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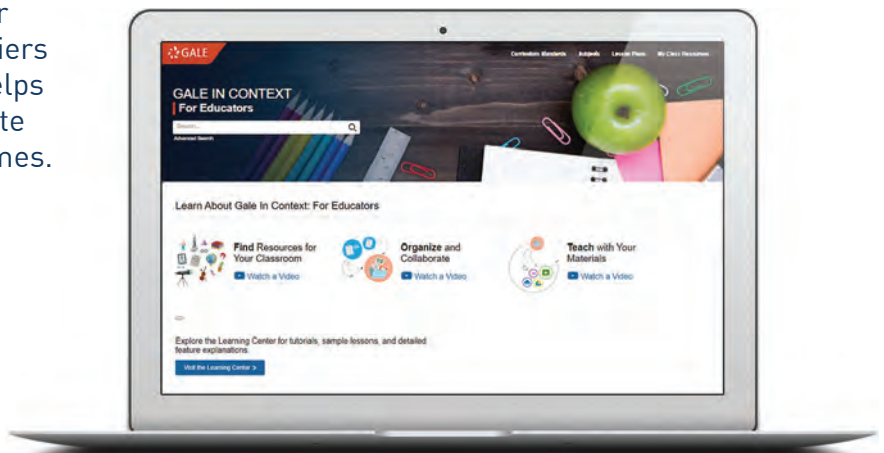
*Product screen capture as of May 2023. Actual interface may vary.*

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# Deepening Learning with Technology

**18**

**26**

**12**

*Cover: Nadia Radic*

# Online Exclusives

www.ascd.org

## Transforming Education or Digitizing the Status Quo?

*Ellen B. Meier, Caron Mineo, Karen Kirsch Page, and Seth McCall*

Four key lessons on using technology to catalyze pedagogical change. **www.ascd.org/el**

## Ask Our EdTech Expert

Monica Burns on sparking student creativity with inspiration from social media. **www.ascd.org/el**

## Giving Retakes Their Best Chance to Improve Learning

*Thomas Guskey*

Assessment retakes can improve student learning if educators clear up a few misconceptions and avoid common missteps. **www.ascd.org/el**

## Planning Professional Development on ChatGPT

*Arpan Chokshi*

How to help educators feel heard, supported, and empowered to address the role of AI in education. **www.ascd.org/blogs**

### Podcast: Asking the Right Questions About AI

Author **Tony Frontier** offers advice on how school leaders can create conditions in schools that will allow educators to explore the transformative power of AI for teaching and learning. **www.ascd.org/podcasts**

## Coming this Fall in *Educational Leadership*

### SEPTEMBER 2023

**The 10 Biggest Challenges in Education (and How to Overcome Them)**

In this special issue, selected experts, thought leaders, and practitioners will examine the key challenges in schools today (as determined by a survey of educators). The authors, chosen based on their areas of expertise, will provide context, solutions, and implementation approaches—making the issue a powerful "user's manual" for teachers and school leaders.

### OCTOBER 2023

**What New Leaders Need**

Newly minted leaders in education face steep challenges and require specialized support. This issue will look at the demands facing new education leaders and how school systems can help them make more seamless transitions. It will also examine leadership skills development, onboarding mentorship programs, school-management best practices, and common personal and interpersonal challenges.

### NOVEMBER 2023

**The Challenge of Challenging Behavior**

In the wake of the pandemic, challenging student behaviors are on the rise, causing frustration for teachers and raising questions about existing disciplinary policies and practices. This issue will take a deep dive into the topic of difficult student behaviors and explore ways educators can constructively address and resolve them while supporting students' growth and dignity.

# Readers React

**April 2023** | *Centering Thinking & Discussion*

### Cultivating Critical Thinkers

More of this, please, ASCD. I'm excited to see more and more pieces in large education publication spaces that advocate for evidence-informed practices. ["Moving from Engagement to Deeper Thinking"] is a good one by the great Jim Heal and Bryan Goodwin.

James Stewart (@JStewartAP)

Another great article from EL magazine—and it supports the notion of "the more reflective you are, the more effective you are" for students, too! We (as a system) have a nice challenge ahead of us: How do we prompt our students to think critically . . . and then let them do it?

Pete Hall (@educationhall)

### Give Students Voice

Read. Highlighted. Lesson created to teach, model, and use for a coaching video! Street data doesn't just belong on the shelf, it belongs in our hearts and daily practices ["Cultivating a Pedagogy of Student Voice" by Shane Safir].

Kimberly May (@kreneemay)

Something about this article [by Shane Safir] really resonated with me; I keep coming back to it.

Erik Kubota (@kubota_sensei)

Yes! Love this! If we want to be in the room where it happens . . . we must give our students voice! Let them do the heavy lifting! They can handle it and grow when there is struggle! Cognitive load! Amen.

Salome Thomas-EL (@Principal_EL)

### Classroom Discussion in the AI Era

["Classroom Discussion Just Got More Important" by Matthew R. Kay] is the most spot on thing I've read about education in years. Bravo! Let's get there!

John Whalen (@johnjwhalen)

### Little Learners, Big Thinkers

Appreciate ["Having Big Conversations with Little Learners"] by Jennifer Orr (with accompanying podcast) on engaging kids in critical thinking by elevating conversations, providing low floor/ high ceiling prompts, noticing and naming, and letting them argue. Same moves for caregivers—especially entertaining kid perspectives.

Nawal Qarooni (@NQCLiteracy)

**Love (or dislike) something in a recent issue of EL? We want to hear about it! Write to us at edleadership@ascd.org or on Twitter @ELmagazine. Printed reactions may be edited for clarity and length.**

"Moving from Engagement to Deeper Thinking" by Jim Heal and Bryan Goodwin is a great read about engagement and deeper thinking in the classroom! Our students are definitely engaged in their learning this morning!

Brandi Barker and Kristin Finck (@BarkerFinckCrew)

# Uniting Tech and Pedagogy

When ISTE and ASCD merged earlier this year, one of the stated intentions was to "bring together best practices in the use of technology and evidence-based pedagogy." This special issue of *Educational Leadership* is an early attempt to exemplify that combination. Developed in partnership by ASCD and ISTE editorial teams, the issue—featuring articles by a topflight selection of tech-savvy educators and leaders—looks explicitly at ways digital tools and platforms can be used to augment high-leverage instructional practices and deepen learning.

In exploring the intersection between technology and effective pedagogy, this issue is also very timely. The emergence of ChatGPT and other generative AI programs has spurred whole new conversations on the role of technology in schools. Meanwhile, many educators are still trying to determine the right approach to tech integration after the challenges (and device proliferation) of the remote-learning period during the pandemic.

The authors featured here may not have all the answers, but they offer plenty of insights and recommendations on how teachers and school leaders can think more creatively and strategically about the uses of edtech in this new landscape. Here are some key takeaways for reflection:

**Ask big questions.** As Tony Frontier writes, schools tend to use new technologies in ways that are either reflective of the status quo or transactional (p. 12). With generative AI, Frontier argues, such approaches could prove disastrous, reducing an innovation that has the potential to reshape the dynamics of teaching and learning to a mere secretarial or data-processing function. To work toward more meaningful solutions, educators can start by asking "big, open-ended questions that discard old assumptions" about how things are done in the classroom. As other contributors affirm, using technology in ways that deepen student learning often requires getting out of instructional ruts.

**Put pedagogy first.** Of course, this doesn't mean abandoning the principles of *effective* instruction. Indeed, in his piece, Bryan Drost outlines research showing that districts that had the most success during the pandemic shift to online learning tended to have sound instructional structures in place—including a consistent instructional framework, clearly outlined pedagogical options, and strong formative assessment cycles (p. 26). As Clare Kilbane and Natalie Milman echo in their article on differentiated instruction, "the goals of instruction . . . should drive the design of learning experiences and technology's integration within it" (p. 20).

**Make it active.** School makerspace director Nicholas Provenzano writes, "I've learned there's one thing educators need to keep in mind [in integrating edtech into lessons]: The use of technology needs to promote active engagement" (p. 31). This idea surfaces often in the issue. Technology's greatest asset as an element of instructional design is its capacity to allow students to engage with and create content as opposed to just consuming it. This can lead to authentic learning experiences and opportunities for transfer of knowledge—both aspects of deep learning.

**Give teachers more and better support.** If school systems want teachers to use technology to create richer instruction, they must provide more nuanced professional learning opportunities. This may include using PD models for edtech integration that turn the page on "one-off, one-size-fits-all" events and provide teachers with more continuous support, in addition to opportunities to experiment, collaborate, and engage in active learning of their own (p. 42). Well-designed edtech coaching programs, Ashley McBride writes, can also be key in giving teachers more personalized and structured support (p. 36).

That is certainly preferable to the oft-prevailing practice of letting teachers figure things out on their own in the middle of a restive classroom, as "precious instructional minutes tick by." As this issue makes clear, to be effective in supporting deep learning, edtech-integration initiatives must be well-planned and cohesive, even as they allow space for educators and students to dream and forge new paths. ⊜

*—Anthony Rebora*
*Chief Content Officer*

# Advisory

*Trends and Ideas on Deepening Learning with Technology*

## RESEARCH ALERT

## Teachers Not Impressed by App "Buzzwords"

**W**hen teachers evaluate educational apps, they are seeking substance over catchphrases and clichés, affirms a recent study from McGill University.

The study used eye-tracking technology and other evaluative measures to judge the responses of 57 preservice and elementary teachers to the app-store pages of 10 simulated mathematics apps.

The researchers found that the teachers were more likely to be swayed by solid benchmarks of educational quality—such as connection to a guiding curriculum, creation by an expert development team, and scaffolding supports for students—than by buzzwords like "hands-on," "personalized," or "multimedia." The teachers also showed greater interest in text descriptions than in images, though they were drawn to images that included benchmark information more than to other images.

The teachers tended to value some educational benchmarks more than others, with those focused on development teams, curriculum, and scaffolding outranking information on theories of learning and feedback for students.

The researchers suggest that the study's findings could be used to develop criteria for school app selection and to identify professional development needs.

But the findings also harbor an important message for leaders in charge of larger school and district technology projects: When it comes to edtech selection and implementation, educators want substance and evidence of educational quality, not bland assurances and surface-level descriptions.

—*Anthony Rebora*

*Source:* Montazami, A., Pearson, H. A., Dubé, A. K., Kacmaz, G., Wen, R., & Alam, S. S. (2022). Why this app? How educators choose a good educational app. *Computers & Education, 184.*

## NUMBERS OF NOTE

# Teachers Are Early Adopters of ChatGPT

**When OpenAI released ChatGPT on November 30, 2022, it generated a mixture of apprehension and excitement. But that didn't stop educators from trying the tool, according to a February 2023 survey of more than 2,000 K–12 teachers and teens:**

**88%** of teachers who've used ChatGPT say it's had a positive impact.

**77%** of teachers surveyed say ChatGPT could help them grow as teachers.

**30%** of teachers have already used it for lesson planning, coming up with creative ideas for classes, or building their own background knowledge.

*Source:* Impact Research. (2023, March 1). *Teachers and students embrace ChatGPT for education.* The Walton Family Foundation.

## RELEVANT READ

# Holding onto What's Good in Blended Learning

**The Boundless Classroom: Designing Purposeful Instruction for Any Learning Environment** by Nathan Lang-Raad and James V. Witty (ISTE, 2022)

Many teachers have struggled with how to retain some of the helpful features of remote and blended learning they saw during the pandemic now that learning is back to in-person. This book can help bridge the gap. It provides frameworks and guidance for how teachers—including those teaching mainly in-person—can change their instruction and planning practices to incorporate beneficial aspects of blended and asynchronous learning. The information will also help school leaders who are considering changing their school's way of operating to offer blended learning to some students.

Lang-Raad and Witty explore key questions connected to blended learning, such as whether synchronous or asynchronous learning is best for certain content, ways to achieve "consistency" (meaning kids aren't learning through too many different platforms), and teaching effectively in a "concurrent" classroom (with some students physically in class and others participating virtually).

Chapters 2 and 5 are especially practical. Chapter 2 gives detailed guidance for how to plan for blended learning experiences, describing seven common models of blended learning. Chapter 5 offers an eight-part framework for delivering a blended learning lesson, including elements like activating prior knowledge and facilitating student discourse. The framework can be used with in-person learning also.

Lang-Raad and Witty include vignettes from teachers facilitating blended learning in schools with varied configurations of in-person and virtual work. These examples show, as the authors promise, paths to "create meaningful, challenging learning opportunities . . . no matter what the modality in which you teach."

—*Naomi Thiers*
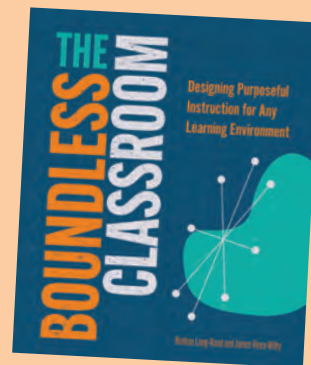
# Transformative, Tangible Learning with Tech

**M**akerspaces give students a place to engage in deep learning, authentic collaboration, and creative problem solving as they start with an idea and "bring it to life." At the Hamilton County School District in Chattanooga, Tennessee, students work in digital fabrication studios (makerspaces that include 3D printers among other tools for designing and creating products) and use the same tools as engineers to create tangible products that apply to their learning. You can find students sewing their fashion designs, coding on computers, creating solutions to problems via a 3D pen, or designing inventions of their own imaginations. The

# Educators Band Together on AI

**I**n recent weeks, education groups, schools, and colleges have teamed up to offer resources for educators and draft policy papers in response to the sudden rise of so-called generative AI tools, chatbots that can compose answers to questions that sound like they are written by a human.

Perhaps the largest of these efforts is TeachAI (https://teachai.org/), a quickly convened partnership of major education organizations, including the World Economic Forum, National Association of State Boards of Education, National School Boards Association, Code.org, Educational Testing Service, Khan Academy, and ISTE (which shares a parent organization with ASCD and EdSurge). The group also encompasses education ministries from several countries and several tech companies working on AI, including Amazon, Microsoft, and OpenAI, the maker of ChatGPT.

Launched in early May, TeachAI plans to produce reports and guidelines for using AI in education; make policy recommendations for incorporating AI in school curriculum standards, courses, tools, assessments, and professional learning; establish a global framework for computer science curriculum that includes AI; and provide engagement opportunities for educators and administrators.

The unprecedented rise of AI "demands deliberation as the implications are vast" for education, the group stated.

"If you imagine how would you design education today for the age of AI," added Hadi Partovi, CEO of Code.org, "we'd not just change the curriculum, we'd change how we grade, learning objectives, what we teach, the purpose of education, and how we assess how students learn, and what they learn."

Other efforts recently announced by educators include:

■ New York University's Center for Responsible AI and the New York Public Library's launch of the All Aboard! Primer, a comprehensive guidebook designed to ensure inclusive instruction on artificial intelligence for teachers.

Hamilton County district, in partnership with a local nonprofit Public Education Foundation, boasts the largest concentration of MIT-certified FabLabs in the world, which means students have plenty of opportunities to create, experiment, play, and learn.

—*Jessica Holloway and Emily Hurst, Innovation Coaches at Hamilton County Schools in Tennessee*
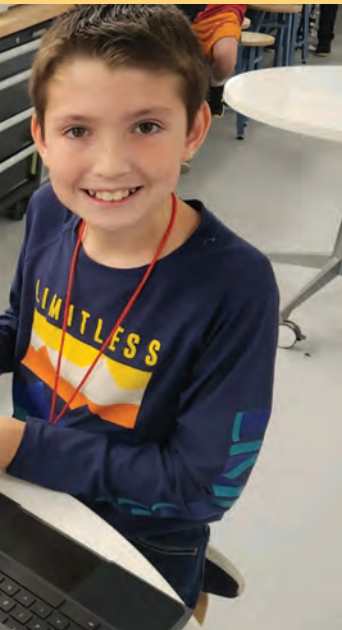
**Far left: Second graders at Battle Academy in Tennessee were challenged to create a pollinator tool that could transfer pollen from one flower to another.**

**Left: Fifth grade students from Middle Valley Elementary in Tennessee work to make a device for a nonverbal classmate. They used coding skills to program a micro:bit that displays different graphics, allowing the student to communicate her emotions at the push of a button.**

■ A free online "teach-out" offered by the University of Michigan, in partnership with Coursera, for educators and others who want to understand how AI chatbots work and what impact they might have on society (www.coursera.org/learn/chatgpt-teach-out).

■ Stanford University's Graduate School of Education is building a collection of curricular resources about AI for teaching that it calls the CRAFT project (https://craft.stanford.edu).

Some compare the level of self-organizing and resource sharing around AI to the early days of the COVID-19 pandemic, when educators around the world suddenly had to shift to remote teaching.

"There's an emotional toll of realizing that you have to reinvent teaching," said Kevin Yee, director of the Faculty Center for Teaching & Learning at the University of Central Florida. "[Y]ou can't just do business as usual and expect students to learn."

—*Jeffrey R. Young*
*This article was originally published by EdSurge.*

## SCHOOL TOOL

# Mapping Digital Tools to the Needs of English Learners

Working with English-language learners can pose unique challenges for educators; these students must master many complex skills and revisit vocabulary and concepts frequently to reach automaticity. Digital tools can ease these challenges, especially if an educator has a sense of which *types* of tools, of the many available, connect to building different skills for language acquisition. Researchers at Cambridge University Press's World of Better Learning hub offer a range of resources centered on digital literacy topics, including Teaching with Digital Tools: A Teacher's Checklist (https://bit.ly/3Bt2aR1). This fillable guide combines second language acquisition and digital pedagogy principles in a checklist organized around three teaching goals: improve learners' cognition and proficiency, motivate learners, and develop learners' autonomy.

The guide pairs instructional strategies with digital tools, unpacking which types of edtech support which strategies. For example, according to the checklist, some online games can give ELLs a sense of individual accomplishment, motivating them to learn more on their own. Other gamification tools let learners interact and feel engaged as a community. Rather than recommending particular products, the guide helps teachers make connections between pedagogical considerations and digital experiences in language learning.

# Taking a Transformative Approach to AI

*What can leaders do to help ensure ChatGPT and other new AI tools will expand and support, rather than undermine, teaching and learning?*

**Tony Frontier**

The internet forever changed how educators and students access and share information. Now, ubiquitous access to natural language-based artificial intelligence (AI) tools will create previously inconceivable opportunities for educators and students to synthesize that information to generate ideas and design solutions. The trajectory of this innovation is easy to summarize but difficult to wrap your head around: The capacity of AI to do more than we can imagine will advance at a rate more quickly than we can understand. What can leaders possibly do to help educators effectively navigate the ambiguity—as well as the sheer potential—of the changes that await?

In our book *Five Levers to Improve Learning: How to Prioritize for Powerful Results in Your School* (ASCD, 2014), Jim Rickabaugh and I argue that how we respond to innovation is more important than the innovation itself. Regardless of what the innovation is, there are patterns among the assumptions we tend to make, the knowledge we apply, the strategies we use, and the associated leadership behaviors that will ultimately determine whether our efforts are irrelevant or lead to improvement.

To respond to an innovation as potentially transformative as AI, leaders should ask three questions: (1) *What has changed?* (2) *What is the magnitude of the change?* (3) *Given the magnitude of change, how should we respond so that we align strategy to intended results?*

## What Has Changed?

Artificial intelligence describes a process through which a computer can be trained to analyze data to generate a unique, logical solution, even though it hasn't been programmed to provide that specific solution. We've had access to AI on our phones and computers for years. AI is how Google "knows" the next word you'll likely type and how Alexa
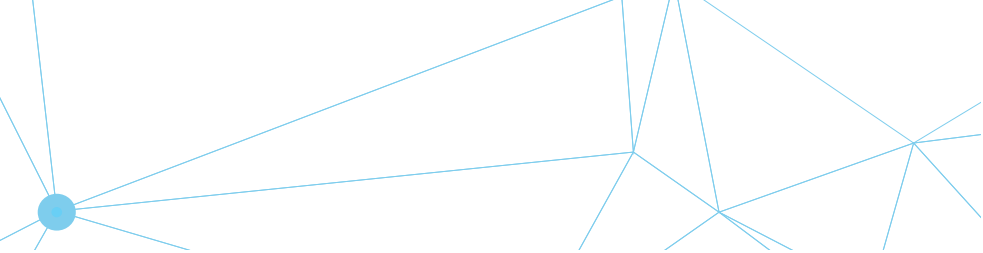
can "understand" what you are saying when you ask about the weather.

The breakthroughs in AI in just the last few months appear to have come out of nowhere, but they are the culmination of 80 years of work by mathematicians, linguists, and computer scientists.[1] A simple way to think about what has changed given recent advancements in AI is to compare a familiar tool to the new innovation. For example, let's compare a search engine to ChatGPT.

A search engine is a gateway to the internet. Search features are built on a layer of computer code that sifts through structured data, such as web pages denoted by keywords, and lists them. At its most basic, a search function uses a "look-up" and "fetch" approach to efficiently access content that has already been created and labeled. *If* the web page includes specific key words, *then* it will be presented in the list. In recent years, search engines have been trained using *machine learning*, a subset of AI that applies code and algorithms, to sort and filter data even more efficiently.

In a familiar classroom scenario, 5th grade students learning about recycling could use a search engine to find articles about recycling. They might enter "importance of recycling" into the search bar, and they would get links to millions of web pages with information written by people on that topic.

ChatGPT, by contrast, uses *deep learning*, a subset of AI that uses transformers (think interconnected hierarchies of code, not cars that can turn into robots) to detect patterns across thousands of layers of if-then scenarios. *Large language models*

(LLMs) are a specific type of deep learning model trained to recognize and predict patterns in language. The most powerful LLMs have been pre-trained with so much data that they can interact with *and generate* text for nearly any purpose and in any format. ChatGPT is an example of a *generative, pre-trained transformer*. The most important thing to understand about LLMs is they aren't search engines. They seek patterns and predict the most likely sequence of words to generate a unique, nuanced response.

> # How we respond to innovation can be more important than the innovation itself.

Applying this technology to our classroom scenario, the 5th grade students writing about recycling could prompt ChatGPT4 (or another LLM tool) to "Write a short, persuasive essay that provides three reasons to use fewer disposable plastic products using the words *renewable*, *non-renewable*, *biodegradable*, and *organic*. Write this at a 5th grade reading level, by a student who loves swimming." The program will write an essay that meets those exact specifications.

This means students can now use ordinary language to direct technology tools to generate, summarize, synthesize, and create unique, sophisticated responses or products in a manner that previously could only

be accomplished by humans who had learned that content knowledge or developed specialized skills. This is an unprecedented change in the history of information science—and education.

## What Is the Magnitude of Change?

*Magnitude of change* is a term used in leadership theory to describe the extent that a change requires individuals to use different knowledge or skills, or adopt new ways of thinking, to achieve a goal.[2] Three ways to describe different magnitudes of change are:

■ *Status quo management*—You apply your current knowledge and strategies to available resources or innovations to maintain results.

■ *Transactional change*—You apply your existing knowledge and strategies, but more frequently, or to different tools, to improve results and efficiency.

■ *Transformational change*—You apply new ways of thinking and different strategies in using new tools to maintain or improve results and create new pathways or products.

These three terms do not represent a hierarchy of *bad* to *better* magnitudes of change. Status quo management is essential in many scenarios; it ensures the buses arrive on time and the lights work. What is most important for leaders to understand is that navigating different magnitudes of change requires different leadership behaviors. The risks of misalignment between the magnitude of the change and a leader's response to that change often determines whether initiatives will succeed or fail. For example, trying to preserve the status quo

during a period of transformational change can leave teachers and students preparing for a world that no longer exists. Similarly, applying transactional solutions to transformational challenges typically results in increased effort without better outcomes.

New AI tools will present transformational opportunities—and challenges—for teaching and learning. By considering the distinctions among status quo, transactional, and transformational approaches to adapting to a world with ubiquitous access to sophisticated AI tools, teachers and administrators can more mindfully invest their thinking and effort into using these tools in a manner that expands and supports, rather than undermines, teaching and learning.

## How Should We Respond to Align Strategy to Intended Results?

We often think of maintaining the status quo in our schools or classrooms as a passive approach that requires little effort. However, maintaining the status quo in response to a transformational change can be actively counterproductive.

Given the unknowns of ChatGPT upon its release, for example, many schools simply blocked access on their networks in an effort to maintain the status quo. The rationale for this approach may have initially been justifiable, but this is not a long-term solution for navigating a transformational challenge. For one thing, blocking local access to something that's widely available will result in a widening of the digital divide; students with access to these tools outside of school will use them anyway. Furthermore, blocking access means students will not have a chance to learn the skills and strategies necessary to use AI tools in productive and responsible ways. That's an odd way for educational institutions to treat a technology that is expected to play a significant role in students' futures.

Using a transactional approach with a transformational tool like AI can be even more problematic. When a new innovation becomes accessible, users typically apply their existing assumptions, knowledge, and strategies to the new tool to accomplish a goal more efficiently. For example, many users' first instinct is to use ChatGPT as a souped-up search engine. They type in a query on a topic and wait for the results. Not surprisingly, these users may leave the experience confused about all the hype.

A more productive, though still transactional, approach to using AI is for students and teachers to use it to generate specific ideas for teaching and learning. For example, teachers could use AI to generate lesson plan ideas based on very specific criteria, or to come up with tips for activities and projects that meet particular criteria. Similarly, students could use AI to generate ideas for projects or to create mnemonic devices to memorize academic content. What had required a web search or a visit to Pinterest, followed by some selecting and synthesizing, can now be accomplished more precisely and efficiently with AI.

But what happens when the transactional assumptions, strategies, and intended results are out of alignment with the transformational nature of the technology? Let's consider two examples.

Many educators fear students will simply use AI for cheating, essentially a transactional activity. A transactional counter-response to this very real problem is to modify plagiarism and acceptable use policies by adding language about AI and ramping up penalties for misuse. Before analyzing this use and response, let's consider a second example.

Teachers today are overwhelmed. Any opportunities to create efficiencies in tasks such as lesson design, creating assessments, and grading student work are justified and welcomed. As a transactional tool, AI will be able to accomplish each of these tasks. Students could seek similar efficiencies to do their work.

Now carry these transactional approaches of both students and teachers using AI to fulfill basic processes of schooling to their logical conclusion: teachers use AI to design assignments, students prompt AI to complete the assignment, and teachers prompt AI to grade it.

**This could be the worst-case scenario for AI use in schools—students and teachers relying on AI to churn out more work, but that work being soullessly devoid of relevance or meaning.**

What started as a quest for *efficiency* becomes a process of data-entry specialists tweaking a series of algorithms to improve the AI's *automaticity*. This could be the worst-case scenario for AI use in schools, with students and teachers relying on AI to churn out more work, but that work being soullessly devoid of relevance or meaning.

These examples reveal some truths about the complexities of helping others navigate change. When new, powerful tools allow people to reach for quick, transactional fixes, many will be satisfied in doing so. Absent the opportunity to develop new understandings about the nature of the work, a transactional application of old strategies applied to new tools is seen as the only possible next step. Ultimately, this misalignment of a transactional approach to a transformational challenge will result in a diminished capacity to teach and learn.

### Transformational Approaches to AI

During times of transformational change, it can be difficult for leaders to acknowledge they don't have all the answers. Absolve yourself of this responsibility. Leading transformational change requires adopting new ways of thinking about the nature of the work, challenging long-held assumptions, and helping others break free from routines that had worked well in the past but may no longer be relevant. In this context, asking big questions is more important than providing simple answers.

It should not be surprising that a transactional question about AI such as "How can AI make lesson planning, assessing, and grading more efficient?" will yield transactional answers. Effective leaders understand that in times of transformational change, asking the right questions is more important than having all the answers. To reframe the conversation and create new possibilities, we must ask big, open-ended questions. For example: "*If you could use AI to provide individualized, one-on-one teaching and tutoring to students each day, what opportunities would you provide to each learner?*" Such a question could generate ideas like the following:

■ *Create opportunities for content to be accessible to each student:* Teachers can paste a passage of text at a 10th grade reading level into an AI tool and ask it to rewrite the passage at a 3rd grade reading level, or in a different language, in a matter of seconds. The possibilities for differentiation and tailoring content to students' individual needs or circumstances are unparalleled.

■ *Meet learners where they are and engage them in personalized formative assessment:* A student could follow a set of prompts from the teacher to have a conversation with an AI tool about an academic topic. The tool could discern what understandings and misunderstandings the learner has on the topic. Then, the AI tool could coach the learner to address specific misconceptions, provide a short passage of clarifying text, create a quiz, and provide instantaneous, formative feedback.

■ *Create specific exemplars and non-exemplars that could help students assess their own work:* We learn complex concepts by looking at examples and non-examples. When prompted effectively with well-designed success criteria from rubrics, new AI tools are remarkably adept at providing relevant examples that can show students what to aspire to, and what to avoid, when writing or engaging in other complex tasks. Teachers can tailor these examples to draw on students'

existing strengths and schema to help them focus on the transferable elements of quality.

These responses are transformational because they discard old assumptions about the inter-relationships among technology, information, teachers, students, and learning. A question that invites teachers to think differently about how AI might be used as a tool to transform their capacity to provide targeted, relevant, instruction to each student can help them see beyond the transactional, urgent busyness that can fill a school day (see Figure 1). This vision, not the technology itself, is what will ultimately determine each teacher's capacity to use these tools in transformative ways.

## Positioning for Change

Leading transformational change takes time. We don't yet know how to fully harness the transformative power of AI to improve teaching and learning. And that is OK. What leaders can do is create conditions that support transformational ways of thinking about how the innovation can be utilized. They can challenge existing paradigms, engage in dialogue around big questions related to teaching and learning, create intentional opportunities for teachers to explore new tools, and acknowledge that our response to AI is what will ultimately determine whether AI improves or diminishes our capacity to teach and students' capacity to learn. ⓔ

[1]Mitchell, M. (2019). *Artificial intelligence: A guide for thinking humans*. Pelican Books.
[2]Frontier, T., & Rickabaugh, J. (2014). *Five levers to improve learning: How to prioritize for powerful results in your school*. ASCD.

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**Tony Frontier** (tonyfrontier@gmail.com) is a consultant and researcher. His most recent book is *Teaching with Clarity: How to Prioritize and Do Less So Students Understand More* (ASCD 2021). He is currently working on a book on what every educator and leader needs to know about artificial intelligence.

# PROMPT LITERACY: A Key for AI-Based Learning

**Michael Fisher and Heidi Hayes Jacobs**

**W**ith the rise of ChatGPT and other artificial intelligence (AI) programs, a new essential literacy skill is emerging. This skill is associated with the creation and engineering of prompts that users input into AI tools to generate content. We call this *prompt literacy*. Learning how to write effective prompts will empower learners to be the drivers of AI rather than being driven by it.

When AI is brought into the classroom, whether it is for generating text, images, videos, or anything else, it is critical to note that these tools are *prompt-dependent*. The better and more nuanced the prompts entered, the more useful and responsive the tools become. As teacher Cherie Shields recently noted on *The New York Times'* *Hard Fork* podcast, students are "going to have to know what they're talking about. They're going to have to ask it questions. They're going to have to be very specific."[1]

In other words, students need to learn how to interact with AI programs in the same way they learn writing processes, math strategies, or research techniques. Thoughtful and strategic work on empowering each student through prompt literacy can also maximize the possibilities for personalization. It will equip students to use AI to tailor their learning to their own "needs, goals, and abilities"[2] and to reinforce the concepts and skills they are being taught.

To help educators teach and experiment with prompt literacy, we've developed the CAST model, which is based on effective search engine practices and what we've learned as we navigate this new space. The acronym stands for Criteria, Audience, Specifications, and Testing. A quick overview:

■ **Criteria** refer to the constraints or delimiters for the output. This includes *rules or norms* that the AI is to follow, such as using short sentences or a bulleted list. Criteria may encompass *points of reference*, such as place or types of vocabulary. They also define parameters for the output, including the *scale*, *format*, and *direction*, or the type of answer requested.

■ **Audience** refers to who specifically the output should be geared toward. In the sandbox stage, when teachers and students are playing with the tools, the audience is likely just themselves. As they get more sophisticated with prompt engineering, they may want to ask the AI to produce something for a particular audience, such as 4th grade students, a group of expert meteorologists, or a committee on diversity and equity.

■ **Specifications** for prompts are where the user includes relevant details and descriptions. For example, users may

input specific examples for the AI tool to emulate, or they could give the AI context to situate a particular result. In our view, specification-making is one of the highest forms of prompt literacy. Its utilization points to richness of meaning and higher-quality results. Good specifications are the difference between "Write a poem about summer" and "Write a poem in iambic pentameter using a languid tone." Another example would be a student pasting their own writing into ChatGPT and asking the program to analyze the text for grammar, voice, tone, or sophisticated language. Consider what a big upgrade this is from tools like Grammarly or the built-in features of Microsoft Word or Google Docs to catch general mistakes.

■ *Testing* is perhaps the most important factor in the development of prompt literacy. Here, students iterate and refine their language to build their knowledge of what AI can do and how they can make it work for them. They can add new keywords to their prompts, revise their original prompt with different parameters, ask the AI to help them brainstorm, or lay out a logical sequence of steps. With testing, students gain agency and reflective skills within AI environments. To support students in this work, ask them to explain how they built their prompts, tweaked them, and ultimately how the final information or product was deemed satisfactory for their work.

As part of prompt-literacy development, educators should also encourage students to defend or extend their output. Why is this the best answer? What products could I create with this information? Did the AI get it right and how do I know? This kind of analysis of the content AI

---

> **FIGURE 1. Transforming a Prompt with the CAST Model**
>
> **Initial Prompt:**
> Summarize the main theme of Elie Wiesel's *Night*.
>
> **CAST Prompt:**
> Acting as a docent (A) for a Holocaust Museum, prepare a bulleted list (C) of statements to explain how identity and the resilience of the human spirit (S) were important themes of Elie Wiesel's *Night,* on a 7th grade level (A).
>
> **Revised Prompt (after Testing):**
> Acting as a visitor (A) to a Holocaust Museum, describe examples of types of exhibits (C, T) that show how identity and the resilience of the human spirit (as exemplified in Elie Wiesel's *Night*) are represented in the museum.

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## Students need to learn how to interact with AI programs in the same way they learn writing processes, math strategies, or research techniques.

generates in response to their prompts is essential to students' understanding and constructive use of AI-based technology.

## An Evolving Pedagogical Space

AI prompt literacy is an evolving space where educators can explore new pedagogical possibilities and better prepare their students for the future. Ultimately, supported by models like CAST, it can help personalize learning experiences, provide opportunities for more immersive and interactive learning, and enhance students' creativity and ability to build products that have

never before been possible. It can also help students develop skills like corroborating and thinking critically about information—skills that will become increasingly important in the age of AI. 🗲

[1] Roose, K., & Newton, C. (Hosts). (2023, January 13). *ChatGPT transforms a classroom and is 'M3GAN' real?* [Audio podcast episode]. In *Hard Fork*. *The New York Times*.

[2] Chincholi, A. (2022, September 20). How AI is changing the way students learn. *Forbes*.

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# Differentiated Learning

*Dynamic, individualized instruction is possible when teachers intentionally design learning experiences.*

**Clare Kilbane and Natalie B. Milman**

For teachers who differentiate instruction, experimenting with technology is both an exciting and necessary experience. Those who work with students of any age understand that a period of experimentation must precede any meaningful implementation of a new educational tool. Before students can benefit from using base 10 blocks, a graphing calculator, a microscope, or a software application, for example, they need a chance to play with the tool, ask questions, and explore its possibilities. Educators who used new digital tools during the emergency remote-learning period know that experimentation and testing were key to effective integration.

But what now? Teachers have always wanted to learn ways to integrate technology effectively in their lessons, but in the post-pandemic era, this desire to move beyond experimental use is even greater. And for teachers who personalize learning for students, technology has potential to transform learning. Differentiated

# and Technology:
# A Powerful
# Combination

instruction can powerfully guide the integration of technology to promote more equitable, efficient, effective, and engaging learning.

Teachers whose educational decision making is guided by differentiated instruction already function as educational designers, using a "design mindset" (Kilbane & Milman, 2014). Designers are professionals who apply their specialized knowledge and skills to create experiences and solutions for others. Intentionally inquiring through needs assessments and similar methods, educational designers learn about their students' priorities, use these to identify clear goals, and then formulate strategic plans to achieve them. As progress is made, these designers systematically create, implement, and evaluate while also adjusting plans as needed. They approach their practice with an awareness of the control they possess as educational designers who not only teach, but also create, manage, and assess their students' learning.

This design orientation provides teachers who differentiate instruction with a mindset and a strategy for better understanding their students, which helps them determine when and how best to leverage available technology tools to respond to students' unique attributes.

## The "4Es" of Edtech Integration

Differentiated instruction puts students' diverse needs front and center (Tomlinson, 2017). When differentiating instruction, teachers develop learning experiences that flexibly adjust specific instructional elements (such as content, process, product, the conditions where the learning takes place, and its atmosphere or "tone") to respond to the natural variability among students (their readiness, interests, or unique backgrounds).

But what's the best way to incorporate technology into this mix? It can be overwhelming to determine each tool's function and best application for a particular classroom. Many teachers are interested in using new technologies to support their students but are not sure where to begin. They wonder which tools are worth the potential risks, and how to gain the most benefit from them so the tools are used for more than basic, transactional purposes.

Guidance we have offered teachers for decades, based on our research and experience, is to remember that the integration of technology in any educational setting should always aim to accomplish the "4Es" (Kilbane & Milman, 2014). The 4Es can help determine whether a tool might make learning more:
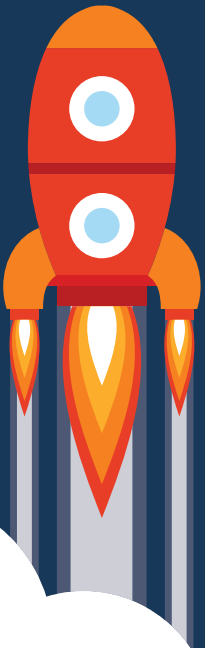
**Teachers have always wanted to learn ways to integrate technology effectively in their lessons, but in the post-pandemic era, this desire to move beyond experimental use is even greater.**

■ *Equitable*: Does use of a certain technology promote more equitable opportunities without adding additional barriers?

■ *Efficient*: Does use save time, energy, or other resources?

■ *Effective*: Does the technology make learning more effective for all or some students?

■ *Engaging*: Does the technology stimulate students' attention and motivation?

It's also important to remember that the goals of instruction, particularly those of differentiated instruction, should drive the design of learning experiences and technology's integration within it. As teachers appraise the value of different tools and the methods for which they will be used, they must prioritize their goals for the design supporting differentiation, carefully consider what purpose will be served (how will it address students' needs equitably, efficiently, effectively, and/or in an engaging way), and determine what positive outcomes might result.

For example, will use of an online survey for pre-assessment save time (be more efficient), aid a teacher's analysis of information about student readiness (add efficiency and enable greater effectiveness), and inform more powerful learning design (resulting in more equitable, effective, and engaging learning experiences)? Will incorporating an online multimedia tool generate greater student investment in demonstrating their learning, diversify the modes available for expressing learning, and expand the classroom boundaries so that parents and other community members may contribute to supporting students' growth?

In addition, teachers will want to identify the constraints of the technology (what it cannot do

and the conditions necessary for successful use) and the drawbacks (the possible compromises or negative effects) it will have in their design. Even when digital tools are used with the 4Es in mind, their incorporation can still result in unintended consequences for learning. For example, a malfunctioning tool might waste precious learning time. Or certain learners may experience barriers because they do not know how to use a tool properly. It is also possible that a technology has so many "bells and whistles" that students spend more time thinking about its gimmicky features than the content they should include to demonstrate their learning. This is why, when making decisions about technology, a teacher must not only consider the potential of the tool itself as it relates to their goals, but also clearly identify its potential problems and pitfalls, as well as be prepared to flexibly address any challenges that might arise.

## Transactional vs. Transformative Learning

Even if a teacher incorporates technology that supports differentiation and achieves the 4Es, it may only serve a transactional purpose. *Transactional learning* involves the exchange of ideas and information between teachers and students where the focus is knowledge transmission and acquisition, which has traditionally been the primary goal of learning. Many teachers routinely incorporate technology to support differentiation in this type of design. For example, they might make a simple lecture more effective for certain students through a multimodal demonstration (one that incorporates visual, auditory, and physical stimuli) using a software

tool. Or they might record their lectures in video format and include captioning to support English language learners, hearing impaired students, or those who were absent, in addition to those who may benefit from rewatching or slowing down their teacher's presentation. Likewise, they might create more tailored, differentiated learning experiences for all students using pre-assessment data that is easier to collect and analyze through an online survey tool.

These uses of technology address the 4Es and meaningfully support students as they strive to achieve the goals for their learning; however, their impact can be finite because transactional approaches have limited outcomes. Even though transactional learning is a necessary, valuable, and efficient means for building the foundational understandings students require for new learning, teachers will also want to design *transformational learning* experiences. Such experiences foster students' capacities for creativity, collaboration, communication, critical thinking, cognitive flexibility, complex problem solving, and curiosity, often at the same time students are acquiring basic knowledge. These capacities are

increasingly emphasized in national curriculum standards built around the recognition that to be prepared for life, citizenship, and work, students must have the ability to apply knowledge, not merely possess it.

Yet, the benefits of transformational learning experiences do not end with their power to support students' development of important capabilities. They also involve a transformation in students' beliefs, understandings, and actions. As students transition from being passive recipients of information to active creators of knowledge, they gain a new awareness of their agency and the dynamics of learning—understandings that better equip them for their future.

In experiences designed to promote transformational learning, students use digital tools to achieve instructional outcomes that are *only possible with certain uses of technology*. Toward this end, both the tool and how it is used are important. The same technology tool could be used in multiple ways, but one way might result in transformational learning and the other might not. For instance, two different groups

**Many teachers are interested in using new technologies to support their students but are not sure where to begin.**

of students might work on a project to promote composting efforts in their community, with the objective to use a photo- and video-sharing app to educate the community. One group might create a simple photo post with information about how and where to compost. The other group might transform their learning, however, by creating a video that includes polls to learn about community members' composting habits and embedded links to several relevant resources (such as composting locations in their community). The video group also engages with others, resulting in their posts going viral and making the local news.

Such outcomes are encouraged by the International Society for Technology in Education's Standards for Students (ISTE, 2016), which suggest learning be designed in a way that allows students to become empowered learners, digital citizens, knowledge constructors, innovative designers, computational thinkers, creative communicators, and global collaborators.

Transformational learning is dynamic and differs depending on contextual factors, such as grade level and content area. Still, according to ISTE, several essential conditions must be in place in a classroom or school before transformational learning can occur, including:

- shared vision,
- implementation planning,
- equitable access,
- prepared educators,
- skilled and sufficient technical support,
- high-quality learning activities and content,
- and ongoing evaluation. (n.d.)

In a differentiated classroom, transformational learning experiences that are supported by technology would address one or more elements of differentiation (content, process, product, environment) and respond to the sources of variability among students (interest, readiness, and learning profile), just as any high-quality differentiated lesson would. However, while technology's inclusion might respond to students' needs to make learning more equitable, efficient, effective, or engaging, its involvement is not limited to this. Rather, the introduction of a digital tool into the learning experience can help students learn more, learn different things, and change how they think about themselves and the world around them.

A differentiated learning experience involving a transformational use of technology might involve students downloading real-time butterfly migration data collected from across the United States and analyzing the data using a spreadsheet to understand the effects of residential development and habitat loss. Students with different learning profiles would have the ability to consider these data using different types of visualizations (such as bar or line graphs or a pie chart) and be aided through the multiple and varied methods of representation made possible with the spreadsheet tool. Students would not only be able to retrieve the data more efficiently and with methods that effectively support diverse learning needs, but would also mirror the work of scientists in an engaging way and come to understand the data more fully. They might also use an augmented reality app to create a map with animated butterflies showing where and when they migrated. This experience would also open up students' sense of what it means to "do science" and empower them to see their role as stewards of the environment.

### Designing for Differentiation

Teachers who differentiate instruction are educational designers, professionals who possess the skills and expertise to address the

**The introduction of a digital tool into the learning experience can help students learn more, learn different things, and change how they think about themselves and the world around them.**

diverse learning needs of their students. Their approach to planning instruction, which incorporates varying content, process, and product, coupled with technology that addresses the 4Es, provides a strong foundation for creating transformational learning for students. Intentionally approaching their role as designers will allow educators to think strategically and systematically about the best ways to incorporate technology to achieve their goals.

The increased availability of digital tools in post-pandemic educational settings means that teachers no longer need to worry so much about whether technology will be available for supporting learning. They can focus their attention on considering how it can be most powerfully used, which depends primarily on how teachers *choose* to integrate it when developing lessons and learning activities. As teachers transition out of the reactive methods that enabled them to succeed during the pandemic, they will benefit from reconsidering the technology in the context of differentiation. This approach provides teachers an orientation to practice that enables them to proactively design experiences that respond to students' unique and diverse needs and promotes transformational learning. Adding technology to the differentiated instruction equation helps students cultivate relevant, real-world skills that will benefit them throughout their education, life, and careers. ⓔ

### References

International Society for Technology in Education. (n.d.). Essential conditions for effective tech use in schools. https://www.iste.org/standards/iste-essential-conditions

International Society for Technology in Education. (2016). ISTE standards: Students. https://www.iste.org/standards/iste-standards-for-students

Kilbane, C. R., & Milman, N. B. (2014). *Teaching models: Designing instruction for 21st century learners*. Pearson.

Tomlinson, C. A. (2017). *How to differentiate instruction in academically diverse classrooms* (3rd ed.). ASCD.

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## Reflect & Discuss

Do you see yourself as a designer when crafting lessons? If not, how might shifting your perspective change the way you create learning opportunities for students?

How might the 4Es help teachers evaluate technology tools in more helpful ways?

Think of one technology tool you incorporated recently. Was it for transactional or transformative purposes? How might you use it differently?

# Pedagogy Before

*Four elements for a pedagogy-first approach to digital learning.*

**Bryan R. Drost**

**W**e just experienced a pandemic. *Let that sink in for a moment.* Teachers, students, and parents were thrust into digital learning. Ask educators anywhere and they will tell you that the educational output during the pandemic was just not the same as before and the situation resulted in some learning loss. "Learning loss" refers to the general

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loss of knowledge or skills, often due to a gap or discontinuity in a student's educational experience. Check the achievement data out there, and it appears that teachers are right—there was learning loss during the pandemic (Sparks, 2023). Many attribute that dip to digital learning (Turner, 2022).

Prior empirical studies on digital instruction, on the other hand, tell quite a different story; they suggest that in some cases digital learning can be more effective than traditional, face-to-face modes of instruction. In one meta-analysis, it was determined that students can learn up to five times more material online than in a face-to-face course (Means et al., 2010). Another study, by MIT, showed that digital learning was as effective as in-person courses, regardless of how much knowledge students start with (Colvin et al., 2014). And a more recent study showed that students enrolled in a virtual learning environment prior to the pandemic outperformed students experiencing remote learning for the first time during the pandemic (Beck, 2022). Clearly, this research and many educators' experience over the last few years seem to be at odds with one another.

While the emergency learning conditions during the pandemic took a heavy toll on schools and districts, however, some emerged surprisingly unscathed—at least in terms of student achievement. Recently, I conducted an exploratory study (Drost & Levine, in press), interviewing students, parents, teachers, and administrators in a dozen Midwest school districts about their experiences with digital learning. I wanted to determine why certain districts (with varying demographics) were less impacted by the pandemic than others. When these districts looked at their pre- and post-COVID data (common assessment data, progress-monitoring data, state achievement data, etc.), they *did not* see learning loss. Their data were

primarily equivalent to pre-pandemic levels, but in two of the districts, data were even higher. So, what allowed these districts to be successful in such trying conditions?

What I found in my research was that districts that thrived during the pandemic focused learning on pedagogy first and technology integration second. It logically makes sense: these districts capitalized on what teachers were trained to be experts in—pedagogy. I remember saying something similar to myself early one morning in March 2020 as the emails were coming in from my teachers faster than I could handle: we must focus on what we do best—teach!

## Four Elements for Success

So, what exactly does this approach look like when using technology to support learning? As I discovered, districts that succeeded during the pandemic engaged in four common practices. While not a perfect recipe for success, these elements below are essential to improving student achievement with technology.

**1** *Having an instructional framework.*
This first element is about ensuring that every teacher knows what an effective lesson looks like in a district. An instructional framework is the way a teacher plans lessons with identified strategies that the teacher and students use to achieve the learning target (Toth, 2022). Instructional frameworks help ensure a guaranteed and viable curriculum (DuFour & Marzano, 2011).

Some of the districts I researched used the 5E model; others used Madeline Hunter's model, Understanding by Design (UBD), or even a homegrown model (or framework that incorporated multiple models based on subject area). Regardless of the framework used, teachers in these districts were clear on what good instruction needed to

## Regardless of the framework used, teachers were clear on what good instruction needed to look like.

look like. Each district had an instructional framework solidly in place.

One caveat: Having an instructional framework doesn't mean that we forsake the art of teaching; kids are not machines. They are spontaneous and ever-changing. The best teachers are the ones who creatively deliver instruction within those established frameworks.

Let's take an example of a teacher who creatively followed an instructional framework using a learning management system. For a unit on the American Revolution, this history teacher used an I Do, We Do, You Do model that allowed for meaningful and deep learning as students described how key battles and individual contributions helped lead to American victory in the Revolutionary War.

The teacher started with an I Do phase where she shared learning objectives, piqued student interest with a video, required students to share prior knowledge, and provided an overview of the content that students were expected to know. Then, in the We Do section, based on a quiz, students self-selected into the two sides of the war, the American or British side. Students then engaged in lively debate based on a reading. Last, students entered a You Do section, where, based on what they had learned, they used their new knowledge to explain legacies of the war that can be found in American society today. That's the instructional framework in action. Now to the creative side: the teacher added learning techniques to engage students. She created student groups based on prior knowledge, provided collaborative space for students to dialogue using a shared page, capitalized on teenagers' desire to debate using a digital discussion board, and incorporated video to hook their interest.

**2** *Determining a clear pedagogical function.*
A second element that was well-defined in the data is identifying and using clear pedagogical functions within each framework. A pedagogical function is best described as the way that a teacher wants students to go about learning the material during a particular part of the lesson. It might be that the teacher wants students to brainstorm or self-reflect or practice. It might be that they want students to discover or explain or self-assess. Because teachers in the districts studied were clear on these pedagogical functions, they were creating explicit instruction, a hallmark of effective instruction (Archer & Hughes, 2011). Explicit instruction is a way to teach in a direct and structured manner. In my experience as a teacher, administrator, and professor, when I lose sight of the pedagogical function because I'm too busy trying to get familiar with technology, my instruction suffers. When I go back to the pedagogy, the learning improves.

Let's return to the American Revolution lesson. In the I Do section, the teacher had two clear pedagogical functions: She drew on prior knowledge and helped students organize their knowledge. In the We Do section, there was a guided support function and a check-for-understanding function. In the You Do part, the teacher assessed to determine what students knew about the topics they studied. By having these clear pedagogical functions, the students were able to understand the ways in which they should go about their learning.

**3** *Connecting technology to the pedagogical function.*
After determining the pedagogical functions, the next step is choosing the tech tools that allow educators to carry them out. When I interviewed teachers and administrators, it was clear that these teachers were letting pedagogy drive the selection of technology tools—not the other way around. For example, instead of saying, "I need to use a Padlet," the statement might be, "I need

way around. For example, instead of saying, "I need to use a Padlet," the statement might be, "I need to find a way to get students to brainstorm their ideas." Once the pedagogical function of brainstorming was established, the choice of which tool to use became clear. The technology simply became the vehicle to get to the pedagogical function.

In my own work with staff during the pandemic, I saw even my best teachers struggling with tech implementation. What was common among those who were thriving, however, was that they identified pedagogical function and then determined technology tools to support that function.

In anecdotally talking with students and more formally talking to some of the parents through the study, I found that putting the pedagogy first seemed to make the switch to remote learning more manageable. Because students knew what the teacher was trying to accomplish, there wasn't as much worry about the technology; the tech flowed more easily. Because the lessons were part of a consistent framework, everyone knew what to do. The technology acted in service of the pedagogy.

Going back to our American Revolution example, the digital tools that were selected were clearly aligned to the pedagogical function. For instance, when the teacher wanted to introduce a new concept while motivating students, she used Edpuzzle, an interactive video tool. When the teacher wanted students to debate, she created discussion boards using a feature in her LMS and engaged in two visible thinking

| FIGURE 1. Selecting Tech Tools Aligned to Instructional Framework (5E) and Pedagogical Function | | |
|---|---|---|
| **Framework Component** | **Pedagogical Function** | **Example Tools** |
| Engage | Brainstorm | Padlet, Jamboard, or MindMeister |
| Explore | Direct Instruction | Pear Deck, Nearpod, or Screencastify |
| Explain | Discussion | Google Question, VoiceThread, or Padlet |
| Elaborate | Self-Assess | Google Form, Formative, or Socrative |
| Evaluate | Assessment | Blooket, Gimkit, or Kahoot! |

*Source:* Bryan R. Drost

routines: a Tug of War and a What Makes You Say That discussion (referred to as a provocative prompt). When the teacher wanted students to self-assess, she built digital forms with a Google Quiz.

The chart in Figure 1 is a conceptualization of how teachers can connect commonly used tools to a prevalent framework (e.g., the 5E approach). Please note that this chart is not exhaustive, and that some tools can be used for more than one function. (For example, Pear Deck could be used to quickly transfer information to students, as well as to determine what students know about a particular topic.)

**4** *Capitalizing on the formative assessment cycle.*
The last element these successful districts engaged in is taking advantage of the formative

assessment cycle. We know that strong formative assessment practices—monitoring student learning and providing feedback and/or making instructional adjustments along the way—make a big difference for all learners. The formative assessment process is a continuous process that includes everything from informal techniques to standardized assessments. What is most important is that the teacher engages in a series of moves (Duckor & Holmberg, 2017) that capitalize on these interactions with students (Drost, 2014).

In talking with teachers and administrators in the study, the use of the formative assessment process came up in almost all conversations. Sometimes this was related to elements one and two as the framework and/or pedagogical function required teachers to think about how they were using student

to interpret to determine students' progress toward learning goals and success criteria.

If we return to the American History classroom, you'll see that the teacher planned multiple opportunities to gather information to improve instruction: an Edpuzzle allowed the teacher to figure out what students knew and didn't know; group discussions allowed the teacher to figure out what students were processing; checks for understanding allowed for pivots; and a final activity helped determine what students learned during that lesson. These processes helped the teacher make informed adjustments for future lessons.

## Following the Research

Researcher Morgan Polikoff (2021) argues that one of the primary reasons some districts struggled during the pandemic after technology and communication systems were in place was that there was little to no guidance about how to teach K–12 students in a digital environment. In the districts I studied that didn't experience learning loss, these four elements were solidly in place, setting the stage for a smoother transition to digital learning. What these elements show is that educators' focus needs to be on pedagogy, not tech integration. Leaders must ensure that each district, school, and classroom has specific curriculum, instruction, and assessment approaches that allow teachers to make appropriate decisions when they need to use technology.

In my own experience as an educator, I have seen the power that these four elements have in improving

> **The technology simply became the vehicle to get to the pedagogical function.**

student success. While some may argue that we don't need to adhere to them because we hopefully won't need to suddenly switch to digital learning again, I argue differently. By putting these four elements into place in our classrooms *now* and connecting with appropriate technology tools, our students' abilities to learn at high levels can and should increase exponentially. We will then, most likely, fulfill what the research has said: that digital learning can increase achievement. 🔓

## References

Archer, A., & Hughes, C. (2011). *Explicit instruction: Effective and efficient teaching*. The Guilford Press.

Beck, D. (2022). *Pearson-supported virtual students outperform national test scores during the pandemic*. Pearson.

Colvin, K. F., Champaign, J., Liu, A., Zhou, Q., Fredericks, C., & Pritchard, D. E. (2014). Learning in an introductory physics MOOC: All cohorts learn equally, including an on-campus class. *The International Review of Research in Open and Distributed Learning, 15*(4).

Drost, B. (2014). *Engaging in authentic formative assessment*. Lambert Academic.

Drost, B., & Levine, A. (in press). *Examining learning loss: The alternative narrative*. State University of New York.

Duckor, B., & Holmberg, C. (2017). *Mastering formative assessment moves: 7 high-leverage practices to advance student learning*. ASCD.

DuFour, R., & Marzano, R. J. (2011). *Leaders of learning: How district, school, and classroom leaders improve student achievement*. Solution Tree Press.

Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2010, September). *Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies*. U.S. Department of Education.

Polikoff, M. (2021). *Beyond standards: The fragmentation of education governance and the promise of curriculum reform*. Harvard Education Press.

Sparks, S. (2023, January 30). Global academic loss persists nearly three years into the pandemic. *EdWeek*.

Toth, M. D. (2022). Models of instruction. *American School Board Journal, 12*(22).

Turner, C. (2022, June 22). *6 things we learned about how the pandemic disrupted learning*. NPR.

## Reflect & Discuss

How might adopting a pedagogy-first approach to technology implementation help schools be better prepared for a future crisis?

What criteria are currently in place for determining which technology tools you use in instruction? Do those criteria prioritize pedagogy?

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# Lifting Student Engagement
## Through Smart Tech Use

*Rule number one is to make learning active.*

**Nicholas Provenzano**

Learning during the pandemic showed that teacher-led direct instruction and rote memorization are not the best way to engage students. In many schools, there was a shift to more project-based learning (PBL) and toward learning activities (and pace) being directed more by students themselves. This shift allowed for a wide variety of technology to be used to support students' learning and help them become more actively engaged in gaining knowledge and skills, as a 2021 study by Hira and Anderson showed.[1] While there were certainly students who struggled with online learning, that wasn't the case for all, and Hira and Anderson's research shows that using PBL in online learning was valuable for many students.

Now that students and teachers are back in the classroom, it's important to not backslide into old habits that don't spark engagement because they don't allow for enough active learning. Educational technology plays a role here. Getting the most out of edtech can allow students with a wide variety of learning profiles to be successful and more fully engaged in class. And tech-based activities or learning approaches can fit into all curricular areas if teachers are given the time to make this happen and the leeway to try new ideas and fail at times.

As a makerspace director and technology coordinator at a K–12 school, I've helped teachers in various disciplines use edtech in more meaningful ways. I've learned there's one thing educators need to keep in mind in such

efforts: The use of technology needs to promote *active* engagement. Students don't need to sit and consume more content from their teacher, even if it's presented through cutting-edge technology; they consume content all the time. Students' ability to *create* content through active engagement is the ultimate testament to an immersive learning experience. While teachers can provide valuable content a student might not discover on their own, exploring, learning, failing, and succeeding on their own is tremendously valuable to students—and happens more regularly when they use technology that lets them become independently engaged in their learning.

Regularly reinventing lessons (and infusing edtech elements into them) so that they're more active and engaging to an ever-changing student population can be exhausting. But it's not a challenge teachers need to take on alone. There are many resources available that have been vetted by experienced educators focused on edtech, who have done the heavy lifting for the average teacher who's just beginning to use tech-enhanced approaches. Allow me to describe a few resources (all freely available) I've seen teachers use in my school during and after learning went remote.

### The Power of Stories: Combining Writing and Coding

One comment I commonly hear from educators is that there is a big push for STEM skills—such as math and coding—in the classroom, but that STEM doesn't fit in their content area. A 6th grade English language arts teacher in my school, Ms. Flexer (a pseudonym), thought this—until we collaborated to get her students engaged in the writing process

**Students don't need to sit and consume more content from their teacher, even if it's presented through cutting-edge technology; they consume content all the time.**

by using Python code to create a text-based game.

Interactive Fiction, meaning a text-based computer game that requires players to enter in text commands to advance the game and story, is one of the original types of computer games. For early versions of interactive fiction games like Zork, developers lacked the ability to generate serious graphics, so they relied on text to drive the narrative a game revolved around. To create a text-based game, you need strong writing skills, an understanding of how plot works in a story, proofreading skills, and basic coding. In the 6th grade ELA curriculum in our school, students learn narrative writing skills, how to craft a plot, proofreading, and other components to writing a story. When their teacher added coding elements, students worked on those writing skills while creating a game they could share with friends and family.

The Raspberry Pi Foundation has an excellent lesson on how to create text-based games (www.projects. raspberrypi.org/en/projects.rpg). With a few tweaks, it can be turned into a full-scale lesson for students to write their very own game that draws on stories they've written. As Ms. Flexer walked her students through the tutorial provided with this lesson on how to code the game, they added elements of their own stories. As the students dug into the code, they

started to ask questions about how different parts worked and whether they could change the code to something different in their game. The students and Ms. Flexer worked together to learn more about the code so the games they were creating could do all the things they wanted.

While adding more elements to their games allowed the kids to personalize those games, it sometimes led to problems: If you want the code to do more, you need to write more code, and when you write more code, you're going to have more bugs crop up. One of the most important parts to coding anything is making sure the code is bug-free so it runs smoothly. All it takes is one improperly placed indent or comma and the whole thing comes crashing down. As students worked on their code and their stories, they willingly spent a lot of time proofreading their work and the work of others, making sure they found all existing errors so the game would work.

Ms. Flexer was astounded by how committed the students were to writing and proofreading their code. Like most ELA teachers, she'd had trouble getting the students to spend time on traditional writing assignments. When the work was reframed around writing code for a game, her students worked on proofreading and other writing elements in a way that was engaging for them—and gave them a taste of text-based coding.

Interactive fiction games are only one way to bring gaming into learning. For instance, Gimkit is a highly engaging tool that enables collaborative learning through gaming, and Kahoot! allows students to review content through playing a game.

## The Power of Showcasing Work

Another way to leverage edtech for greater engagement in the classroom is to find digitally supported ways for students to organize and share their work. Teaching during the pandemic led to a greater use not only of project-based learning, but also of digital portfolios. Students learning from home could share their work using digital tools that both teachers and parents could access. When students know they will share their work, they are more engaged because they want to showcase something that will reflect well on them.

Two tools many teachers used successfully toward this end were Seesaw and Adobe Express. Seesaw is a student-driven digital portfolio and communication platform that let teachers easily engage with students and their families, facilitating personalized learning and sharing of multimedia assignments, progress, and feedback. I worked with teachers who would post a learning activity on Seesaw that provided all the details students needed to complete the activity. Students would complete the learning activity on Seesaw and then use Adobe Express to create an additional artifact—such as a digital poster, short video, or website—to further demonstrate their understanding. Adobe Express gives students access to a wide variety of tools for creating high-quality work, such as adding text to graphics, creating



Two students use design thinking with Minecraft Education.



Two 7th grade students work collaboratively on their laptops.

PHOTOS COURTESY OF NICHOLAS PROVENZANO

simple websites for presentations, and more. This free tool helped students showcase their creativity while presenting something that highlighted what they learned.

I've found Seesaw to be a helpful tool for students, teachers, and parents because it gives all stakeholders access to the work a student has completed, allowing for more engagement from parents. Students store their products in a digital space where teachers or parents can provide feedback and students can reflect on their progress. The material a student publishes to Seesaw can be kept private, to be seen only by the teacher, student, and their parents, or made public to all students. This is helpful because some portfolios might be designed for

specific feedback from a small group and others might just be used to collect student work.

While Adobe Express and Seesaw need not be used together to work well, I've found that pairing a creativity tool with a portfolio tool helps get the most out of students. Other good tools that enable students to create and share digital products include Flip from Microsoft, Canva for Education, and Book Creator. Now that schools are in-person again, there's no reason teachers shouldn't continue to use tools like these to motivate students to learn and create.

## The Power of Leveraging What Kids Love

Another great way to engage students

# Exploring ways technology can make student learning more immersive and experiential will involve failures, but also big wins for students.

is to meet them where they are by using activities students already know and enjoy. For many students, that would be Minecraft. Minecraft Education, a crafting and building program that lets students create massive "worlds" on their computers, has been a huge hit with students and teachers for years. This program can be used across multiple disciplines. It engages students who are itching to envision and design possible societies, cities, or buildings or to simulate scientific experiments.

I've seen students use Minecraft in social studies to build countries, establish borders and trade, and more, learning social studies-related concepts and the value of collaboration. In science classes, teachers are giving students virtual access to volatile substances through the safety of Minecraft Education's chemistry workbench. Students can freely experiment with what happens when they combine various elements; if something blows up in Minecraft, it's harmless. Students in math class can explore ratios by deciding how to place blocks within the program and dive into scale sizes by building houses.

Minecraft isn't the only digital program that lets students virtually design and build things and that can be tapped for learning. Other good options include CoSpaces Edu (a virtual reality and augmented reality creation platform) and Tinkercad (a free, web-based 3D modeling and design tool that provides an interface for students and educators to create, prototype, and explore design ideas). Scratch is a visual programming language and online community designed for beginners, especially children, to learn coding concepts by creating interactive projects.

Teachers are often amazed by how engaged students are and how hard they work when given an assignment that uses Minecraft Education or similar programs. And it's no problem if the teacher is a novice; students love to showcase their Minecraft skills and will support the teacher or any student who is struggling to place their first block.

Students can use the program differently to develop whatever skill they're most interested in. Some will use the coding feature to automate tasks; others might teach themselves how to build pointed roofs by watching videos on YouTube. I've seen students spend hours exploring the content needed to create their perfect virtual worlds. They learn to collaborate to build elaborate town centers, shops, amusement parks, and whatever else pops into their mind, gaining valuable design skills.

## Taking the First Step

It's a reality that teachers need to continue to innovate to find ways to engage students, and some of these new ways will involve edtech. But don't be overwhelmed or think you immediately need to change everything you're doing to incorporate more tech in your teaching. Go at your own pace, and realize you are going to fail from time to time. It's easy to give up when you try a new lesson with a new piece of technology and it doesn't land the way you had hoped. But consider how many *traditional* lessons you have created that flopped. Why should a lesson that utilizes technology be thought of differently? Be open with students when you try a new lesson involving edtech. Tell them they are going to be "Beta testers" for your new lesson and give you feedback that will help make the lesson better for the next group of students. Move forward with the hope that failure will teach you a valuable lesson and provide experience that will help you improve.

The Chinese philosopher Lao Tzu said, "The journey of 1,000 miles begins with a single step." Take a deep breath and identify one thing you think will engage your students and start there. Exploring ways technology can make learning more immersive and experiential is a pursuit that will involve failures, but also big wins for students. Seeing smiles on your students' faces will let you know when you are heading in the right direction. ⓔ

[1]Hira, M., & Anderson, E. (2021). Motivating online learning through project-based learning during the 2020 COVID-19 pandemic. IAFOR *Journal of Education, 9*(2).

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# Got an Edtech COACH?

*If we really want technology-rich learning environments, our teachers need more personalized support.*

**Ashley McBride**

I served as a middle and high school English teacher for the first 10 years of my career in education. One lesson still stands out to me: I vividly remember standing alone in front of a classroom of students, trying to get them started on creating their own blogging site so they could have an authentic audience for their writing—and *failing miserably*. I had a horrible feeling in the pit of my stomach as I was bombarded by questions about not only the assignment itself, but also how to navigate areas of the blog platform that looked entirely different in "student view." I only had 50 minutes with the class before the bell rang so I'd have to either start the whole process over again or scratch the lesson and pivot to something nontechnical.

To run into so many issues was disheartening.

I had spent weeks working late into the night searching for an online platform that would allow my students to showcase their writing while keeping them safe from potentially harmful or inappropriate public commenting.

While I ended up regrouping after that day, taking another week to dig into the platform from the student side, and eventually trying again (with success this time), the scenario could have easily frustrated me to the point that I never wanted to use computers for writing assignments again. This is why, just a short time later, I was excited to discover a job opening for an educational technology coach in a neighboring district. I had never heard of the role before, but after reading the description, I was hooked. I never wanted another teacher to have to go through the long and tedious process of researching

a new technology-rich strategy and trying to implement it alone in a room full of students with precious instructional minutes ticking away.

I eventually landed an edtech coaching role at a high school in a neighboring district. With a flexible schedule, I could fully mix into the culture of the school and support any teacher at any time. I was soon spending almost all my time inside classrooms—learning about the projects teachers wanted their students to create, coplanning with teachers to reimagine units they had been teaching the same way for many years, and supporting teachers as they tried a new resource or strategy. I was giving the teachers at my school something I didn't have when I taught.

Fast forward I *won't tell you how many years* and I was working as a district technology director. In response to the North Carolina Digital Learning Initiative in 2016, my district had made it a priority to fund an edtech coach for each elementary, middle, and high schools. Having this role in place was one of the top reasons we were able to transition so quickly and effectively into remote learning when the pandemic shut schools down in March 2020. The teachers in our district didn't skip a beat, and those who needed extra guidance knew exactly who to call for support with transitioning their lesson plans to a virtual environment. Our edtech coaches worked with large groups of teachers from our school district, providing professional learning on how to run virtual meetings; supported the creation of instructional schedules that included whole-class, small-group, and one-on-one instruction; and worked individually with teachers who wanted to talk through their

lessons plans. These coaches had become and still are an invaluable resource.

## How to Utilize an Edtech Coach

During the pandemic, emergency federal funding enabled many schools to provide devices to every student, purchase new programs, and upgrade their infrastructures. As students started returning to school, there was a great deal of excitement that this influx of hardware and software would translate to more engaging, technology-rich learning environments when schools returned to in-person instruction. But, as I have seen in my current role at the North Carolina Department of Public Instruction, some schools are moving away from using technology altogether. This trend may be an attempt to reduce screentime for students or an overcorrection by schools who saw test scores drop after students were required to participate in remote learning. We have to keep in mind, though, that the way many districts went about digital teaching and learning during the pandemic wasn't best practice. So, blaming the technology and removing the devices isn't going to solve anything. Schools should be focusing on supporting engaging pedagogical strategies that leverage the technology resources now available to them in a way that enhances student learning.

Well-placed edtech coaches can help bridge this post-pandemic gap and help teachers learn to focus less on the technology tool itself and more on choosing a technology-rich pedagogical approach that best fits the learning goals. The *human support* for technology use is an invaluable resource. An edtech coach can keep up to date on new resources and support teachers in embedding these resources into their curriculum in meaningful ways. They can be a catalyst in transforming how technology is used in the classroom.

## Starting with a Vision

For this role to be as effective as possible, it must be implemented in a way that emphasizes direct teacher support. The Edtech Coaching Framework (see fig. 1) outlined in my book *The Edtech Coaching Primer* (ISTE, 2021) can help leaders structure the role in a way that helps shift classroom practices to be more active, engaging, and personalized to students' needs. This framework was designed using research on best practices in coaching and professional learning to ensure educator growth (Darling-Hammond, Hyler, & Gardner, 2017). It includes tangible actions for coaches to meet the ISTE Standards for Coaches.
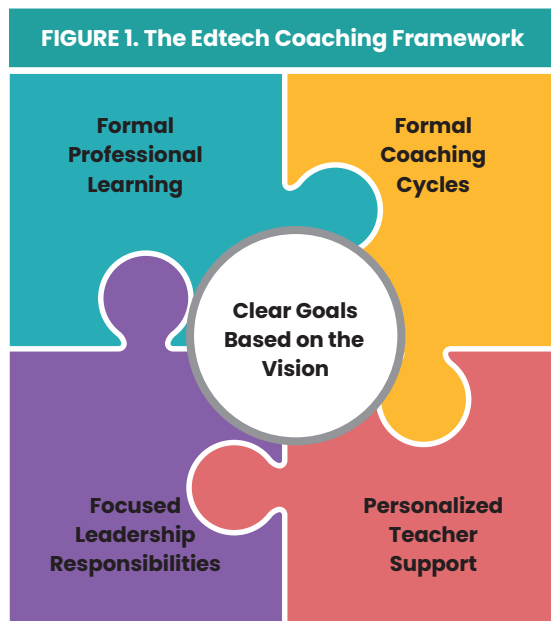


**FIGURE 1. The Edtech Coaching Framework**

Formal Professional Learning

Formal Coaching Cycles

Clear Goals Based on the Vision

Focused Leadership Responsibilities

Personalized Teacher Support

*Source*: McBride, A. (2021) *The edtech coaching primer. Supporting teachers in the digital age classroom.* ISTE.

As the figure shows, an edtech coach's work should be *vision-based*. In the center of the Edtech Coaching Framework are clear goals the coach sets based on the school's vision for teaching and learning. The student learning environment can be transformed in so many ways using technology. For this to happen, though, it has to be OK for teachers to try new technology-infused pedagogies and take measurable risks. Even if the school's vision does not specifically mention technology or risk-

taking, it can and should be supported with solid technology pedagogy.

## Four Elements of the Edtech Coaching Role

The four elements of the Edtech Coaching Framework, anchored by the school's vision, should intertwine to provide structure to the role of the edtech coach while ensuring the coach is meeting the goals set in the ISTE Standards for Coaches. This structure creates the best possible environment for supporting teachers to leverage technology in the most effective ways with their students.

### 1
### Providing Formal Professional Learning

As a member of the school community, the edtech coach can take information they gather from observations, impromptu conversations, and daily interactions with teachers and students to create or curate professional learning that is aligned to the specific needs of teachers and the curriculum.

Knowing firsthand what kind of teaching strategies a teacher already uses can prevent coaches from unnecessarily repeating material and wasting teachers' time with generic PD. The professional learning can also be provided in appropriate bite-sized increments to small groups of teachers who teach the same subject matter or grade level, ensuring the content is specific to the context of their own classrooms.

### 2
### Offering Feedback and Reflection Through Coaching Cycles

With support—not evaluation—being the focus of the role, an edtech coach can observe a teacher in their classroom, provide space for reflection and feedback, help with creating a plan for adjustments or growth, then work with the teacher on implementing that plan through a coaching cycle. Because technology integration is more comfortable for some than it is for

others, these cycles can take anywhere from a few days to a few weeks to complete.

Coaching cycles require teachers to be willing and ready to accept feedback and participate in reflective conversations about their practice. The experience will be less impactful if the cycle is forced on the teacher when he or she is not ready. But a coach who starts these cycles with willing participants looking for ways to improve may find that other initially hesitant teachers will become interested in the process and may request to participate in a cycle in the future.

Figure 2 shows a coaching cycle that is flexible and provides opportunities for conversation, collaboration, planning, and support for educator growth in implementing digital learning strategies.



FIGURE 2. The Edtech Coaching Cycle
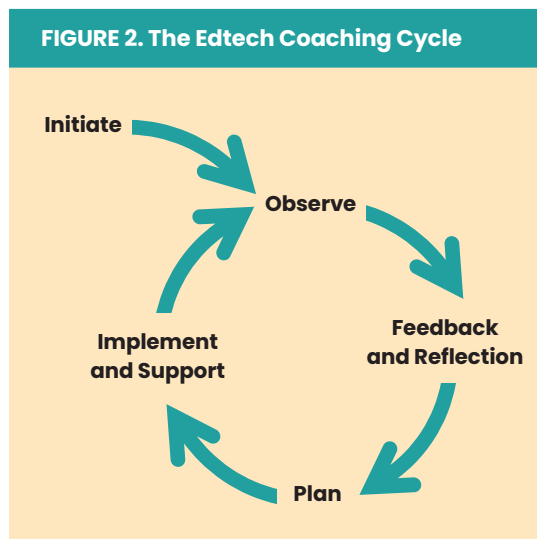
Initiate → Observe → Feedback and Reflection → Plan → Implement and Support → Observe

*Source*: McBride, A. (2021) *The edtech coaching primer. Supporting teachers in the digital age classroom.* ISTE.

### 3
### Providing Personalized Teacher Support

Every teacher and every class of students is unique. Ask any secondary educator who has taught the same lesson to a different group of students only an hour apart, and they'll tell you the experience is never 100 percent the same.

This is why teachers need personalized support. An edtech coach can offer support through modeling, coplanning, coteaching, curation of research and resources, supporting the analysis and usage of student data, and a myriad of other strategies. The key is that this support is provided not only through PLCs or before- or after-school professional learning, but also one-on-one as needed or requested by the teacher.

The edtech coach needs a flexible schedule in order to be able to provide the type of support a teacher needs at a time that is most convenient to the *teacher's* schedule. This allows for just-in-time learning to occur as the coach can work with teachers on topics that are most necessary to their classroom and will have the greatest impact.

Personalization can also entail coteaching, which was my favorite way to support educators when I was a coach. It provides a safe space for teachers to try out new strategies and tools without feeling like they are alone.

### 4
### Assuming Leadership Roles that Fit Needs and Strengths

The edtech coach can often get pulled into tasks that are not necessarily the best fit for their skills. These often include break-fix tech support, testing coordination, administrative tasks, or teaching scheduled classes. While sometimes unavoidable, such side roles should be limited as much as possible. Otherwise, they can undermine the ability of the coach to work with teachers effectively, and take time from teachers who need the edtech coach's support in their classroom.

> **Well-placed edtech coaches can help bridge this post-pandemic gap and help teachers learn to focus on choosing a technology-rich pedagogical approach that best fits the learning goals.**

The task I see that most often takes up too much time is break-fix. Because the edtech coach is usually knowledgeable enough to provide a quick equipment fix, they can quickly get bogged down in supporting help desk tickets all day. So, I have always subscribed to the 10-minute rule for this role. It's OK to ask an edtech coach to try to troubleshoot a technical problem, but if he or she cannot solve it within 10 minutes, it's time to move on. The coach or educator

### Reflect & Discuss

Has your school or district "overcorrected" by cutting back on tech use after the pandemic? What are the pros and cons of this approach?

———————

How well-supported is the role of edtech coach in your school or district? What could be changed to make edtech coaches more central to instructional planning and PD?

———————

Have you ever had an edtech coach? What did you like or dislike about the arrangement? How could it have been improved?

should submit a ticket to the district's technical team and support the teacher in pivoting plans to continue the lesson.

Instead of ancillary tasks, edtech coaches should be given opportunities to provide leadership in areas that align to their strengths and that complement their coaching work. When I worked as an edtech coach, I was the lead for our school's data team. When I served as a technology director, I worked with my edtech coaches to provide them leadership opportunities on district projects like creating a computer skills curriculum map; leading the school media and technology advisory council; developing a plan to ensure all technology used in the district met data privacy standards; and running the district robotics league.

These types of leadership roles are also a better fit for the coach because they can be done at flexible times so that support for classroom instruction always takes precedence.

### The Impact of the Edtech Coach

I still reflect on those days when I was a classroom teacher and had a technology-rich lesson fail miserably—not because I didn't do the research or have a basic understanding of what I was trying to accomplish, but because I had never tried the lesson before and was completely on my own. I would have been more successful and grown

as a classroom teacher so much faster if I had someone supporting me along the way. I needed an edtech coach, someone with a flexible schedule who could come in to help me research, plan, reflect, and grow in my understanding of how to appropriately use technology to enhance learning.

At the time, I could only check out laptop carts for my classes once a week. Consider how much greater the need for edtech coaches is now that many students and teachers have devices available every day and all the time, and the power of technology to transform learning experiences has increased exponentially.

With a structure in place that allows edtech coaches to focus on supporting teachers' instructional evolution, such coaches can help to create a culture of active and engaged learning throughout the school. ⓐ

### References

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). Effective teacher professional development (Research brief). Learning Policy Institute.

ISTE standards: Coaches. (2019). Retrieved from https://www.iste.org/standards/iste-standards-for-coaches.

McBride, A. (2021). *The edtech coaching primer: Supporting teachers in the digital age classroom.* ISTE.

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# The "Secret Sauce" of a Great Edtech PD Program

*Professional learning on classroom tech integration doesn't have to be dull and disconnected.*

**Cathy James, Bronia Whipp, Robert D. Wachtel Pronovost, and Victor R. Lee**

Let's face it—technology-integration PD experiences too often feel like uninspired one-off, one-size-fits-all events. For all our hopes that technology can be used in ways to engage and meaningfully connect to the interests and concerns of our young learners, we strangely don't do enough to engage the *teachers*. It is too easy to forget that when it comes to technology, many teachers are learners also.

Like students, teachers benefit from the same ideas being revisited over time. They also benefit when they can build their understanding while making something personally meaningful and specific to their lived experiences. And like our students, teachers also learn more when they have time for reflective conversations with peers.

Our district, Redwood City School District in California, started exploring approaching professional development in this manner in 2016 and took steps to build Empowered Digital Learners, a professional learning program for integrating technology into instruction. This name borrows language from the International Society for Technology in Education's Standards for Students (ISTE, 2016). EDL

intentionally turns the page on the one-off, one-size-fits-all technology PD approach and gives teachers a powerful learning experience like the ones we hope they will feel empowered to give their students.

Over the years, word of the program spread to other districts and PD providers in the area, and it inspired a research-practice partnership with our local university (Stanford) to unpack what works well for teachers and why. Some of the key elements of Empowered Digital Learners include spacing the professional learning experience across several weeks, positioning teachers to experience ISTE student standards as learners themselves, inviting teachers to create and share their own "PD Snack" resources and presentations based on what worked in their classrooms, and one-on-one coaching during which a thought partner helps imagine how to leverage technology tools to empower learning in the classroom.

## 1 Give Teachers Time to Learn and Experiment

Empowered Digital Learners is not meant to be, and will not work well, as a one-and-done PD experience. It is a voluntary multi-week program, where a group of teachers from across the district participate in collaborative whole-group sessions and one-on-one or small-group coaching meetings. Spacing the sessions out is key to giving teachers time to experiment and work on their own side projects. It also provides valuable time for teachers to collaborate with one another.

## 2 Let Teachers Experience What Their Students Do

During whole-group sessions, teachers unpack the concepts and research behind our district's Learner Framework Pillars: Empowered

Learners, Knowledge Constructors, Effective Collaborators, and Creative Communicators. Teachers get firsthand experience practicing each one of these learning skills, each adapted from the ISTE Standards for Students.

In the first sessions of the program, teachers are given choices about what to read and research related to the pillars of the learner framework. They select and examine reading materials and use what they learned to collaboratively construct common definitions of the pillars. They represent these definitions visually by creating infographics in Canva, resources that the entire cohort then use as a reference throughout the EDL program.

Then, to reinforce our focus on knowledge construction and effective collaboration, teachers in the group sessions use different digital tools in the context of their own learning. This might include building their own virtual spaces in Google Slides, sharing their thinking in a Flip video, or collaboratively brainstorming on Jamboard. Closing the loop, teachers individually and collectively reflect on what worked for them as learners and how they might use a similar approach in their own classrooms.

### 3 Allow Teachers to Share Ideas with Their Peers

One part of EDL asks teachers to gather data through student surveys and empathy interviews with select students. An empathy interview allows the teacher to get a better sense of a student's experience of school. Based on what teachers learn about their class, they construct aspirational goals focused on deepening student learning. Because each teacher's class has different strengths, interests, and challenges, the focus of their aspirational goals reflects their students' unique needs. For example, one middle school science teacher crafted an aspirational goal for his students to become curators by creating collections of

artifacts that demonstrate their understanding of a unit.

Emphasizing the *digital* aspect of the program's name, we encourage and guide teachers toward considering how technology might aid in reaching the aspirational goal. During a traits and reproduction unit, the science teacher had his students use the online tool Book Creator to compile their own collection of information relevant to the claims they were investigating about what traits are passed from generation to generation and why. They used this collection to write a scientific argument and to share their research with other members of the class.

Teachers in EDL then create mini-lessons based on the changes they made in their classrooms. These "PD Snacks" are shared with colleagues through district newsletters and in staff meetings. The nuggets of learning inspire others to try out similar approaches, and teachers can reach out to the EDL participating teachers to learn more.

As a culminating event at the end of each school year, the district invites teachers who participated in the EDL cohorts to lead interactive sessions at a conference open to all district teachers. In one conference presentation, for example, the middle school science teacher mentioned earlier and his colleague led a session on Book Creator to help other teachers understand how they might use the tool in their lessons.

### 4 Provide One-on-One Coaching

Coaching sessions with one of the district's technology specialists is a last, yet very important, part of the EDL experience. Coaching is an opportunity to have productive and supportive one-on-one conversations around specific questions that teachers might have. The conversations are focused on supporting classroom exploration of new digital tools and strategies that empower students as learners. Each teacher meets with their coach three times.

Our collaborators at Stanford have been reviewing some of our coaching conversations to help us understand how coaching to support technology use works. For example, we are seeing that coaches are most effective when they fluidly alternate in a coaching session between listening and advising—empathetically hearing in detail what is going on in our teachers' classrooms, drawing ideas from teachers' own background knowledge, and generating specific new ideas for how to use technology in ways that align with ISTE standards and our district framework (Wachtel Pronovost & Lee, 2023). The coaching sessions also allow the opportunity to bridge across other instructional priorities our school district is focused on, current research, and each teacher's own classroom experiences. Said one 6th grade teacher, "The coaching was the most compelling piece. Having a collaborative thought partner and sounding board is invaluable and contributed to the most growth for me."

### Incorporating Research Best Practices

Empowered Digital Learners was developed in-house. Therefore, when we partnered with researchers from the Stanford Graduate School of Education, we were eager to ask them to help us articulate our core priorities and show us how published education research could take the program even further. The researchers confirmed that much of what we were doing was in line with current research on best practices for professional learning. But they have helped distill the "secret sauce" of EDL as having the following ingredients, which are qualities that any school who wishes to adopt a similar program can use as guidelines:

1. *Collaborative*—Teachers collaborate on projects in groups of various sizes during workshops and collaborate with their coach during one-on-one or small-group coaching sessions (Darling-Hammond et al., 2017).

2. *Learner-Centered*—Adult learners are treated like adults, while engaging in similar ways to how their K–8 students could be expected to participate (Darling-Hammond et al., 2017).

3. *Promotes Learner Agency*—Teachers select their own learning goals connected to key components of the program and determine how they incorporate the goal into their instructional practice (Desimone et al., 2002).

4. *Promotes Technology-Enhanced Learning*—Teachers utilize new and familiar digital technology to accomplish shared learning goals, rather than simply learning about how to use the digital technology (Ertmer & Ottenbreit-Leftwich, 2013).

## This program intentionally turns the page on the one-off, one-size-fits-all technology PD approach.

5. *Reflective*—Teachers reflect on their learning through group conversations and one-on-one coaching conversations (Ottenbreit-Leftwich et al., 2020)

6. *Sustained*—Teachers engage in learning and reflection over a sustained period of time, often including multiple workshops/meetings and one-on-one or small-group coaching sessions (Darling-Hammond et al., 2017).

7. *Voluntary Participation*—Teachers voluntarily apply to participate in the program and select their own learning goals based upon the objectives of the program (Bakhshaei et al., 2018).

Understanding where our program aligns with research has allowed us to better advocate for the expansion of the professional learning program into other content areas and allowed other educators to help bring similar programs to their districts.

### A Replicable Program

In the past couple of years, EDL has spread and grown in our local area. Our district has tailored the program for specific subject areas (including one for math), and our colleagues at the local

**For all our hopes that technology can be used in ways to engage and meaningfully connect to the interests and concerns of our young learners, schools often don't do enough to engage the *teachers*.**

county office of education have adopted the program for their own PD offerings as well. Citing some of the research previously mentioned, we have prepared a guidebook for others wanting to start their own EDL programs (www.caedpartners.org/resource/redwood-city-school-district-core-elements-of-an-empowered-learner-program-report-2022). EDL has improved and continues to grow and thrive. There is an old saying that we tend to teach in the same way we were taught. That's one way to explain why some traditional ways of teaching from decades back are still in use today. But by organizing PD so that teachers are empowered learners, we can provide a professional learning experience in which teachers themselves are

active learners of technology integration in new and powerful ways. We are hopeful this will help our teachers to "pay it forward" by empowering their students with technology as well. ⊖

**References**

Bakhshaei, M., Hardy, A., Francisco, A., Noakes, S., & Fusco, J. (2018). *Fostering powerful use of technology through instructional coaching*. Digital Promise.

Darling-Hammond, L., Hyler, M., & Gardner, M. (2017). *Effective teacher professional development*. Learning Policy Institute.

Desimone, L. M., Porter, A. C., Garet, M. S., Yoon, K. S., & Birman, B. F. (2002). Effects of professional development on teachers' instruction: Results from a three-year longitudinal study. *Educational Evaluation and Policy Analysis, 24*(2), 81–112.

Ertmer, P. A., & Ottenbreit-Leftwich, A. (2013). Removing obstacles to the pedagogical changes required by Jonassen's vision of authentic technology-enabled learning. *Computers & Education, 64*, 175–182.

International Society for Technology in Education. (2016). ISTE Standards•S. ISTE. https://cdn.iste.org/www-root/PDF/ISTE%20Standards-One-Sheet_Combined_09-2021_vF3.pdf

Ottenbreit-Leftwich, A., Liao, Y.-C., Karlin, M., Lu, Y.-H., Ding, A.-C. E., & Guo, M. (2020). Year-long implementation of a research-based technology integration professional development coaching model in an elementary school. *Journal of Digital Learning in Teacher Education, 36*(4), 206–220.

Wachtel Pronovost, R., & Lee, V. R. (2023). Discourse moves and specialized forms of knowledge in technology integration coaching conversations. Paper presented at the 2023 Annual Meeting of the American Educational Research Association, Chicago, IL.

## Reflect & Discuss

What type of tech-integration PD would be most helpful to you and/or your school? What about this model is most useful or replicable?

Where does PD on edtech most often fail? Why?

What would a "PD Snack" look like for you? Could you create something similar to share with colleagues?

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# Interoperability:
# The Key to Effective Tech-Supported Learning

*When systems are freed of access and compatibility issues, teaching and learning can go deeper.*

**Matt Hiefield**

Last year toward the end of the semester, I was helping a student in an after-school homework club and asked him how he was doing in his classes. Alejandro told me he was receiving a B in history and a C in math, but that he really didn't have even a good guess about his grades in his four other classes.

I gave him an incredulous glance and asked him to show me his district gradebook and his learning management system (LMS) account. Alejandro opened up his Chromebook and navigated to both his district gradebook and LMS account. Sure enough, we could see all his assignments and even teacher feedback in the LMS, but the final grade function was turned off and individual assignment grades from the LMS did not transfer seamlessly to the district gradebook. When I dug deeper, it appeared that Alejandro's history and math teachers had taken the extra step of entering assignment scores and final grades in *both* the LMS and the district gradebook, an onerous task when teachers have more than 170 students.

## What Is Interoperability—And Why Is It Important?

So, why is Alejandro's experience of not being able to see exactly how he's doing important? Because not knowing how you're doing in a class makes it difficult to know how to improve—and

one reason students in some schools can't see how they're doing is the lack of interoperability of tech systems within those schools. That's something school leaders should be able to change. (We could, of course, blame teachers for not double-entering all their grades, but that wouldn't be fair or constructive.)

Interoperability—the ability of different systems to communicate with each other—affects both teacher efficiency and student learning. Technology, when integrated seamlessly, should make teaching and learning resources easier to access for both teachers and students. When it doesn't, everyone suffers.

> **Access challenges should not be another thing that pushes students away from learning, collaboration, creation, and everything else that a thoughtfully implemented set of edtech tools can offer.**

When different learning and gradebook systems can communicate with one another, it reduces the amount of time and effort educators need to spend on administrative tasks; this frees up more time for educators to focus on student learning, which can help improve outcomes. And when learning systems in a school can communicate, students can easily see how they're doing in all their classes and gain a better understanding of their progress.

Another key interoperability issue relates to how students experience learning when they are required to use multiple learning websites and platforms. Sometimes, educators find a great website that requires students to create a user account. That might seem like a simple task. But having students click on a user agreement and provide personal information can be problematic at best and illegal at worst.

The bigger problem, though, is the hurdle students encounter from creating an increasing

number of logins and passwords in order to access learning resources. Perhaps one extra username and password isn't overly burdensome, but multiply that by the number of teachers each student has, and it can quickly become overwhelming—and make learning difficult.

Yes, many students can navigate multiple passwords, but creating barriers for our most vulnerable students who may have already experienced frustrations with technology is indefensible. Access challenges should not be another thing that pushes students away from learning, collaboration, creation, and everything else that a thoughtfully implemented set of edtech tools can offer.

## Vetting for Seamless Integration

There is no easy answer to resolving existing interoperability challenges; they often require time, effort, and money to fix. The best course of action is to address interoperability of district systems *before* software is purchased. As Ben Franklin put it, "An ounce of prevention is worth a pound of cure."

The good news is that districts are increasingly adopting vetting processes for edtech programs that include consideration for *rostering*. This means that new apps and sites are accepted into the learning environment only if they can be accessed seamlessly when the student logs on using their student account. This single sign-on approach makes navigating between tools easier and allows students to focus on learning rather than access. With this approach, teachers who find an application or education materials platform that they want to purchase and use need to start a conversation with their IT department. They should determine whether the resource in question can be incorporated into the LMS in a way that maintains interoperability and, crucially, respects student privacy.

In addition to a single sign-on environment, districts need to make sure that applications can work seamlessly together. How do applications work within the LMS, and if grading is done

online, where are grades entered and where do students see feedback? These types of integration and compatibility questions should be asked near the start of the vetting process, not at the end.

A couple key strategies can help with this process. First, a vendor should be willing to share names and contacts of districts who are currently using their application. Calling current users and asking for their perceptions of the benefits and challenges of the system, as well as specific things you're wondering about, can be invaluable. Second, vendors should allow a trial period to see if the software is truly compatible with your school or district's other systems, such as electronic gradebooks. It might be that your IT department has enough background to make the initial judgement, but doing an actual integration test before purchasing can save a lot of headaches in the future.

**A Question of Equity**

As for Alejandro, the student in the after-school homework club, we were able to contact his teachers to ask for clarification on how he was doing in class and where he needed to focus. But Alejandro might be the exception to the rule. He was lucky enough to find out about the after-school homework help in the library, he had the motivation to come after a long day, and he had the free time after school to devote to this and the wherewithal to figure out transportation home.

Many students aren't as lucky and are stymied by the lack of interoperability of tech-based systems in schools. Improving interoperability is thus an equity issue. Addressing these challenges will reduce administrative burdens on educators, increase transparency, improve collaboration, and ensure that all students have access to the same deeper-learning resources and opportunities. ❸

*Editor's note*: This article was originally published, in a different form, on the ISTE Blog.

**Technology should make teaching and learning easier for both teachers and students. When it doesn't, everyone suffers.**

**Matt Hiefield** has 25 years of experience teaching high school social studies in the Beaverton (Oregon) School District and has been a teacher on special assignment for curriculum adoption, technology integration, and digital equity initiatives. He works for the Oregon Department of Education as a digital instructional materials coordinator, helping districts evaluate digital instructional material platforms.

# Students Struggle

As school leaders, we often hear about challenges that our educators and staff face with technology—particularly with implementing new tools, troubleshooting technology, and figuring out best practices to use edtech in their classrooms. But we can forget to consider the challenges, experiences, and frustrations that our *students* face with technology.

Depending on grade level, familiarity with technology, and academic subject, students, too, are at varying levels of comfort using devices and platforms. Unfortunately, this can also mean that students are frustrated with the ways that we address technology as educators and school leaders. They enter our schools with a variety of experiences with technology. You may have students that lack

# with Tech, Too

*Don't assume your students can just "figure it out"
when introducing a new technology to the classroom.*

**Victoria Thompson**

internet access and have very limited experience with technology, and you may have students with multiple devices and unlimited screen time. You may have students who use technology to complete academic tasks, explore new and difficult concepts, learn more about what they're interested in, and connect with their peers. And you may have students who only use technology for academic purposes.

Educators need to take all this into account. Just as we would not assume that students have prior knowledge of any subject we are teaching, we cannot assume they have knowledge of and experience with technology. So we cannot offer up a video platform to students and essentially say, "Figure it out." I wouldn't put any piece of technology in front of anyone without first experimenting with it myself, because I not only want to know how the technology works, but also how I can best provide support to students if they have questions about using it. If I don't know, my students will feel lost or frustrated. They may come to me with questions that I can't answer. Worst case of all, they may get so overwhelmed with the tool, or the prospect of asking questions about how to use the tool, that they just give up.

## The Struggle Is Real

I recently observed a group of high school students who were expected to complete a 15-minute video project for a school showcase of student learning— essentially a night where they invited their families and peers to see various projects, activities, and videos that they had created to show what they had learned

throughout the year. The students had the opportunity to submit the videos to a districtwide contest for a chance to win a local scholarship for college, given by a business in the area. So the stakes were high, and the students were very excited.

The educator in charge of the project assumed that since the students had experience watching videos on platforms like YouTube and TikTok, they would be able to jump right into making and editing the videos. That was not the case. Although the students *watched* videos, and at times created small one-minute videos to share with their friends, they did not have the skillset to create a 15-minute piece of media that was going to be viewed, graded, and perhaps judged on a much larger scale.

The educator provided no structure for how the videos should be created and submitted, and very little support. In fact, the educator later admitted to me that they did not do research on the video platform before giving it to the students, so they couldn't answer the questions students had as they were attempting to work on the project. It wasn't that the educator didn't have the time (as is sometimes the case) to do research on the platform; the educator thought that the students would just be able to handle it. But the students were confused and, frankly, angry about the process.

The project did get completed—but not without challenges and frustrations that could have been avoided with even a little bit of planning and preparation.

Teachers need to be supported in their technology use in the classroom, but in order to make sure that

support is effective, we must first understand some of the challenges our students are likely to encounter with technology. When we address some roots of the challenges, we can find ways to problem solve as a school community.

### They Don't Know It All

Below are four main technology-related challenges for students I have seen in my work with schools, along with suggestions for how teachers and school leaders can help overcome them.

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**1** *Teachers assume all students are "digital natives" and may not give enough scaffolding and support for new technology tools.*

I was a kid when landlines and dial-up internet still existed at work and school. Then technology advanced rapidly with smart phones and other devices when I was in high school. I was labeled a "digital native" because I came of age during a large technology revolution of touchscreens and mobile devices, even though I'm still learning new things about technology every single day. The same is true for our students. Just because a student grows up surrounded by various pieces of technology doesn't mean that they automatically know how to *use* any technology—especially if the technology is new to them. Students still need scaffolding, support, and time to experiment with technology tools to use them to showcase their learning.

This will look different depending on school environment, devices, and platforms that may be available, a student's comfort level with technology, and what the technology is being used for (among other things). But regardless, students need assistance with planning, problem solving, and creating with technology.

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**2** *Students spend a lot of their time online, which can lead to technology burnout.*

Students can experience "technology burnout," the same way that adults sometimes

struggle with being on devices for a long time. I once observed a grade level where, for the full seven hours of in-person schooling, every teacher used the *same* educational technology platform to teach their lessons, have students work collaboratively with their peers, and administer summative assessments/exit checks. Students were on their computers from the moment they entered each classroom to the moment they exited each classroom. By the middle of the day, the students were burnt out. They had had no variety and were bored from using the same platform day in and day out.

I suggested that the team examine other platforms that could be used to deliver the content and also to limit the use of that specific platform to one period per class per week. My recommendation was not necessarily to use less technology, but rather to be more varied with the way teachers used it to deliver content, create assignments, and have students complete assignments. Student engagement in that grade level immediately went up, and students reported being happier with the new variety in tech tools.

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**3** *Teachers aren't providing enough robust instruction with technology.*

Because students have spent more of their time online both in and out of school, they expect to work *with* the technology, not just passively use it. I have friends whose children say they prefer virtual school or homeschooling because they feel the delivery of the content in their in-person school seems nearly identical to what they were doing when they were virtual—they log in every day, they have initial check-in time with their teachers, then they go on a learning management

system to complete their assignments and turn everything in online. There seems to be very little collaboration with their peers, very little interaction with their teachers, and no opportunities for students to be creative.

That was very unfortunate to hear, and it's absolutely not the way we want to use technology in our school communities. Technology should enhance learning and collaboration and be used for things like project creation with multimedia platforms, essay writing, and social-emotional check-ins. When we move past the more shallow ways of using tech and toward deeper creation, students can really see the opportunities that technology provides for deepening their learning experiences.

**4** *Students are eager to use technology in innovative ways to showcase their learning, but are sometimes given limited opportunities to do so.*

"Showcase" is the most important piece here; when students can use technology to demonstrate what they've done and create new learning experiences for themselves, we've transformed it to define and demonstrate learning. Traditional ways to showcase learning (such as trifolds, poster boards, and science fair projects) can seem outdated in the context of today's technology. Additionally, learning showcases are often regulated to certain times of the year, which gives students only certain time frames to show what they've accomplished. Given more time and support to use technology creatively, students can create videos, dynamic portfolios, multimedia presentations, items with 3D printers, and more—and these tools offer more flexibility for showcasing learning more often throughout the year.

## Leadership Strategies

In light of these challenges, here are three strategies that can help school leaders take student learning to the next level by using technology.

■ *Establish yourself as a technology leader.* School leaders can shape technology use on campus so that the whole school has a consistent approach that improves outcomes for students. They can ask good questions to get to the heart of student and teacher technology needs.

Do teachers need more support with technology implementation? If so, you may need to create technology-learning communities or time during faculty meetings to address challenges. Do students want more opportunity to give anonymous feedback to their teachers? If so, you may need to lead (or find a faculty or staff member to lead) a small professional development session on using technology for feedback and insights. Do your colleagues need assistance with using technology for assessment? If so, you may need to look into which assessment tools can help your teachers assess formatively and summatively in the classroom. All of these and more can be addressed from a leadership standpoint, and technology can also help you address these points.

As a first step toward becoming a technology leader, I recommend school leaders actually *use*

**When students can use technology to demonstrate what they've done and create new learning experiences for themselves, we've transformed it to define and showcase learning.**

the technology that their educators employ in their classrooms. Yes, this might seem obvious, but many school leaders do not do this! During faculty or staff meetings, department meetings, or district meetings, find creative ways to incorporate the tools your teachers are using. An example of this may be, at the beginning of the year, using a platform like Kahoot! or Quizizz for a "back to school" game through which faculty and staff review school policies, procedures, and pertinent staff information (such as when to arrive, when school dismissal is, general behavior procedures, school dress code, and protocol for family-teacher conferences). When educators see you using what they use, it helps you build credibility among your faculty and staff, and they may feel more inclined to speak with you about how they use technology, too.

■ *Identify technology leaders within your student body and use their feedback to identify areas of strength and weakness in your school.* Students can not only help other students with technology solutions, they can also bring to light what technology usage looks like in classrooms from their perspective. Create a technology professional learning community, where students can discuss the technology they've used, what they have and haven't enjoyed, and answer questions. Incorporate their feedback

into schoolwide faculty and administrative meetings to identify areas of strength and weakness in your school regarding technology usage.

■ *Make it a mission to proactively avoid "technology burnout" in your school.* Technology usage in school communities should be intentional and purposeful, but shouldn't overwhelm people. As a leader, think about how you'd like to use technology to achieve your school community goals and put steps in place so that you can get started. Initial questions to ask include:

• How can technology support innovation at our school?

• How do I want my teachers and students to be using technology?

• How can I model best practices as an administrator?

• How often should educators be using certain tools in the classroom?

When you're tackling technology burnout, this is also a wonderful opportunity to leverage your student technology learning community. You, your faculty, and your staff may have ideas on how technology can help achieve your school's goals, but students may have different opinions. Make it a point to ask these questions directly (with student-friendly language) and receive their feedback. Once you've got their insight, you can begin to work with your educators to address strategies that can help with

technology burnout. Here are some suggestions:

• Survey faculty, staff, and students to see which technology tools they use in the classroom and at school daily, frequently (two to three times a week), or rarely (less than once a week). Which tools do students like best?

• If faculty members on the same team are consistently using the same technology tools, suggest exploring different tools.

• Make it a routine practice (at least once per quarter) for educators to observe other teachers using technology with their students. Observations can help lead to new ideas and new ways to use edtech in their own classrooms.

When we step back and take a closer look at the way our students experience and use technology and the challenges they might face, we can create support and solutions to positively impact our students and school communities. Supporting our students in the journey of technology transition is just as important as supporting our faculty and staff. 🖉

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# What's NEW?

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## Using AI Chatbots to Enhance Planning and Instruction

*Monica Burns*

With AI's influence on education growing as technology rapidly changes, teachers must be ready to adapt how they lead their classrooms. Distinguished educator and edtech consultant Monica Burns offers a quick reference guide to help teachers take advantage of the benefits of AI chatbots while managing the risks they pose to learning. This timely resource features classroom integration tips for lesson planning and differentiated instruction, prompts to try, tips on crafting assignments to ensure student work integrity, and more.

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### USING AI CHATBOTS TO ENHANCE PLANNING AND INSTRUCTION

**BY MONICA BURNS**

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**3** KEY OPPORTUNITIES

**10+** TIPS

**30+** PROMPTS AND EXAMPLES

Artificial intelligence (AI) is increasingly finding its way into our everyday lives. As teachers, we might already use AI in our daily workflow and appreciate the help of spell-check, predictive text, and the adaptive learning software used by students.

Teachers can use chatbots to design learning experiences for students and accelerate their workflow as they learn about emerging technologies. In this quick reference guide, we use the example of ChatGPT to illustrate what is possible with AI chatbot technology. You can transfer these ideas to your chatbot of choice or platforms that arrive on the scene as new technology emerges.

#### WHAT IS A CHATBOT?

A chatbot answers questions and provides information based on your submitted queries or prompts. It is a tool that requires users to know what questions to ask to get the desired output. Unlike a search engine that provides a list of resources related to a topic, chatbots generate responses to questions or prompts that are more fully formed and mimic the way a human would respond to a query or task.

ChatGPT is a chatbot developed by OpenAI and launched in the fall of 2022. To access ChatGPT, you must go to the website https://chat.openai.com/ and create an account.

#### HOW DOES A CHATBOT WORK?

After you sign into ChatGPT's website, there is a space to type in a question or prompt. This is where users enter a command or question. In a search engine like Google or Bing, you often use keywords or phrases to find information that answers your question.

In a chatbot, you can use question starters like or commands with adjectives. ChatGPT will then provide a response based on your question or prompt. For example, if you ask it to write an email, it will respond in the format of an email. Or if you ask it to make a list, it will provide bullet points in your response.

WHO  WHAT  WHEN  WHERE  LIST  CREATE  EXPLAIN  COMPARE  REWRITE

ChatGPT can take on other complex tasks like reformatting text and manipulating computer code. You can even build off previous prompts to help refine the response. For example, if the response to your query is very long, you might follow up with a prompt that says, "Shorten this to 50 words."

#### KEY TERMS

- **Artificial Intelligence (AI):** technology that performs tasks that normally only people can do, such as respond to questions, solve problems, and make decisions
- **Conversational AI:** technology where a chatbot responds to a question as if you are having a conversation between two humans
- **Generative AI:** technology that creates new content (e.g., text, audio, images) by using existing data; ChatGPT is an example of Generative AI

#### IMPORTANT NOTE

The responses given by a chatbot like ChatGPT aren't perfect and can even be inaccurate at times. You will need to review the responses and should view them as a starting point for further revisions and modifications. This form of AI can also amplify bias that is present in the data being used to generate a response. The goal of this quick reference guide is to look at the ways to save you time and accelerate your workflow, but this technology shouldn't be seen as a replacement or substitution for your professional expertise.

1

## Preorder Today!

Tech tools can ease many aspects of the writing process—but we still need to teach students the bedrock skills of writing.

# In a Brave New (Writing) World, Let's Hold on to Some Basics

**Betsy L. Woods**

I remember my first steps, as an English and writing teacher, into incorporating digital tech into teaching. In 2000, my second year of teaching, the staff in my school district got email addresses, and I remember how one teacher made the mistake of "replying all" to an email from the superintendent. The following year, I discovered that our school had one LCD projector available for checkout from the library. By fashioning a complex menagerie of cables, extension cords, and surge protectors, I could display my desktop computer screen on the pull-down projection screen for my high school English students. It was like magic.

I kept quiet about my lucky find, but at the time, most teachers had no interest in the LCD projector (or the patience to navigate the obstacle course of wires). I, however, did not hesitate to shift my instruction. After all, my classroom was equipped only with a brown chalkboard which, for unknown reasons, only tolerated a specific, ancient brand of yellow chalk. I "saved time" by no longer writing vocabulary, agendas, and due dates on the board; instead, I projected this information on a screen and added it to a class website. My students and I navigated our brave new world one click at a time. I

modeled writing and revision with emerging digital tools, helping students become real-time editors. Taking advantage of the devices on our school's new computer cart, we revised thesis statements and first drafts, displayed and critiqued original poetry, and—when questions came up—searched the internet together for answers.

Next came computer labs for students, early versions of learning management systems, discussion boards, and teacher-created "webquests." More teachers got on board in using edtech. I remember my principal sharing an

**I wondered if I wasn't spending more time teaching students how to use technology than how to write thoughtfully and critically.**

article about wikis because he thought it sounded like something I would like. I quickly fell in love with wikis, combining that tool with Crocodoc (does that ring a bell for anyone?). My creative writing students crafted collaborative multi-modal stories on wikis, while Crocodoc allowed my Honors English students to peer edit in a paperless environment for the first time. Such early collaborative models quickly made way for Google Docs, Zoom, and the Chromebooks that dot our learning landscapes today.

### A Tug of War: The Thrill of Tech vs. the Basics

I look back now at my early efforts in using technology and see charming lesson experiments and more than a few miscalculations. More than once, I allowed my fascination with technology to eclipse the focus of my English lessons. As time went on, I became less enchanted by new tech programs; as much as I missed the excitement of those early days of education's technological revolution, I longed for a return to direct engagement with content. I wondered if I wasn't spending more time teaching how to use technology than how to write thoughtfully

and critically. I wanted my students to harness the power of words, not just the power of technology, and to do this, they needed a deep understanding of language. I remember looking over the sessions at the 2014 National Council of Teachers of English convention and feeling relief that tech-focused sessions were no longer dominating, and we were finally returning our focus to reading, writing, and storytelling.

I admit, I still feel a tug of war—one side of me wants to return to basics, but the other side is enamored with the next big thing and addicted to innovation and breakthrough tools. I want to be on the cusp of something monumental in education, and I want my students there with me.

But I also want to hold on to good ideas—fundamental ideas—especially about writing.

### Has Edtech *Really* Changed How People Write?

The answer to this question, it seems to me, is both yes and no. More than 30 years ago, Ernest Balajthy (1985) noted that with the advent of word processing, student writers would now be able to easily engage in revision, which had been "long advocated but ignored by both teachers and students as too mechanical and painful" (p. 25). Most writers, professional and novice, would surely agree that computers have revolutionized the process of revision. The nature of writing, however, hasn't changed, and revision can still be painful—just for different reasons. Writing is still hard and at many times solitary. Writers often depend on themselves for initial, generative ideas. And they need to cultivate a discerning eye, a thick skin, and an actual will to revise. Technology surely helps with some of this—but does it change the whole game?

Collaboration also helps the writing process. The collaborative features of the Google suite have recast the feedback loop that English teachers try to establish with student writers. We can invite more people into that loop, including classroom peers, writing center consultants and tutors. The more writers' eyes on a piece, the better. Having students engage with each other's work is easier than ever, and it is

engagement that grows writers.

For example, a high school student may learn from reading another's work that yes, you *can* begin a sentence with the word "Because." Subsequently, that student will abandon their allegiance to an old rule of writing ingrained years ago at a different developmental stage. Such seemingly small gains can occur unnoticed, as students work asynchronously on Google Docs. These gains compound as exposure increases and students continue to view each other's work through critical lenses. Collaboration engenders opportunities for growth, and often the teacher may not be involved or even aware.

In addition to collaborative opportunities made possible through shared files and real-time editing, writers can now take advantage of tools like Grammarly, predictive text, and a dictionary full of synonyms only a right-click away, tools that make writing and revision easier than ever. Robert Murphy (2019) classifies these types of tools as "narrow AI," a type of artificial intelligence that can "perform a single, specific function" (p. 2). Most writers have come to appreciate this assistance. Students can even generate citations in MLA style, Chicago style, and more simply by accessing tools built into Google Docs.

But collaborative tools and narrow artificial intelligence shortcuts aren't a replacement for the writing process—a process that begins with a germ of an idea, a turn of a phrase, a desire to communicate, and includes personal exploration and discovery. These tools are merely conveniences provided by technology, some by a type of artificial intelligence that is inherently limited and may actually fail to meet some of our expectations. They will likely continue to improve, but even if such tools were to remain only as effective as they are now, they would adequately meet most writers' (and most writing teachers') needs for helpful shortcuts. When I talk about writing with colleagues at the high school and college level, they express comfort with current tools and their uses. They appreciate predictive text in emails, but still love to laugh knowingly when the suggestions miss the mark.

## The New Challenge of AI

So it seems to me that for a moment in the third decade of this century, many writing teachers have stalled in our relationship with edtech. We've moved past the initial thrill of technology for technology's sake. We no longer rush to add the latest fad to our lessons. We want to focus on the basics and use technology to enhance, not replace, the foundations of writing. We have grown accustomed to the status quo—using narrow AI—and as tools like thumb drives and Prezis have come and gone, we've continued teaching writing.

But late last year, Daniel Herman's "The End of High School English" (2022) was published in *The Atlantic*. This vanguard piece posited that "the majority of students do not see writing as a worthwhile skill to cultivate," and that many writing tasks would be better achieved by a new generation of AI tools, ones that were stronger, better, faster. Soon after this, Elon Musk (2022) tweeted that "ChatGPT is scary good. We are not far from dangerously strong AI."

**The real danger of AI in writing instruction is that we will buy into the notion that the product is more important than the process.**

Subsequent articles, blog posts, and Twitter rants ran the gamut in response. The paradigm-shifting potential presented by ChatGPT and other generative AI platforms began to pit teacher against teacher; some saw it as a disaster, some welcomed it as a game-changing instructional resource. In a matter of days, everyone had an opinion, and many fell victim to that same Zeitgeist of divisiveness that pervades our nation, our politics, and our everyday interactions. Teachers were deemed either Luddites incapable of adjusting or foolish dreamers willing to sacrifice a bedrock of education for flights of fancy. Some found solace in the idea of returning to paper and pen, while others jumped to inform their students of new possibilities for writing.

Hearing all this, it seems to me that once again, many educators are focusing more thought on the technology used for writing than on the writing itself—or the question of how to teach young people writing skills.

The dust has now settled somewhat. Companies have rushed in to offer detection services that can tell (at least for the time being) whether a text was written by ChatGPT, students have become more aware of the nuances of AI and its problems as well as temptations, and writing teachers have begun to experiment. What remains to be seen, however, is how we will meet this moment, as teachers and students. Will we recognize the true danger of AI writing tools? In my view, that danger is not students cheating. That danger isn't a teacher

using the tool to write a first draft of a letter of recommendation due the next day, or asking AI for help with brainstorming or grammar.

The danger is that we will stop teaching the fundamentals of writing altogether, that we will buy into the argument that the product—an error-free piece of writing—is more important than the process. Honoring the writing process often involves multiple drafts, peer editing, review, and polishing, but it also involves exercising critical thinking, organization, and decision-making skills. Through this, students develop nuanced vocabularies and more complex ideas. They are also better able to articulate their thoughts and understand the writing of others. Some will even become writers.

The current situation with AI tools bears resemblance to other arguments about product over process. For example, if a math student can pass the final exam without help (this "product" showing they understand the concepts), does it matter if that student did the homework? In English Language Arts, the equivalent question has a clearer answer than in math: The process is more important than the product. The slow, deliberate nature of learning to write, revise, and write again can be difficult, even painful, but that process strengthens many important skills.

## Holding on to What We Know
Can AI alleviate some of the struggle? Probably. We need to determine which parts of the struggle are

necessary for development and which parts are simply extra work for students and teachers. We need to determine the ways AI can enhance the writing process without eliminating it, incorporating these new tools with the goal of building stronger writers and thinkers. We have work to do, but it is exciting work. Writing teachers are pioneers again, and although the path before us is not yet clear, we've been at the intersection of technology and writing before. We can hold on to what we know is true about writing while adapting to what will certainly change. ⊖

### References
Balajthy, E. (1985). Artificial intelligence and the teaching of reading and writing by computers. *Journal of Reading*, 29(1), 23–32.

Herman, D. (2022, December 9). ChatGPT will end high-school English. *The Atlantic*.

Murphy, R. F. (2019). Artificial intelligence applications to support K–12 teachers and teaching: A review of promising applications, opportunities, and challenges. RAND Corporation.

Musk, E. [@elonmusk]. (2022, December 3). ChatGPT is scary good. We are not far from dangerously strong AI. [Tweet]. Twitter. https://twitter.com/elonmusk/status/1599128577068650498

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# A Rising Priority for Edtech:
# Relationship Building in Schools
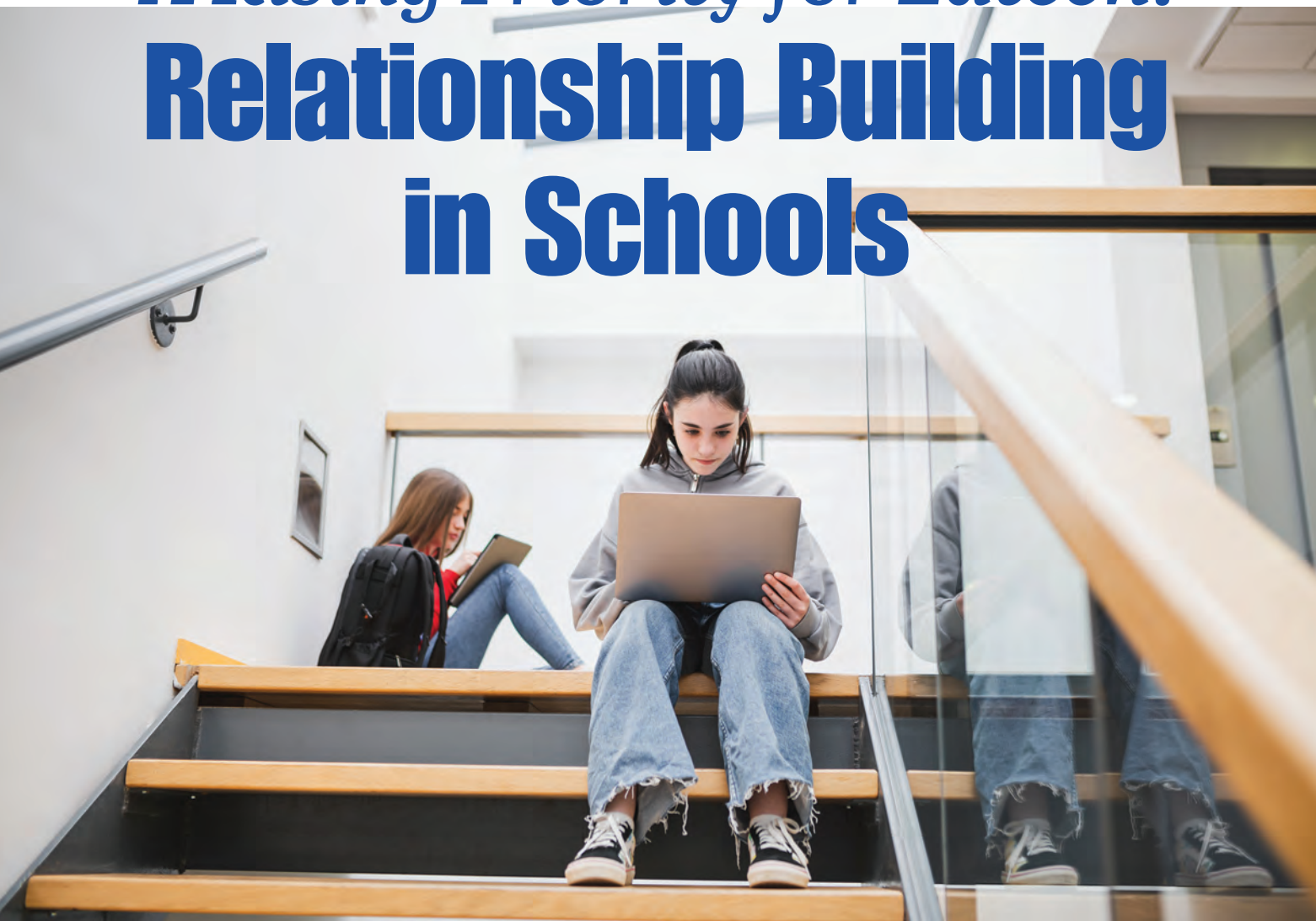
*A growing number of tools can be used by educators to support developmental relationships with students, which are key to learning.*

**Kent Pekel**

I recently attended a conference where I provided the perspective of a school district leader on a panel otherwise composed of leaders from educational technology companies. During the discussion, I was asked where I thought the edtech sector should focus its efforts in the years ahead. My response didn't focus on developing apps that help students master academic subjects or on software that improves operational efficiency, though I think both of those are good objectives. Instead, I replied that I think the edtech industry should focus on solutions that

enable and empower relationships—that take some of the friction out of making human connections to help students succeed within and beyond our schools.

The fact that I was able to say this without being met with complete surprise or disdain is notable. It's useful to remember that in preK–12 education, relationships in schools haven't always been considered a worthy focus of policy or serious investment—or even much discussion. During and after the No Child Left Behind era, educators who wanted to focus on relationships

> **Relationships in schools haven't always been considered a worthy focus of policy or serious investment—or even much discussion. But that is changing.**

faced major pressure from federal and state policies and local stakeholders to focus on more strictly academic strategies—initiatives narrowly designed to produce gains on standardized tests and improve district and state accountability rankings.

Fast forward to today, however, and the challenge is no longer convincing people that relationships in schools matter. If that debate was not settled before the COVID-19 pandemic, it was conclusively decided by the lived experience of millions of students and teachers who could not connect with each other in person during lengthy quarantines, and by studies that have demonstrated the negative impact distance learning had on students' achievement. The latest results from the National Assessment of Educational Progress, for example, report significant declines in math and reading between 2019 and 2022,

losses largely attributed to the disruptions caused by the pandemic. Additionally, the inaugural State of the Student report by the Center on Reinventing Public Education shows widespread harm to student mental health during the pandemic, but also notes that well-being concerns have been on the rise prior to 2020, as have rising levels of student disengagement in classrooms (CRPE, 2022). In this context, it has become increasingly clear that the relational aspects of schooling are not separate from academic achievement.

For many schools, the focus has shifted toward making it possible to build strong relationships with all students amidst the many other challenges and time pressures that educators face. This shift doesn't mean that academics rank lower in our priority focus—nor should they, given the data we are seeing post-pandemic. However, we have begun to recognize in earnest that helping students perform at their best begins with the foundational elements of a positive school culture and strong student-teacher relationships. Somewhat paradoxically, our challenge is to make relationship building more efficient and "at scale" while also maintaining the authenticity of those relationships.

### Researching Relationships

My career trajectory has provided me with a unique understanding of the importance of this problem, as well as the beginnings to some solutions to it. I began my career as a high school social studies teacher in the 1990s, when—like almost every teacher—I learned through experience that the personal connections I made with students had powerful effects on their effort and learning in my class.

Through a somewhat circuitous turn of events, I left the classroom earlier than I planned to and eventually found myself working in the world of research. I worked first at the University of Minnesota and then as president and CEO of Search Institute, an applied research organization that has conducted pioneering

studies on the developmental assets and relationships that young people need in order to be and become their best selves.

During the decade I spent at Search Institute, my colleagues and I conducted studies showing that when young people experience what we described as a *developmental relationship* with teachers, out-of-school-time program staff, and parents and other caregivers, their social-emotional competencies and academic outcomes, including motivation to learn and grades, are significantly stronger (Scales, Pekel, & Houltberg, 2022). Developmental relationships are the close connections through which young people are able to discover who they are, cultivate abilities to shape their own lives, and learn how to engage with and contribute to the world around them. In a longitudinal study of middle and high school students, we also found that when students' experience of developmental relationships increases over the course of the school year, they have better educational outcomes than do students whose relationships with teachers stay about the same or get worse (Scales et al., 2019).

So when I left Search Institute in 2021 to become superintendent of schools in Rochester, Minnesota, I knew that I wanted to make building relationships a major aspect of our district's work. I shared the research that we conducted at Search Institute with teachers, principals, and other educators in the district during the first days of my tenure. Many of my new colleagues found the Developmental Relationships Framework (Search Institute, 2020) that had emerged from the Search Institute's research to be a helpful resource for identifying specific actions—such as making students feel known and valued and guiding students through challenging situations—that can lead to transformative relationships. However, we were still lacking a practical tool to help teachers implement the 20 actions included in the framework amidst the many other responsibilities they have both inside and outside the classroom.

The solution came in the form of technology, which—in the right conditions—can offer new ways to enhance human connection. In our quest to help teachers build better relationships, we began using Along, a conversation-building platform based on the research conducted at Search Institute and findings from other scholars and organizations. Along provides a safe and convenient space for teachers to send regular messages to students that are designed to help teacher and student get to know each other better. Using Along, educators can access research-based reflective questions crafted to help build teacher-student connections in a quick and meaningful manner, and students can respond back through video, audio, or text. Additional classroom lessons and activities

> **Somewhat paradoxically, our challenge is to make relationship-building more efficient and "at scale" while also maintaining the authenticity of those relationships.**

within Along further reinforce the connections that are made via the technology.

We piloted Along in Rochester Public Schools during the 2021–2022 school year. The pilot took place over 3 months in a variety of elementary, middle, and high schools in our district. Teachers had the option to try Along by regularly using it to ask their students reflection questions within the platform. The results were promising. We found that after using Along, teachers and students felt more connected with each other, with 83 percent of students saying that Along helped their teacher get to know them and 81 percent of teachers saying that the platform helped them to be more open with their students. As we implement our new strategic plan for the district, we will be focusing on ways to evaluate how relationship building efforts are impacting student learning.

Of course, Along is not the only example of how technology can enable better relationships. At the conference where I participated on the edtech panel, I encountered PowerMyLearning, which reinforces students' skills in math and language arts through engaging play-based activities that create closer connections between students, teachers, and parents and other caregivers. I also met the developer of Short Answer, a free platform that enables students to work together to respond to teachers' questions and provide feedback on each other's responses, in the process strengthening relationships among students in the class. Finally, I met the leader of Intellispark, which enables educators to communicate with each other and with students to personalize students' educational experience in multiple ways.

Many different types of strategies and resources will be required to make building developmental relationships a reality for all students in our schools and classrooms. Some of those strategies will utilize technology; others will be activities and practices that educators can integrate into curriculum and instruction and other school programming. Whatever tools we use, it is time to move beyond talking about the power of relationships to harnessing the power of technology to spark and strengthen the human connections that all young people need to thrive. @

### References

Center for Reinventing Public Education. (2022) The state of the American student: Fall 2022.

Scales, P. C., Pekel, K., & Houltberg, B. J. (2022). Developmental relationships and student academic motivation: Current research and future findings. In A.L. Reschly & S.L. Christenson (Ed.), *Handbook of Research on Student Engagement* (pp. 257–283). Springer.

Scales, P. C., Pekel, K., Sethi, J., Chamberlain, R., & Van Boekel, M. (2019). Academic year changes in student-teacher developmental relationships and their linkage to middle and high school students' motivation: A mixed methods study. *The Journal of Early Adolescence*, 40(4).

Search Institute (2020). "Developmental relationships framework." Retrieved from https://searchinstitute.org/resources-hub/developmental-relationships-framework

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We don't yet know how to fully harness the transformative power of AI to improve teaching and learning. And that is OK. What leaders can do is create conditions that support transformational ways of thinking about how the innovation can be utilized.

*—Tony Frontier, p. 12*

*Introducing a digital tool into the learning experience can help students learn more, learn different things, and change how they think about themselves and the world around them.*

*—Clare Kilbane and Natalie B. Milman, p. 20*

Technology should make teaching and learning easier for both teachers and students. When it doesn't, everyone suffers.

*—Matt Hiefield, p. 47*