students' notes and highlights using Google Classroom. "Looking at their notes, questions and vocabulary gaps informs instruction because it gives concrete data on what the student is struggling or engaging with," explains Patti Carlyle, K-12 specialist with OverDrive. "You can uncover the parts of a text that are compelling or problematic and design interventions to help the student engage more deeply with the material. And if there's overlap across multiple students, you can use that data to review with the whole class."



TALES FROM THE REAL WORLD

Use these ideas to take advantage of digital texts or to inspire your own activities:

- **INTEGRATE WITH OTHER CLASSROOM TECHNOLOGY.** "Teachers can use Sora on their smart boards and show the students different things they are looking for, then have students replicate the activity or reading skill in their own digital books and share it with the instructor," Bem says. "Some of my teachers check out an audiobook on Sora then play it on Fridays for their classes. The students can't wait until the next installment!"

- **MODEL THE HABITS OF A GOOD READER.** Sharing your own love of reading with students conveys skills and shows that reading is a lifelong hobby. "One strategy would be to model reading discovery, such as sharing favorite quotes or sections in stories with students and discuss why they are meaningful," Saia says. "Students could be asked to share their own favorites, which they will probably be reluctant to do, but it will open them up to looking for places in stories where text is meaningful to them."

- **MAKE IT A GAME.** "Plan a scavenger hunt of vocab words in the text," Carlyle suggests. "Have groups or each student find the words, define them, then write a new sentence in a note. Export and share the results, then vote on the funniest or most creative sentence for each word." Digital reading apps like Sora also challenge students to unlock achievement badges, creating additional motivation to read.

- **LET STUDENTS LEAD LEARNING.** "One of our teachers uses a 'daily definer,' a student whose job is to check the online dictionary in Sora and define words for the rest of the class," Saia notes. "Students like the responsibility and enjoy using the technology in a way that is approved for class use."

In Health Care, A Wide Range of Jobs Are Becoming More Digital

Researchers gave occupations a "digital score" on how much computer knowledge is required to perform the job, and how central computer use is to the position. The scale is 0-100, with 100 representing fully digital and 0 representing not digital at all.

Occupation	2002	2016
Janitor/cleaner	3	18
Cooks	4	31
Registered nurse	38	55
Medical Record/Health Information Technician	59	59

she said. "There's just so much content to synthesize."

Both the variety of challenges and the pace of change are staggering.

A full 60 percent of the hospital's 4,200 discrete health record forms are now administered digitally.

Since 2014, Christiana Care has cut its annual medical-transcription budget by 90 percent—the result of rapid adoption of digital speech-to-text systems that automatically transcribe notes as they are dictated by physicians.

Currently, some of Christiana Care's primary-care doctors are part of a new project: During patient visits, they wear Google "smart glasses" that livestream audio and video of the encounter to remote medical scribes, who document the visit directly into the patient's electronic medical record, to be reviewed by the physician later. It dramatically increases the amount of information recorded in each visit, Brumberg said, while freeing up doctors to focus on their patients without distractions.

And the near future holds even more disruption, especially for Christiana Care's dozens of medical coders.

According to the Brookings analysis, their jobs have long been highly digital. But the health system is in the midst of implementing a "computer-assisted coding environment," driven by artificially intelligent software. Instead of being collectors and locators of information, the medical coders will have to adapt to becoming validators of what the software recommends, making sure the system has not missed anything important and allowing the department to take on more work.

For Brumberg, it will mean yet another flow of new digital information that will need to be fit into a very complicated puzzle.

The takeaway for the nation's K-12 schools?

The ability to synthesize digital information across multiple sources, pull it all together in a meaningful and engaging way, and share it with others is the key to the corner office of the future, Spires said.

"Schools absolutely need to be teaching these skills," she said. "If they aren't digitally literate, people will be left behind." ■

COMMENTARY

Published on April 14, 2019, in Education Week's Classroom Q&A Blog

Response: Ways to Use Tech Effectively in English Classes

By Larry Ferlazzo

What are effective ways to use tech in English classes?

There are lots of English classes in schools and there are sure a lot of ed-tech possibilities out there.

This series will explore if there are any useful connections that can be made between them.

Today's column features responses from Jennifer Casa-Todd, Jenny Vo, Maggie Verdoia, Sarah Acosta Landry, Ingrid Nelson, and Stephanie Affinito.

Response From Jennifer Casa-Todd

Jennifer Casa-Todd is currently a teacher-librarian, a former literacy consultant and English teacher, and the author of *Social LEADia: Moving Students from Digital Citizenship to Digital Leadership*. She uses technology and social media to learn and share learning, empower and celebrate others, and make a positive impact on others. She is deeply passionate about shining a light on kids and their adult mentors who are making a difference on and offline:

The temptation to have students use a Chromebook or tablet to write and peer edit papers is great, but there is so much more to using tech in English. Don't get me wrong; using collaborative tools to get feedback on a student's writing (text or audio) can be very powerful, but technology and social media allow for powerful storytelling and transformational learning experiences in English classes. Here are a few examples:

-Select texts from contemporary authors and have your kids reach out to the authors with their questions or comments.

-Use your own social-media connections to find another class reading the same book and connect with them by sharing questions and feelings about the book on Google Hangouts or Webroom (if in the same time zone), or Padlet or Flipgrid (if synchronous meetings are not possible).

-Have students join the Global Read Aloud, created by Pernille Ripp, and use the Twitter hashtags to talk about what resonates. OR create a slow chat (from a class account if students are under 13) and invite others to respond to your students' questions.

-Use virtual reality, for example the Within app and NY Times VR, to immerse your students in powerful stories in places they would never visit. Use these with a Q-chart to help students devise good questions and as a springboard for students' own stories.

-Use virtual reality and coding via Cospaces for students to synthesize what they know about a story or create an alternative ending.

-Use augmented reality (Wallame or Metaverse) to create scavenger hunts or BreakoutEDU style challenges for vocabulary or content sharing.

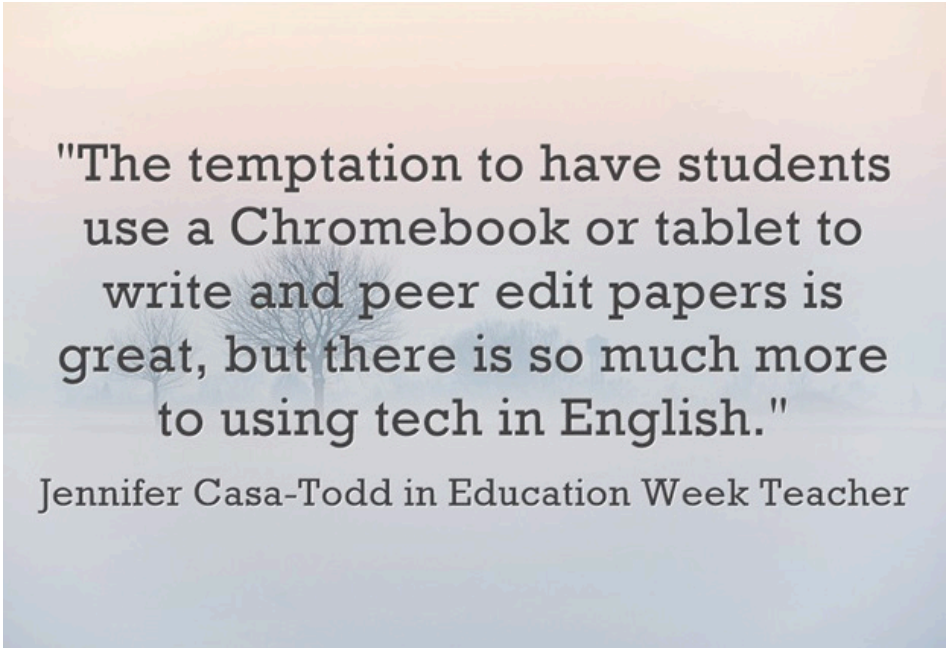
-Have kids post a review on Amazon or Goodreads for the book they are reading in class or Rotten Tomatoes for a film they are watching (class account for younger kids). Help them to construct a review and teach them how to respond positively and critically to other reviews with which they either agree or disagree. This not only provides an authentic audience, but it also teaches students how to comment appropriately to others.

-Create a Twitter poem using a maximum of 280 characters.

-Use Tourbuilder and the power of Google Earth to create an interactive map of the setting and moments that resonate from the novel or story they are reading.

-Create Hyperdocs for novels, stories, and nonfiction units. Hyperdocs reinforce the 4Cs, are multimodal and therefore allow for a variety of entry points, and provide students with the opportunity to work at their own pace.

Most importantly, ask your students—what are they writing, reading, creating? Students lead rich digital lives outside the classroom. Use these ideas flexibly to meet your curriculum needs; this will reinforce their own literate behaviors and help them to feel valued in the classroom.



Response From Jenny Vo

Jenny Vo earned her B.A. in English from Rice University and her M.Ed. in educational leadership from Lamar University. She has been teaching for 22 years and is currently an ESL ISST in the Katy Independent school district in Katy, Texas:

In this digital age where technology is everywhere, it behooves us as educators to embrace it and use it to our benefit and for the benefit of our students. Why not integrate technology into your instruction to enhance the learning experiences of your students? The goal is not to substitute technology for quality teacher instruction but to integrate it seamlessly so that it supports your teaching and provides the students with interactive, meaningful lessons that will engage both their attention and their brains. With so many programs and apps available, however, teachers need to make wise choices about which ones to use and how to use them.

What are some effective ways you can use technology in the classroom?

1. *Use technology to develop the language skills of your students, especially your English-language learners. There are great programs and apps that help the students with their listening, speaking, reading, and writing skills. Flipgrid is a great online discussion tool where students can record themselves responding to questions posted by the teacher and then listen and respond to other students' replies. Use this to activate background knowledge, share experiences, book discussions, etc. Poplet is a powerful mind-mapping tool that allows students to think and learn visually. They use words and pictures to show relationships between ideas. Use this to teach vocabulary, main idea/details, plan for writing, plan out presentations, etc. EPIC and ReadWorks are online libraries of books and nonfiction and literary articles. Teachers can assign students books to read during independent reading time or at home. Students may also choose books themselves. They both have quizzes and assessments that teachers can use to track their students' reading progress.*
2. *Use technology to give your students opportunities to share their learning and show off their work. Have students create presentations using PowerPoint or Google Slides. With TeleStory, students can create their own movies. Students can write stories using StoryJumper. These are great to use at the end of the unit when you want students to summarize what they have learned. Not only will the students feel great about sharing their work, you can also use the finished products as an assessment tool and to share with parents what their children have learned.*
3. *Use technology to enhance your lessons and for assessments. Teachers can use technology to create and deliver lessons and to assess student learning. My school started using Nearpod last year. Nearpod has been a game changer in helping to create engaging and interac-*

tive lessons for our students. You can create your own lessons or import lessons from the lesson bank and customize them to your needs. You can add interactive features such as 3D objects, polls, open-ended questions where students can type in answers or draw their answers, virtual field trips, quizzes, etc. It is a great tool for formative assessment during your lesson. Reports can be printed out and used to determine which students mastered the concepts and who needs reteaching. Kahoot! is a game-based technology tool that can be used for pre- and formative assessment. Use it to check for background knowledge, check for understanding midunit, or as a review before an assessment. Teachers can add questions and polls, along with images and videos to their quizzes. Like Nearpod, Kahoot! also has a bank of quizzes that teachers can access and customize.

Technology will only get more advanced as time goes by. Why not embrace it and allow it to support our instruction? Our students will benefit from the fun, interactive lessons and will think we are so cool because we know how to use technology. It's a win-win situation!

Response From Maggie Verdoia, Sarah Acosta Landry & Ingrid Nelson

Maggie Verdoia and Sarah Acosta Landry are teachers at Raymond J. Fisher Middle School in the Los Gatos Union school district in Los Gatos, Calif. Ingrid Nelson is a teacher at John Sloat Elementary School in the Sacramento City Unified school district. They are members of the Instructional Leadership Corps, a collaboration among the California Teachers Association, the Stanford Center for Opportunity Policy in Education, and the National Board Resource Center at Stanford:

It's easy to feel overwhelmed by all the tech tools available for the English classroom. As teachers, even though tech is engaging for students, we know that arbitrarily choosing a tool is not going to raise content mastery—it has to be the right tool, for the right purpose, at the right time.

In designing 21st-century instruction for an English class, we seek tech tools that promote three key areas: inquiry, reasoning (or critical thinking), and authenticity. When tech allows students to inquire effectively and safely, think critically about the world around them, and do so in authentic ways, we know it's a good integration.

When it comes to inquiry, we want to encourage students to be curious, empowered learners. But we find that students struggle with how to inquire when searching online. They often end up talking to Google like it's their buddy, asking questions when, in reality, they should be doing purposeful keyword searches. When they do find content, we also worry whether they'll be able to discern its reliability. We've found that Google's Search Education can be helpful for secondary students in helping them become "Power Searchers" who can find reliable information online. What's really great is that the courses are self-paced and auto-graded. For younger students, we find that the R-A-P test (reliability-authenticity-purpose) works well to help them evaluate websites and determine credibility.

> "The goal is not to substitute technology for quality teacher instruction but to integrate it seamlessly so that it supports your teaching and provides the students with interactive, meaningful lessons that will engage both their attention and their brains."
>
> - Jenny Vo in Education Week Teacher

Backchannels are another great tool we use regularly to promote inquiry, reasoning, and authenticity. Students can engage in a backchannel during the class read-aloud of a novel or story, asking questions or making comments in real-time during the lesson. Backchannels are a great tool to get every student involved. For instance, in a class debate, we've found that usually there are only a few students who dominate the conversation. But with a backchannel, every student gets to have a voice and share what they're thinking. And because students are typing their contribution, the affective filter is lowered, which is especially helpful for second-language learners or struggling students. In our practice, we've found that two of the most useful backchannel apps are Backchannel Chat and TodaysMeet.

Another versatile tool is Padlet, a virtual bulletin board that can be used in a multitude of ways. For inquiry, students use Padlet to post questions (for example, either as part of a K-W-L activity or in response to student presentations), or to post answers to other students' questions. When it comes to authenticity, we want students sharing their work with real audiences, and Padlet works well as a place where students can share their writing (via the Google Doc link) and then comment on each other's pieces using Padlet's comment feature.

A cool tool to get those brains thinking critically is EdPuzzle. There's no denying kids love watching videos online. With EdPuzzle, you can take YouTube videos and make them interactive for students. Teachers import the YouTube video, either use the audio given or record your own, and embed critical-thinking questions for students to answer. Students can also create EdPuzzle videos to demonstrate their own thinking about a text (digital or traditional) and teach others!

Lastly, after inquiring and reasoning about a topic or content, we want to give students authentic opportunities to publish their thinking. Students can use Edmodo to publish their thinking in small groups (think Literature Circles) by posting thoughts and commenting on the thoughts of others. And if we want to share with a wider audience (the entire school or beyond), we use Google Sites to publish student work. We use Google Sites for literature circles, reciprocal lessons, book reviews, and student portfolios.

We challenge you to choose a tool and implement it with your students! They'll thank you!

Response From Stephanie Affinito

Stephanie Affinito, a former classroom teacher and literacy specialist, is a literacy teacher educator at the University of Albany. She has a deep love for literacy coaching and supporting teachers' learning through technology and presents nationally on this topic.

Our conceptualization of literacy is ever evolving. It includes attention to new, digital, and multimodal literacies and acknowledges that these literacies change our habits as readers. Therefore, literacy teachers must reimagine instruction to ensure students authentically create, communicate, collaborate, and learn together through technology.

Based on my work in teacher learning communities, I have found technology can be particularly effective to build connected literacy communities, engage teachers during professional development, and support personalized learning, lessons easily trans-

ferred to the English classroom:

Build a connected literacy community. *Technology has the potential to connect readers and writers together. Students can use digital tools such as Padlet and Flipgrid to share books they are reading and begin literate conversations. Students can use Google Docs to easily share their writing with others for feedback and celebration. While these connections might begin in the classroom, they can be continued outside of them, blurring the boundaries of learning.*

Engage students during literacy instruction. *Innovate your literacy teaching by using technology to spice up lessons and increase student engagement. Survey students before a new unit of study using Google Forms to inform your planning and instruction. Create attractive slides and memes to spark thinking using Canva or Adobe Spark during lessons. Encourage interaction through QR Codes and ThingLink. Engage students by creating backchannels for discussion through Recap or Today's Meet.*

Support personalized learning. *Flip your classroom with technology! Flipped learning is a pedagogical approach where individual reflection precedes group collaboration and discussion to create an active and engaged learning space. Create resources for students to guide their own learning: collections of texts and videos, tutorials for skills and strategies, and options for student choice. Connect individually with students to support their journeys and share their voice with others.*

Above all, pedagogy must lead technology. We must intentionally choose digital tools for the classroom using our knowledge of the learners in front of us. If we focus on how technology can amplify student voice and provide authentic audiences for student work, we harness the power of literacy, empowering students to share their voices with the world and leave their mark on it.

Larry Ferlazzo is an award-winning English and Social Studies teacher at Luther Burbank High School in Sacramento, Calif., Larry Ferlazzo is the author of Helping Students Motivate Themselves: Practical Answers To Classroom Challenges, The ESL/ELL Teacher's Survival Guide, *and* Building Parent Engagement In Schools. ■

—Getty

COMMENTARY

Published on June 20, 2018, in Education Week Teacher

The Way We Read Online Has Changed. As Literacy Teachers, We Need to Keep Up

By Chris Panell

Even as a technology teacher, I often have no idea what students are talking about when it comes to their digital worlds. I know I'm not alone—even many younger people who grew up with computers and mobile phones have expressed shock at how fast our world is changing.

While many teachers want to do their best to keep up with technology, there has been a battle waged against students' personal use of electronic devices in the classroom for as long as I've been a teacher. But these attitudes are changing. If you've been in any 21st-century school with 1-to-1 device initiatives, you already know the electronics have won.

I understand the competing pressures. On the one hand, I want my students to stay up-to-date. On the other hand, I am frustrated when students prefer to look down at their devices rather than at what I am writing on the board. It is hard to adjust to the new ways in which students receive information. Ask them to research and they head to the laptop, not the library. Tell them to send a note home to their parents, and they start thumbing on a virtual keyboard without ever considering pen and paper. Tell them to find out what an expert has said on a chosen topic and they'll head to YouTube.

Technology hasn't only changed the way students find information—the way students can create texts has changed as well. They can use digital languages, including coding, to add video and sound or even make texts that change in response to commands by the readers—no two readers of the same text might ever see the same sequence of words, for example. Increasingly, for our students who are fully literate, writing is becoming about creating an experience for the reader. This must lead to changes in our approach to literacy in schools.

A New Definition of Literacy

The definition of what it means to be "literate"—the ability to understand

and create meaning through static symbols—has been fairly stable over time. There was no Google translator for messages received in Roman times, and the hardware of the scroll—and, later, the book—carried symbols from place to place. The symbols did not link or jump to other symbols, and the receiver of the symbols didn't have the option to change the size of the text that they received, to answer questions within the text, or to personalize the experience of viewing the text in any way.

That is the legacy that technology has overthrown.

Thinkers like Marshall McLuhan and Neil Postman, two 20th-century professors who worried about students being controlled by technology, understood the significance of the coming changes long before their peers. They recognized that emerging technology was pushing aside the printed word; they believed images would dominate.

What might surprise these soothsayers, were they still with us, is the sheer abundance of words that still frame the landscape of this new literacy. As of January 2016, there were about 100 trillion words on the Internet, according to the calculations of one Reddit.com user. By comparison, a 2014 Internet Trends report found there were 657 billion photos uploaded online per year. The digital-literacy picture that is emerging is one that uses words, facts, images, and ideas to create an experience. Students who are fully digitally literate in the future should not only be able to read the surface of the text, but also the programming behind it.

A Digital Language Curriculum

Digital languages are an extension of the spoken languages we already use, as I contended in a Tech Directions magazine article in 2003. This premise, I wrote, should "guide the activities used in our [computer] programming courses."

Since then, much evidence in favor of my argument has accumulated. In one 2014 study, researchers imaged the brains of students learning to program and found that, as they wrote in code, the portions of the brain "related to different facets of language processing" were activated. Another set of researchers found using second-language-acquisition techniques promising in teaching entry-level computer programming classes.

The recognition that digital coding languages are an extension of other spoken and written languages has significant implications for how we approach literacy. Coding languages can be incorporated across the curricula, giving children the chance not just to use provided digital texts but to create texts of their own.

We should provide our students with a collaborative environment in which the language of technology is integrated into everything that they do—as will be the case for the remainder of their lives outside of school. To do otherwise is to consign significant numbers of our population to simply respond to the prompts created by those who know how to tell our technology what to do.

Where Can Teachers Begin?

Students in math classes could learn to program their own calculating apps. Students in science classes could build programs in which they care for a simulated population of microorganisms. History students could explore alternate endings to famous events by programming them into a game.

In my own classes, I've found that an easy entry point is to let students create YouTube videos to support different sides of a topic in classroom debate. This allows kids to incorporate a wide variety of technologies at a pace of their own choosing. Students also enjoy creating animated story boards, and this helps them gain more knowledge about how to integrate words and images in a dynamic way.

As students advance, teachers can also incorporate game creation into their curricula. For example, in my school, we have used games in science classes to simulate hunter and prey behavior. This year, in literature discussions in my English class, I have had students analyze both the story and programming of an existing game app.

It is not fair to relegate any young person to the role of the listener in our emerging digital conversation, condemning them to silence. We might, as teachers, not always understand what children are saying—but I want them to have the chance to try to say it. ■

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