ELEMENTS Ed

RESEARCH + INSIGHTS + STRATEGIES

When Schools *Go* Online

The Problems and the Promise

ADAPTING TO THE NEW ABNORMAL

FOSTERING SOCIAL CONNECTIONS + WELL-BEING

ENGAGING THE YOUNGEST LEARNERS

SUPPORTING NEURODIVERSE STUDENTS

ISSUE 01 • FALL 2022

“**Books will soon be obsolete**
in the public schools.
Scholars will be **instructed through the eye**.
It is possible to teach every branch
of human knowledge
with the **motion picture**.
Our school system will be completely changed
inside of **ten years**.”

Thomas Edison *Inventor and Entrepreneur*

ELEMENTS *from the* PAST

by Jill Butler

B. F. Skinner's Teaching Machine, c. 1957.

Contents

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Letter from the Editor

In 2019, a small group at Avenues The World School in New York City began discussing the creation of a publication that spoke to the needs of educational designers and planners, school administrators, and classroom teachers. We imagined a thoughtful source of plainspoken prose that examined issues of maximum practical value to educators. We knew most educators didn't have a lot of time to read formal research; but we thought that by being clear and practical, with articles based on solid research, some might want to squeeze a new voice into their busy schedules.

In March of 2020, the world's school systems faced the greatest dislocation any living educator has experienced. The COVID-19 pandemic closed classrooms around the world and suddenly forced millions of students and their faculty and families into the unfamiliar realm of remote learning. And while this experience was disruptive to our plans, it highlighted the need for a new kind of publication. In a world facing the disruption of climate change, polarization, war, and misinformation, global-scale problems will increasingly impact our classrooms. Traditional educational practices will fail in the face of the many challenges we face on this crowded planet. Educators will need a thoughtful voice that seeks to respond to global challenges to education with research, insights, and strategies for the future.

While humans have the capability to look far into the future and anticipate conditions that may affect us positively or adversely, we are less successful in making the hard decisions to put in place plans that may ease the burden of what the future will bring. The COVID-19 pandemic demonstrates this clearly. Since 1918 scientists have predicted another world-wide pandemic. Yet when the 2020 pandemic arrived, we were largely unprepared. The move to remote learning in countries around the globe demonstrated our lack of preparedness. Despite the widespread prevalence of the internet and personal computing devices, many children had difficulty connecting to online lessons, and many school systems had difficulty delivering lessons that kept their students learning at traditional rates.

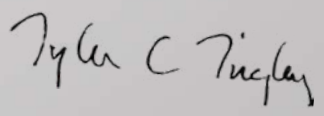
The COVID-19 pandemic perfectly illustrates how a global challenge may impact a nation's—or the world's—education systems so they begin to fail in their mission. We already have data showing that the cumulative effect of the pandemic is visible in a measurable deficit in the mathematics and verbal scores of the world's children. Much as an earthquake can create a ravine that lasts for millennia, the educational impact of the pandemic will mark a generation of students, perhaps for their entire lives.

If we had heeded the warnings of doctors and scientists for the last century, we might have had a better plan. But we paid no attention. However, in the wake of switching to remote learning overnight, we should look to learn all we can from our mistakes and our successes in implementing online schooling. It is still early—the pandemic has not fully ended—but it is not too early to begin to ask the question, what have we learned about remote learning from the experience of the COVID-19 pandemic?

This is the theme of this first issue of ***ElementsEd: Research + Insights + Strategies***. In considering this theme, we have asked our authors to explore what educational research tells us about the conditions that maximize the productivity of remote learning. Other authors consider insights the pandemic has sparked into how to view remote learning as a viable educational alternative for school systems. And amidst the haste and confusion COVID-19 unleashed in schools, our authors look for strategies to improve the delivery of remote learning in the years to come.

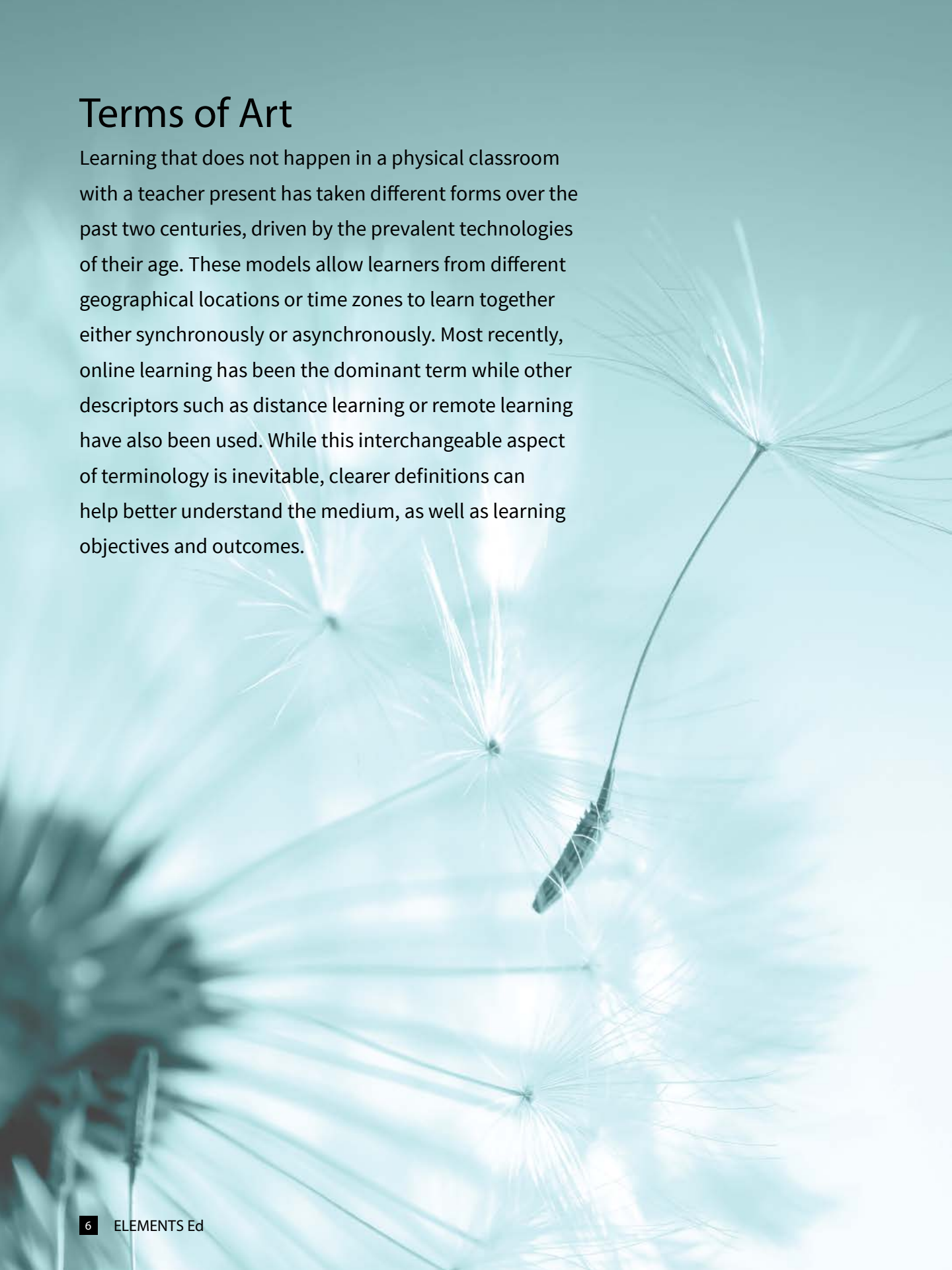
Future issues of ***ElementsEd*** will examine other global problems and their possible impact on education. We will announce the theme for upcoming issues. Educators interested in contributing to an issue of ***ElementsEd*** should consult our website: press.avenues.org/elements-ed.

The last two academic years have been a stressful challenge for everyone involved in education. Nevertheless, the speed with which educators in the U.S. and around the world have forgone centuries of academic traditions to improvise and accommodate education during a pandemic speaks to the creativity and commitment of educators everywhere. With this creative dedication as a backdrop, we bring you the first issue of ***ElementsEd: Research + Insights + Strategies***.



Terms of Art

Learning that does not happen in a physical classroom with a teacher present has taken different forms over the past two centuries, driven by the prevalent technologies of their age. These models allow learners from different geographical locations or time zones to learn together either synchronously or asynchronously. Most recently, online learning has been the dominant term while other descriptors such as distance learning or remote learning have also been used. While this interchangeable aspect of terminology is inevitable, clearer definitions can help better understand the medium, as well as learning objectives and outcomes.



Asynchronous v. Synchronous Learning

The distinction between the way interaction takes place in online learning. In asynchronous learning, communication exchanges occur in elapsed time between two or more people. Examples are email, online discussion forums, message boards, blogs, podcasts, etc. In synchronous learning, participants interact in real time.

Blended Learning

A formal education program in which a student learns partly through online learning with some student control over time, place, path, and pace and in part at a supervised brick-and-mortar location away from home. Modalities along each student's learning path within a course or subject are connected to provide an integrated learning experience.

Computer-Assisted Instruction (CAI)

The use of educational software to enhance the mastering of educational concepts or standards without the involvement of a teacher.

Distance Learning

Learning that happens when students and teachers are not present in a physical classroom space. Learning is asynchronous and conducted via messages exchanged between teachers and students. Correspondence courses were an early example of distance learning.

Emergency Response Teaching / Emergency Remote Learning

Temporary shift of instructional delivery to an alternate delivery mode due to a crisis. The goal is to mitigate the impact of the event on learners.

Learning Management Systems (LMS)

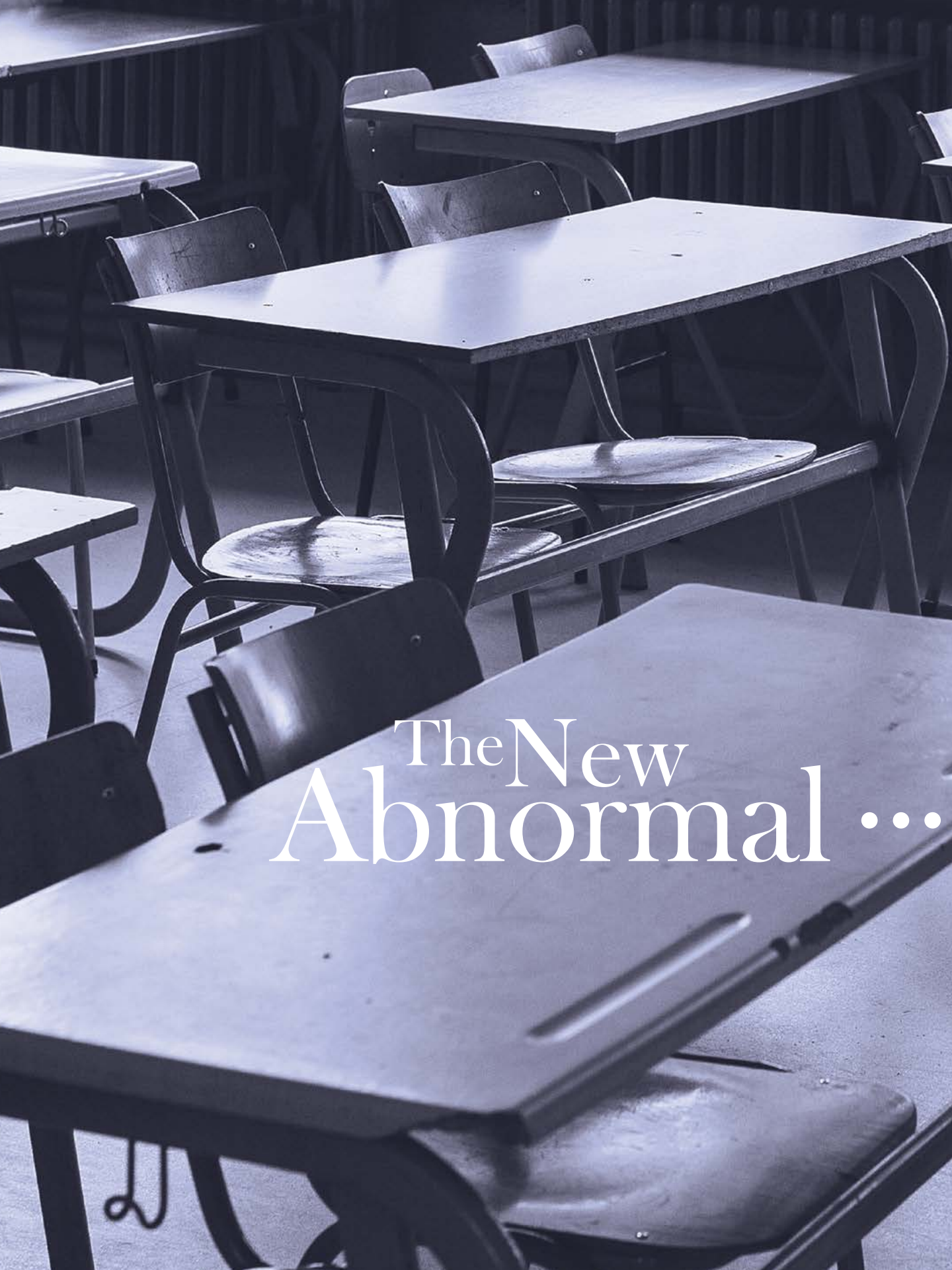
Technology platforms through which students access online courses. An LMS includes software for creating and editing course content, communication tools, assessment tools, and other features for managing the course.

Online Learning / Virtual Learning Environment / Online School

A form of remote learning where instruction and content are delivered primarily via internet.

Remote Learning

Learning that happens when students and teachers are not present in a physical classroom space. Learning can happen synchronously or asynchronously via a multitude of educational technologies such as video meetings, video lectures, and online discussion platforms.



The New Abnormal ...

and the

Inevitable Transition *to* Remote Learning

by **William Lidwell** and **Chris Dede**

The COVID-19 pandemic has reshaped how we live and has upended a range of industries, accelerating the decline of sectors of the economy already suffering from disruption due to climate change, globalization, and technological advance.

Place-based industries requiring customers to come to them for products and services have been the most impacted. For example, in 2019, movie theater ticket sales were at 1.23 billion tickets sold, a steady decline from their peak of 1.58 billion tickets sold in 2002. In 2020, however, ticket sales were 224 million, a collapse of more than 80 percent.[1] Similarly, visits to public libraries were already in decline by about 30 percent in the decade leading up to the pandemic. In 2020, most libraries were in lockdown or forced to restrict access, scrambling to transition their offerings toward online content.[2]

What will happen to these and similarly affected industries when the pandemic inevitably fades? Theaters and libraries closed in 1918 because of the flu and recovered as the pandemic faded, but there was no internet or streaming services back then.[3] Computer technology and the internet have matured to the point that they can often substitute for in-person experiences, and there is reason to believe many sectors of the economy are likely to be permanently transformed by the pandemic experience. Nowhere is this more apparent than in the shift to remote work.

Before the pandemic, only 6 percent of the employed worked primarily from home. In May 2020, over 30 percent of the employed worked from home due to the pandemic, close to 100 percent of the estimated share of work that could be done remotely.[4] Further, according to a 2022 Pew Research Center survey, 60 percent of workers with jobs that can be done from home say that if they have the choice, they would like to work from home most or all of the time when the pandemic is over. This is up from 54 percent who said the same in 2020. Among those who are currently working from home most or all of the time, 78 percent say they'd like to continue to do so after the pandemic, up from 64 percent in 2020.[5] And in a survey conducted by economists at Stanford University, University of Chicago, and the Instituto Tecnológico Autónomo de México, nearly a quarter of all full work days will happen at home after the pandemic ends, as opposed to 5 percent before the pandemic.[6]

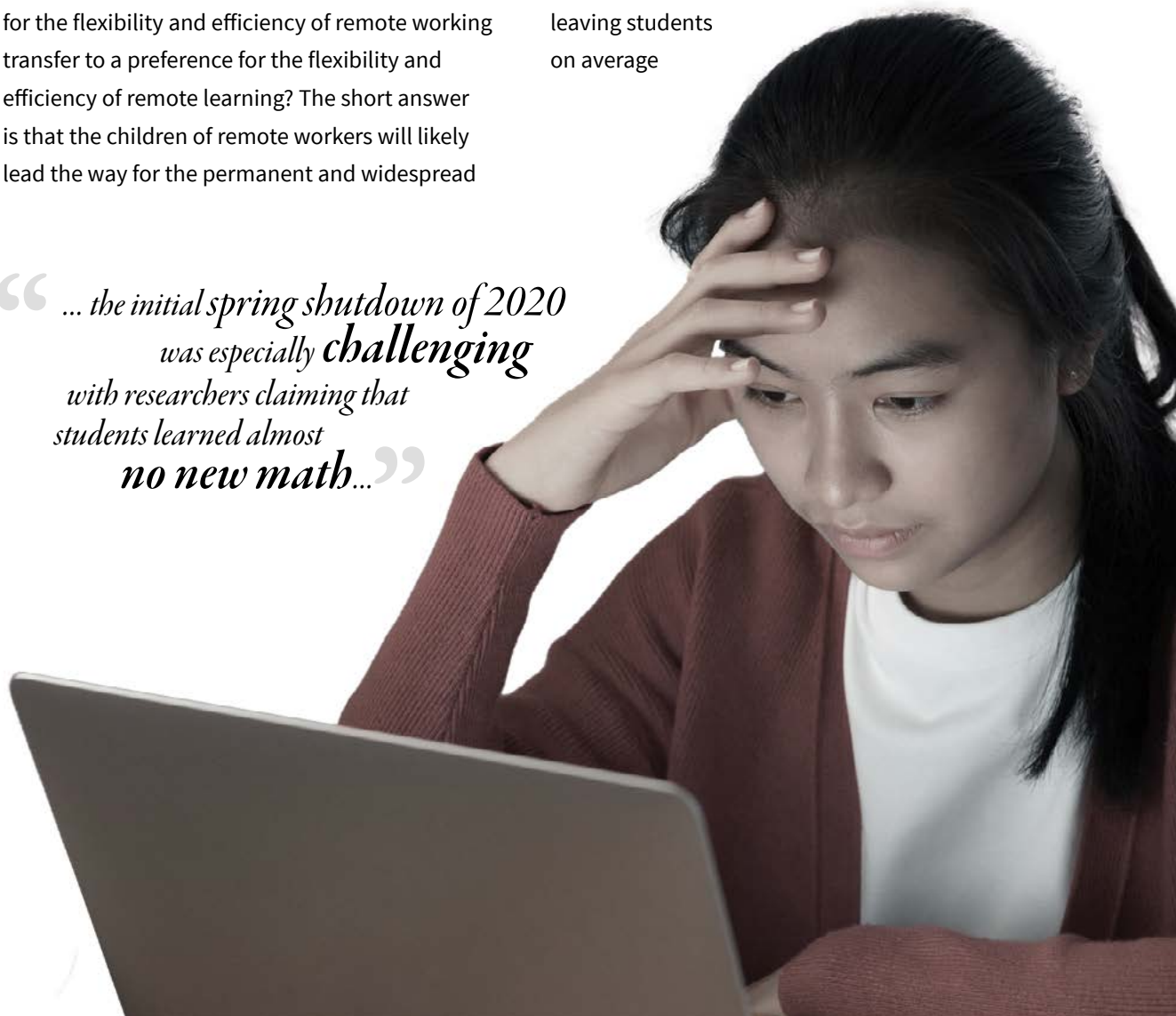
This shift in preferences for the location of work is not only redefining the occupational landscape of the American economy, it is also redefining the talent landscape of the American economy. For

decades, America's top talent disproportionately flowed to a handful of "superstar cities" such as Los Angeles, New York, San Francisco, and Washington, D.C. But no more: in the brief two-year span of the pandemic, this trend has begun to reverse. In a survey conducted by Upwork, nearly five million American workers said they have moved their home's location since 2020 because of remote work, and an additional 18.9 million more are planning to do so. Where are they moving? To areas that have a low cost of living, low crime rates, and affordable housing—away from superstar cities.[7]

Where will the children of these remote workers go to school? Will they continue to favor nearby brick-and-mortar schools, or will their preference for the flexibility and efficiency of remote working transfer to a preference for the flexibility and efficiency of remote learning? The short answer is that the children of remote workers will likely lead the way for the permanent and widespread adoption of remote and hybrid learning models. The longer answer involves discussion about the unique kinds of crises humanity will be confronting in the century ahead, as well as some re-education about the efficacy and potential of remote learning. In case you haven't heard, remote learning has a public relations problem—a problem that has been exacerbated by the negative press coverage and negative experiences of many families during the pandemic.

The Public Relations Problem

A McKinsey & Company study reports that the impact of the pandemic on K–12 student learning has been significant, leaving students on average



> "... the initial *spring shutdown of 2020* was especially ***challenging*** with researchers claiming that students learned almost ***no new math***..."

five months behind in mathematics and four months behind in reading by the end of the 2020–21 school year.[8] According to the study, the initial spring shutdown of 2020 was especially challenging, with researchers claiming students learned almost no new math content in the final months of the semester.

Although student achievement did improve in the 2020–21 school year—no doubt the result of heroic acts by teachers and administrators who adapted to effectively offer online and hybrid options—the pace of learning still fell short of normal classroom instruction. The authors provide this cautionary note about increased student success:

> *Before we celebrate the improvements in student trajectories between the initial school shutdowns and the subsequent year of learning, we should remember that these are still sobering numbers. On average, students who took the spring assessments in school are half a year behind in math, and nearly that in reading. For Black and Hispanic students, the losses are not only greater but also piled on top of historical inequities in opportunity and achievement.*

Others have been less reserved with their cautionary notes. Michael Petrilli, president of the conservative Thomas B. Fordham Institute, stated, "This is a disaster. The bottom has fallen out, and the results are as bad as you can imagine… We haven't seen this kind of academic achievement crisis in living memory."[9] The editors of Bloomberg concluded in an op-ed, "At this point, the evidence against remote learning is overwhelming… Reducing in-person class time is not just a disaster for students—it's also a betrayal of public trust."[10] Michael Strain, director of economic policy studies and Arthur F. Burns Scholar in Political Economy at the American Enterprise Institute, said, "After 21 months, remote learning has proved to be a massive failure. Its consequences have been well documented and widely discussed: learning loss, developmental setbacks, mental health issues, food insecurity and even an increase in the severity of child abuse."[11]

> "*What gets us into* ***trouble*** *is* ***not*** *what we* ***don't know,*** *but what we know* ***for sure*** *that* ***just ain't so.***"

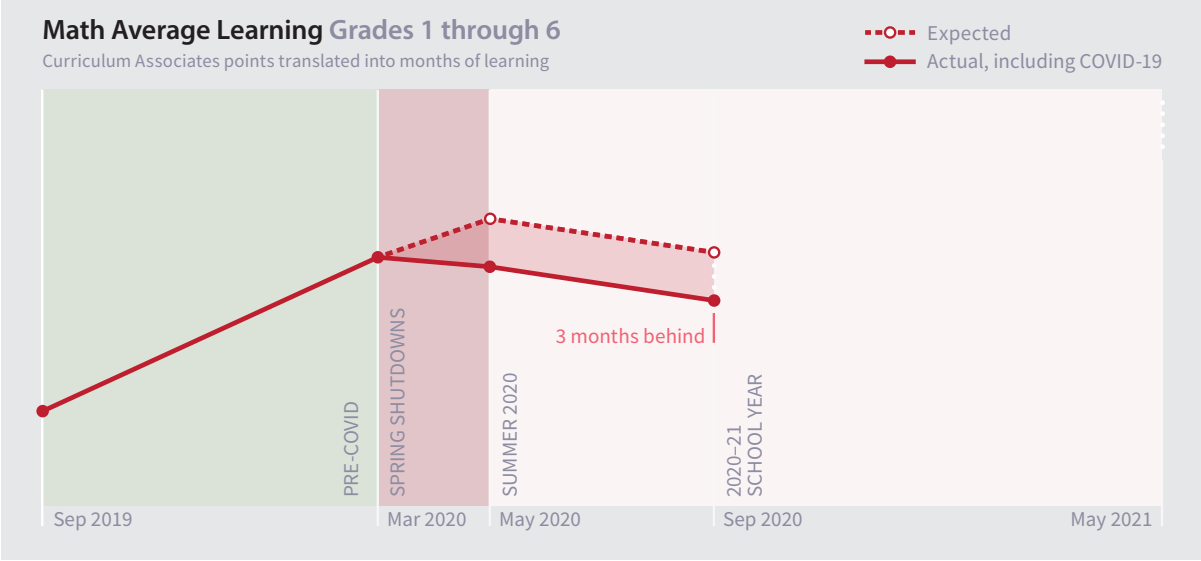
In the wake of such fevered characterizations, one could be forgiven for drawing the conclusion that remote learning is significantly and inherently inferior to classroom learning: a second- or third-rate option that should be avoided at almost any cost. We have, in fact, seen the effects of such reasoning as policymakers and politicians forced schools to open their classrooms and de-mask for the spring semester despite a holiday surge of the pandemic. In what possible world does it make sense to re-open often poorly equipped facilities where unvaccinated children congregate daily en masse during a pandemic? The answer is a world in which traditional, in-person classroom learning is

believed to be the only viable option. This reminds us of an old quotation often attributed to Mark Twain: "What gets us into trouble is not what we don't know, but what we know for sure that just ain't so." Many people seem to know for sure that in-person classroom learning is the only viable option, but the truth is that this just ain't so.

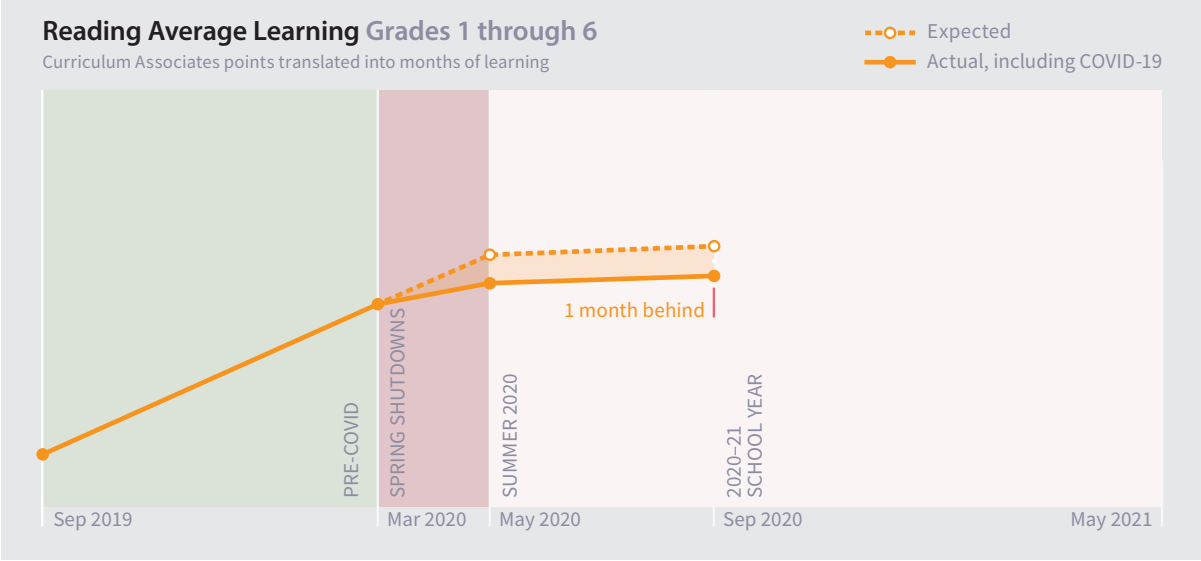
From "Get a Horse!" to "Get a Classroom!"

Let's return to the spring of 2020 and remind ourselves of the situation. We were at the beginning of a global pandemic. Entire sectors of the economy were shutting down. Both the case and death counts were on the rise. No vaccine or treatment options

The shock was especially severe in math, with students learning little, if anything, during the initial spring shutdowns.



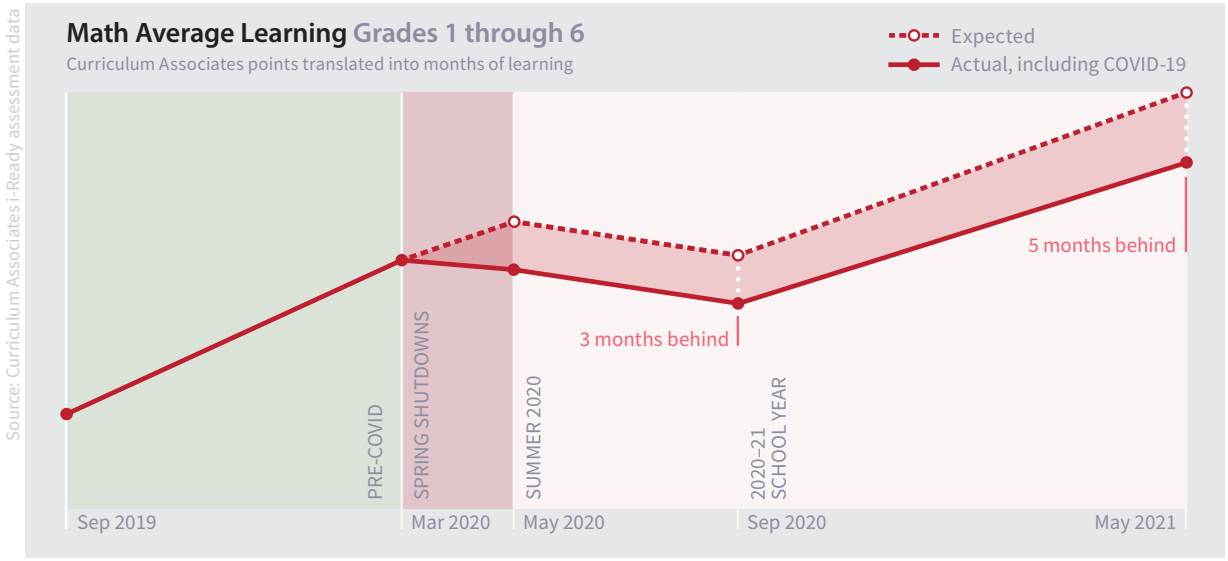
The initial shock was less severe in reading, but losses continued to build up over the 2020–21 school year.

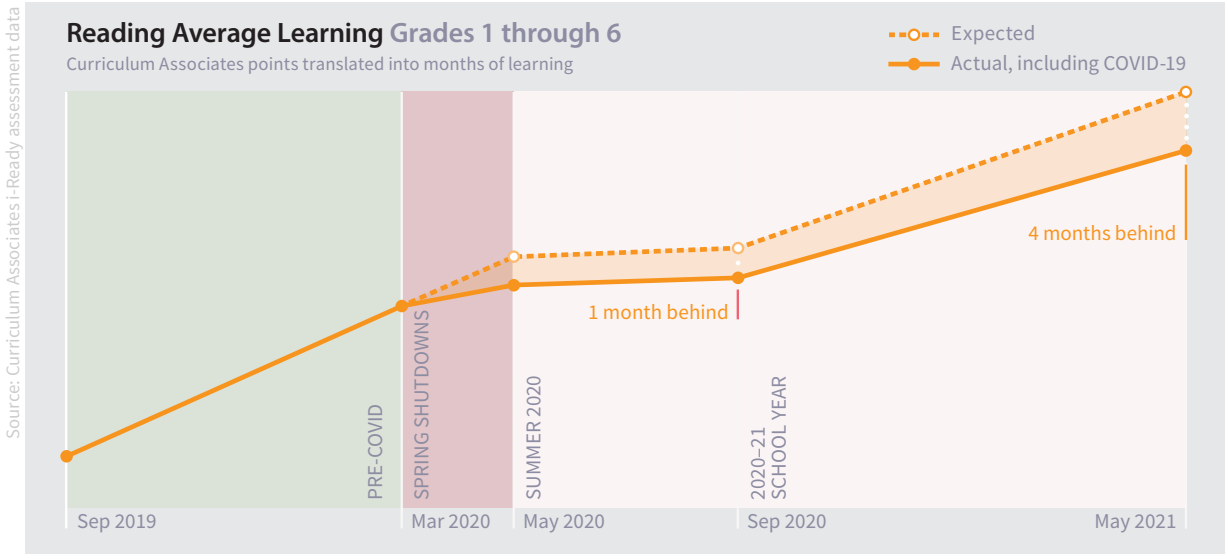


existed. Little was known about how the virus spread or what protective measures, if any, were effective. With no other safe choice, thousands of schools transitioned to online learning.

It's a simple thing to say — "transitioned to online learning" — but a much harder thing to do. Rapid systemic changes like this don't come easily: schools didn't have online curricula; teachers weren't trained or practiced in online teaching or technology; many schools lacked the technology staffing and infrastructure to support reliable remote learning; and many students lacked the at-home internet infrastructure to connect to them if they did. And then there was all the administrative and legal programming that needed to be adapted, including attendance, testing, counseling, disciplinary action, and so on, none of which existed for the online medium.

By the fall of 2020, students resumed learning online at a rate close to the pre-pandemic normal.





Given these circumstances, what quality of learning would a reasonable person expect during this period?

Terrible, of course. And that's exactly what we saw. The last three months of the 2019–20 school year looked like summer break came early in terms of academic achievement. Not surprisingly, when learning experiences are thrown together and poorly executed, learning suffers. This is just as true in a physical classroom as it is in a virtual classroom.

But critics of remote learning tend to gloss over what happened next. During the summer of 2020, educators got busy adapting curricula for online; they got busy learning and practicing how to teach online; and they got busy getting the technology issues worked out to support online. They figured out how to run their schools online, or in hybrid combinations with classroom or lab instruction. And not all schools struggled in this transition. Many schools that already used digital learning in their classrooms had little difficulty making the switch. Within a three-month period following an exhausting, demoralizing, and stressful conclusion to the previous school year, significant progress was made.[12]

Now, given these circumstances, what quality of learning would a reasonable person expect for 2020–21? Again, terrible. After all, what could possibly be accomplished in just three short months? And this is, in fact, what the headlines reported, setting the narrative that remote learning was a necessary compromise in learning quality due to the pandemic. But the trend lines tell a different story.

When the school year began online in the fall of 2020, students resumed learning at a rate that is very close to the baseline vis-à-vis the pre-pandemic normal, reversing the flat or negative achievement of just a few months before.[13] It is true that students were carrying the learning deficit from the previous spring and still were not on pace with normal rates of growth, but to go from a flat or negative trend to a trend that is positive and just shy of normal in three months—amidst an ongoing pandemic, no less—is an astonishing achievement. If this kind of

performance improvement could be realized with just three months of preparation, imagine what could be achieved in a few years.

This is where so many academics and pundits have missed the educational forest for the standardized-testing trees. Rather than recognizing the potential for remote learning at scale—as a viable non-pandemic alternative to traditional school programming, rather than as an emergency-response backup—they instead focus on the spring 2020 deficit and assume the performance of remote learning in 2020–21 peaked, resulting in an ever-widening gap.

It is a common fallacy in the history of innovation to compare the first generation of a new product or service to a well-established product or service and then declare the first-generation offering as hopeless when it fails to match established performance expectations. When Henry Ford drove the first protocar, called a Quadricycle, on the streets of Detroit, he was ridiculed as a “loafer” and told to “Get a horse!” This early model car was slow and clunky and loud. How could it ever compete with the horse?

For most schools, the experience with remote learning was their Quadricycle: slow and clunky and loud. And, true to history, the response has effectively been, “Get a classroom!”

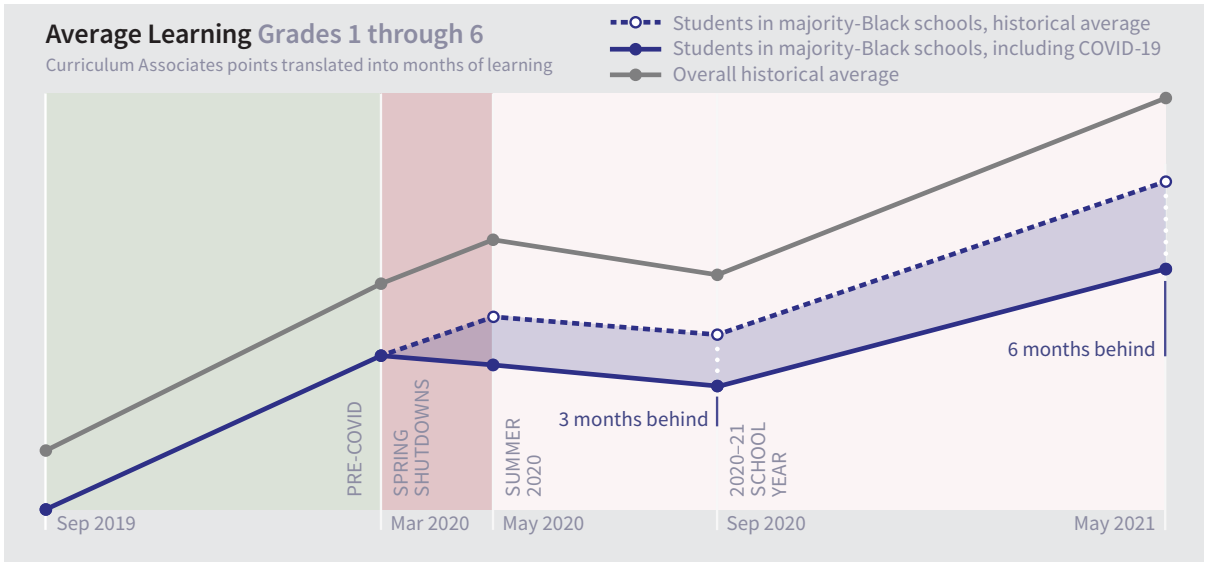
The only proper way to evaluate the long-term potential

of an innovation is to track changes in performance across generations of its development—i.e., the difference in performance between the first generation and second generation and third generation, etc.—and then compare the progress over time against established performance benchmarks. In the case of the car, it took less than ten years to reach speeds in excess of a horse. Shouts of "Get a horse!" were initially because cars were too slow, but soon the shouts were because they were too fast. In fact, laws were passed to limit speeds to 15 mph, about the speed of a horse-drawn carriage. From "loafer" to "speeder," the car had become so disliked that farmers threatened to open fire on "autoists" who refused to slow down.

The pandemic has given us a large-scale, natural experiment, letting us compare a nationwide twelve-month transition to remote learning against two hundred years of conventional schooling. Contrary to the headlines, online learning came out better than expected. But it turns out we didn't really need this experiment to know the potential of remote learning. The evidence has long suggested that remote learning can match or exceed the quality of classroom learning for most students. This is perhaps the worst-kept secret in educational technology research, often spoken about in hushed tones for fear of alienating the educational establishment.

Research Evidence

Consider the research on homeschooled children. About 2.5 million (or 3 to 4 percent of school-age children) were homeschooled in the U.S. prior to the pandemic. Research on the academic performance of these children generally finds they score higher on tests of academic skills than their public-school peers.[14] And contrary to popular belief, they do this without suffering deficits in social development or skills on standard measures of social ability.[15] How can this be? How can children taught at home by non-professional educators do better than children taught in designed educational facilities operated by professionally trained educators? The short answer is that the benefits of



Unfinished learning through the pandemic exacerbates historical inequities, especially for Black students.

individualized support coupled with a "structured" learning program—well-designed curriculum, lesson plans, and resources—generally outweigh the benefits of being in a physical classroom run by a professional teacher. The quality of the curriculum is the key. Homeschooled children who study in structured programs outperform children in conventional schools, but homeschooled children who study in unstructured programs—i.e., no designed curricula, lesson plans, and resources—do not.[16]

Or consider the U.S. Department of Education's systematic review and meta-analysis of more than a thousand empirical studies of online learning from 1996 to 2008, which found that, on average, students engaged in online learning performed modestly better than those receiving face-to-face instruction, and that both modes of delivery are less effective alone than when combined.[17] There are, of course, gives and takes with different modes of learning—for example, classrooms are better at facilitating collaboration on group projects, while remote learning is better at promoting independent thinking and self-direction—but when you net out the positives and negatives of all these variables, remote learning performs well compared to conventional classrooms.

Or consider Thomas Russell's compilation and summaries of over one hundred years of research comparing classroom instruction to instruction delivered over various modes and media, ranging from correspondence courses to televised learning to modern forms of online instruction. The conclusion of all these studies: no significant difference in learning. This persistent result became known as the "no significant difference phenomenon" and later the title of his book.[18] Research continues to support the basic principle that effective learning is all about ***how*** minds are engaged, not ***where*** minds are engaged—i.e., it is more about what happens between the ears of learners than between the walls of classrooms.[19]

With this said, it is true that historically disadvantaged students have suffered the most during the pandemic, but this has more to do with the role of schools as a provider of social services

than of learning services. If students are relying on schools for food security, basic health services, escape from unstable home environments, and access to infrastructural technologies like the internet, the necessary pre-conditions for remote learning to be successful are obviously not present.

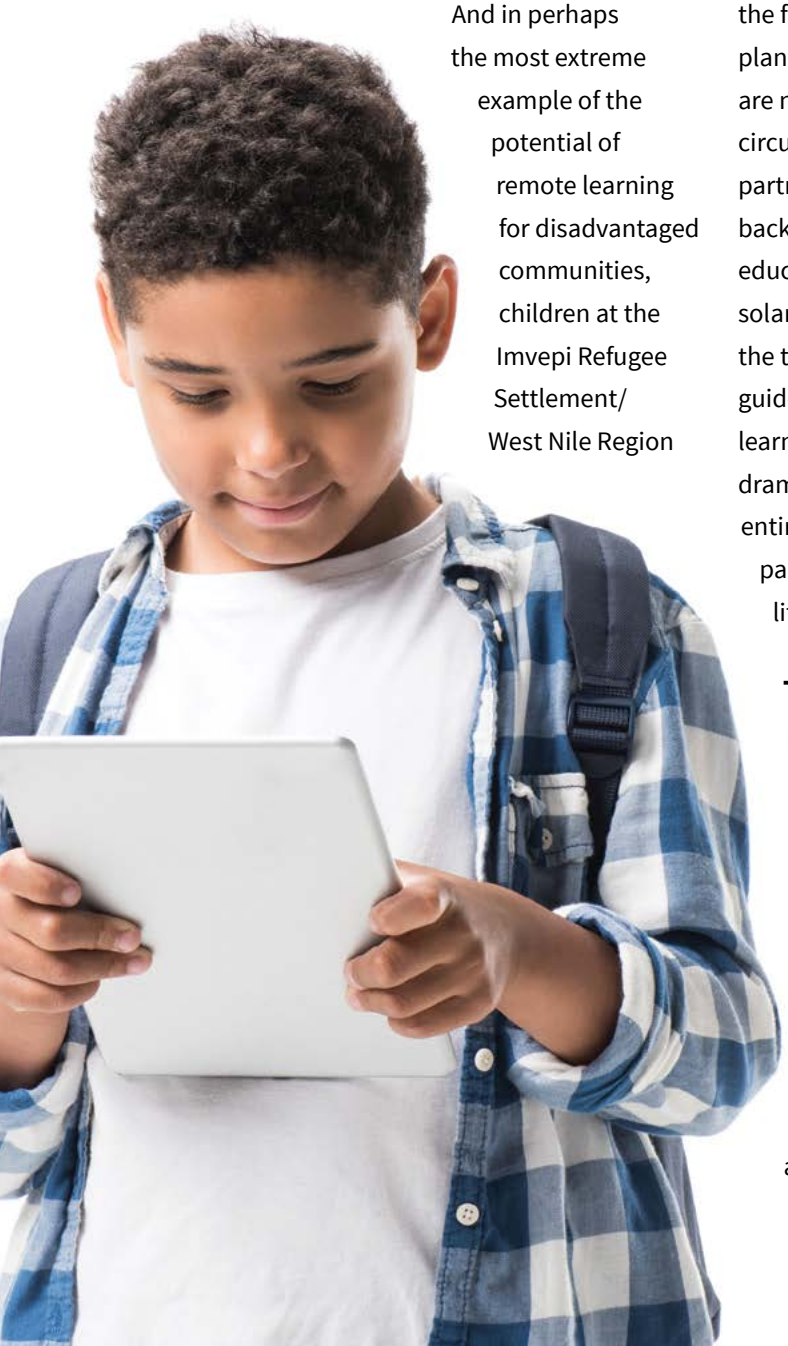
If the argument for returning to the classroom amidst a pandemic is that schools are the only equitable way for disadvantaged children to receive essential social services, then we need to say so honestly, instead of pretending classrooms are the only tool in the educational toolbox that can effectuate quality learning.

But even with disadvantaged students, the news is not all bad. To compensate for inequities in access to digital devices and the internet, many teachers are using multiple methods to deliver lessons. For students without internet access (an estimated seven million families nationwide), some districts are lending families educational devices from classrooms and using school buses as mobile hotspots to support home-based instruction. Others are using the borrowed devices with the offline versions of their application software. In some cases, teachers are mailing instructional materials or using school buses to deliver schoolwork to students and placing physical drop boxes at community locations for handing in homework. Elsewhere, teachers and districts are utilizing public television educational programming as a basis for curriculum or creating their own public-access televised instruction.[20]

Some schools and districts are developing systemic models for implementing distance education, including building the capacity of their teachers to engage in remote instruction. Miami-Dade, a large, high-poverty district in Florida that routinely experiences weather-related disruption to schooling, has a comprehensive approach to distance learning. This includes distributing devices and, more recently, providing special professional development for their teachers on how to shift to remote education during the pandemic. In California, the Lindsey Unified School District is leveraging its existing infrastructure for technology-infused learning by creating ways to adapt classroom strategies for competency-based, personalized learning to an online environment. In Massachusetts, Another Course to College (ACC) is a Boston Public Schools high school that prepares

> *...effective learning is all about **how** minds are engaged, not where minds are engaged...*

all its students for college. ACC has developed a comprehensive online portal that illustrates how, with typical per-pupil costs, schools can provide a rich range of instructional services remotely. The collaborative, guided learning-by-doing in its curriculum is still taking place. For example, teams of students are remotely designing personal protective equipment that is built in the school's makerspace lab and donated to frontline first responders.



And in perhaps the most extreme example of the potential of remote learning for disadvantaged communities, children at the Imvepi Refugee Settlement/ West Nile Region of Uganda participated in a remote learning experiment dubbed "Project Backpack" that enabled them to continue their literacy studies at home during the pandemic. It is important to clarify what "at home" means in a refugee settlement: displaced from the civil war in South Sudan that began in 2013, refugee families live in tents on 100' x 100' plots with little to no access to electricity or the internet. Monthly food rations were cut by 30 percent during COVID-19, forcing the families to push out into the nearby bush to plant their own food because their current plots are not large enough. Amidst these challenging circumstances, Avenues The World School, in partnership with local NGOs, provided families with backpacks containing an Apple iPad, pre-installed educational software, backup battery, and portable solar charging equipment. The interaction with the technology was supported by local learning guides who visited families weekly to provide basic learning and technical support. The results were dramatic: During the pandemic, when schools were entirely closed for nearly two years, 55 percent of participants (110 students) achieved functional literacy within nine months.

The Future of the Future

Educators across the world are heroically confronting the challenges of the COVID-19 pandemic, striving bottom-up to develop remote-learning solutions that work for all students. In doing so, they are transcending our collective denial, the first stage of grief for a cherished past that is no longer sustainable. We must face that we are moving into a historically unprecedented "new abnormal" and unlearn our habits and assumptions about what education is.[21]

In his 1969 book, *The Future of the Future*, John McHale coined this epigram:

The future of the past is in the future.
The future of the present is in the past.
The future of the future is in the present.

While those who cannot remember the past are condemned to repeat it, the first line indicates we are constantly reinterpreting history; for example, in many localities, Columbus Day has shifted to Indigenous Peoples Day. The second line acknowledges that trends and structures from the past, such as the traditional school curriculum, constrain what we can do in the present. But the third line highlights that we have the power to invent the future, rather than simply see it as an extension of the past and present. Humans have been learning and working together in person for as long as there have been humans. The social norms and tools that support this mode of interaction have been honed over millennia. The most difficult aspect of realizing the potential of remote learning is overcoming this psychological and cultural inertia that impedes us from using this opportunity to improve our practice — to unlearn the school-centered ritual patterns of the past and to create new ritual patterns that center around the student and family.

It is said that in crisis lies opportunity. Despite the terrible human cost of the COVID-19 pandemic, this crisis presents us with the unique opportunity to strategically upgrade our educational systems to become what Nassim Taleb refers to as “antifragile”: a property of systems in which the performance of the system actually improves with the introduction of shocks, volatility, attacks, and failures. Today, we are experiencing a pandemic. Tomorrow, it will be an extreme weather event due to climate change. The day after that, global disruption due to a nation-state conflict. The current crisis will end, but there will be no shortage of future crises to replace it. The question is: What can be done

Characteristics *of* Next-Generation Instructional Models

Learning-by-Doing

Utilize collaborative, guided learning-by-doing to complement passive learning-by-assimilation.

Agency

Equip students with agency to include their personal interests in what they are learning and infusing these into the curriculum to be covered.

Measurement Breadth

Complement high-stakes tests with diagnostic and formative assessments that measure a broad range of knowledge and skills useful in life.

Extended Learning

Involve many types of people as "teachers" in various life settings of students, extending learning outside the classroom and beyond the school day.

Flexibility

Provide the logistical and scheduling flexibility to empower students to learn at their own pace, enabling them to blend personal and pre-professional pursuits with their formal academic studies.

to ensure continuously improving educational outcomes for our children despite the inevitability of future calamities?

Theory and evidence show the benefits of using innovative teaching strategies based on current knowledge about learning. These next-generation instructional models share several characteristics (*left*).

These strategies are now being implemented in remote learning by well-prepared and supported teachers, whose creativity has been unleashed in the pandemic response.[22] In situations of remote-only interactions, these next-generation strategies are actually easier to use than industrial-era instruction. Further, educational models based on these strategies and implemented by well-prepared teachers produce outcomes that are more equitable and effective, as well as better suited to what students need for success in life. While taking steps to close the digital divide is critical, the challenges and the opportunities of distance learning go beyond providing access to devices and the internet. Distance learning provides opportunities to explore and advance student-centered approaches, regardless of where schools, districts, teachers, and families are on the continuum from traditional instruction to next-generation learning. Educators have achieved much in meeting the crisis of today. Now is not the time to slow down or backtrack but to push ahead: to re-invent an educational system that embraces next-generation instructional models; an educational system that is more family-centered and family friendly; and an educational system that is antifragile to the inevitable crises of tomorrow.

Ed

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Endnotes

1. "The Numbers - Movie Market Summary 1995 to 2022," *The Numbers*, accessed April 15, 2022, https://www.the-numbers.com/market/.
2. Tim Coates, *Freckle Report 2021: Digital Or Diverse?- The Future for Public Libraries* (Tim Coates Books, 2021).
3. Olivia B. Waxman, "People Also Sorely Missed Movie Theaters in the 1918 Pandemic," *Time*, accessed April 15, 2022, https://time.com/5940086/1918-pandemic-covid-19-movie-theaters-history/.
4. Patrick Coate, "Remote Work Before, During, and After the Pandemic," January 25, 2021, https://www.ncci.com/SecureDocuments/QEB/QEB_Q4_2020_RemoteWork.html.
5. Kim Parker, Juliana Menasce Horowitz, and Rachel Minkin, "COVID-19 Pandemic Continues To Reshape Work in America," *Pew Research Center's Social & Demographic Trends Project* (blog), February 16, 2022, https://www.pewresearch.org/social-trends/2022/02/16/covid-19-pandemic-continues-to-reshape-work-in-america/.
6. Jose Maria Barrero, Nicholas Bloom, and Steven J. Davis, "Why Working from Home Will Stick," Working Paper Series (National Bureau of Economic Research, April 2021), https://doi.org/10.3386/w28731.
7. Adam Ozimek, "The New Geography of Remote Work | Upwork," accessed April 15, 2022, https://www.upwork.com/press/releases/the-new-geography-of-remote-work.
8. Emma Dorn et al., "COVID-19 and Education: The Lingering Effects of Unfinished Learning | McKinsey," accessed April 15, 2022, https://www.mckinsey.com/industries/education/our-insights/covid-19-and-education-the-lingering-effects-of-unfinished-learning.
9. Jessica Calefati, "'This Is a Disaster.': Severity of Learning Lost to the Pandemic Comes into Focus," *POLITICO*, accessed April 15, 2022, https://politi.co/3IixGmZ.
10. "There's No Excuse for Shutting Down Schools Again," *Bloomberg.com*, December 7, 2021, https://www.bloomberg.com/opinion/articles/2021-12-07/shutting-down-schools-again-is-indefensible.
11. "Follow De Blasio's Lead and Keep Schools Open During Omicron," *NewsBreak*, accessed April 15, 2022, https://www.newsbreak.com/news/2472470292262/follow-de-blasio-s-lead-and-keep-schools-open-during-omicron.
12. Chris Dede, "Blog Post | Necessity Is the Father of Transformation | Silver Lining for Learning," accessed April 15, 2022, https://silverliningforlearning.org/necessity-is-the-father-of-transformation/.
13. Dorn et al.
14. Robert Kunzman and Milton Gaither, "Homeschooling: A Comprehensive Survey of the Research," *Other Education - the Journal of Educational Alternatives* 2, no. 1 (2013): 4–59.
15. Brian D. Ray, "A Systematic Review of the Empirical Research on Selected Aspects of Homeschooling as a School Choice," *Journal of School Choice* 11, no. 4 (2017): 604–21, https://doi.org/10.1080/15582159.2017.1395638.
16. Sandra Martin-Chang, Odette N. Gould, and Reanne E. Meuse, "The Impact of Schooling on Academic Achievement: Evidence from Homeschooled and Traditionally Schooled Students," *Canadian Journal of Behavioural Science / Revue Canadienne Des Sciences Du Comportement* 43, no. 3 (2011): 195–202, https://doi.org/10.1037/a0022697.
17. Barbara Means et al., *Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies*, US Department of Education (US Department of Education, 2009), https://eric.ed.gov/?id=ED505824.
18. Thomas L. Russell, *The No Significant Difference Phenomenon: As Reported in 355 Research Reports, Summaries and Papers* (North Carolina State University, 1999).
19. Richard E. Clark, "Media Will Never Influence Learning," *Educational Technology Research and Development* 42, no. 2 (1994): 21–29, https://doi.org/10.1007/BF02299088.
20. Chris Dede, "Remote Learning and Stone Soup," *Learning Policy Institute*, May 6, 2020, https://learningpolicyinstitute.org/blog/remote-learning-and-stone-soup.
21. Chris Dede, "Blog Post | Advising Your Children about Learning in the Era of 'New Abnormal' | Silver Lining for Learning," May 25, 2020, https://silverliningforlearning.org/advising-your-children-about-learning-in-the-era-of-new-abnormal/.
22. "Silver Lining for Learning | Conversations about the Future of Education," accessed April 15, 2022, https://silverliningforlearning.org/.

A Brief History *of* Remote Learning

1840

Isaac Pitman, recognized as the pioneer of distance education, began teaching shorthand by correspondence in 1840 in Bath, England.

1873

First official correspondence education program, "Society to Encourage Home Studies," began in Boston.

1878

John Heyl Vincent established the Chautauqua Literary and Scientific Circle in Chautauqua, New York, the first adult education program and correspondence school in the country.

1892

Using the Chautauqua model, the correspondence division at the University of Chicago enrolled 3,000 students in 350 courses with 125 instructors.

The term "distance education" was first used at the University of Wisconsin.

1906

The University of Wisconsin-Extension was founded as a distance-teaching unit. Also in 1919, University of Wisconsin professors began an amateur wireless station, later known as WHA, the first federally licensed radio station dedicated to educational broadcasting.

1911

Department of Correspondence Studies founded at the University of Queensland.

1926

Sidney L. Pressey, a cognitive psychologist from Ohio State University, created a crude teaching machine suitable for rote-and-drill learning.

1930

The National Committee on Education by Radio (NCER) was formed, to use radio for educational purposes.

1953

First televised college classes were offered by University of Houston.

1957

B. F. Skinner, a Harvard University psychologist, created a teaching machine to allow automated, self-paced learning.

1960

PLATO (Programmed Logic for Automatic Teaching Operations), a computer-based education system, was created by Donald L. Bitzer at the University of Illinois at Urbana-Champaign.

1969

First Open University opened in the UK, using television studios and editing facilities vacated by the BBC.

1984

The first-ever completely online course was offered by the University of Toronto.

1986

The Electronic University Network was established for use in DOS and Commodore 64 computers.

The National Science Foundation Network (NSFNET) launched the first open computer network, allowing institutions to create and distribute electronic information.

1989

The University of Phoenix launched a fully online collegiate institution that offered both bachelor's and master's degrees.

1992

The Alfred P. Sloan Foundation developed the Asynchronous Learning Networks (ALNs) to explore educational alternatives for those unable to attend traditional classes in the classroom.

1993

Jones International University was launched, which became the first accredited and fully web-based university.

1998

New York University (NYU) became the first large nonprofit university to create an online education subsidiary, NYU Online, as a for-profit entity.

2001

University of Phoenix enrollment doubled from 17,000 to 35,000.

The Massachusetts Institute of Technology (MIT) launched the OpenCourseWare project.

2006

iTunes U began offering lectures available for download.

Stanford Online High School was founded.

2009

YouTube EDU offered thousands of lectures for free online.

2010

Udemy, one of the world's largest and most popular online course platforms, was founded.

2012

President Barack Obama announced $500 million in grants to online learning programs.

Coursera was founded by Stanford researchers.

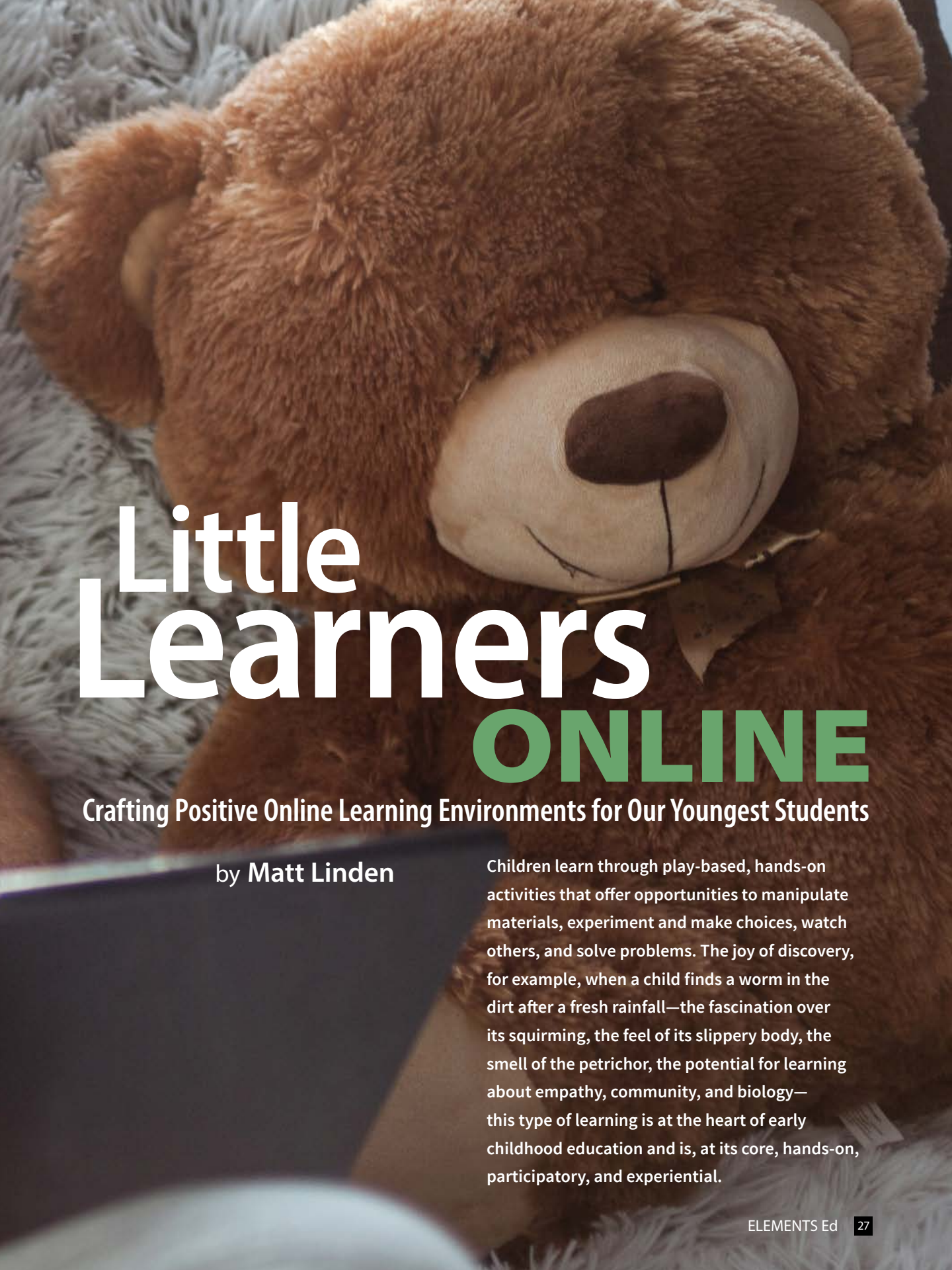
Udacity began offering massive open online courses (MOOCs). MIT and Harvard followed with MOOC platform edX. The University of Wisconsin's Flexible Option began offering competency-based bachelor's degrees.

2013

University of Florida became the first online-only public university.

2020

The COVID-19 pandemic disrupted education in over 150 countries and affected 1.6 billion students. As a response, many countries switched to emergency remote learning.



Little Learners ONLINE

Crafting Positive Online Learning Environments for Our Youngest Students

by **Matt Linden**

Children learn through play-based, hands-on activities that offer opportunities to manipulate materials, experiment and make choices, watch others, and solve problems. The joy of discovery, for example, when a child finds a worm in the dirt after a fresh rainfall—the fascination over its squirming, the feel of its slippery body, the smell of the petrichor, the potential for learning about empathy, community, and biology—this type of learning is at the heart of early childhood education and is, at its core, hands-on, participatory, and experiential.

Imagine the buzz of a few dozen three- and four-year-olds busily at work playing in the classroom. These children thrive when they move freely in their environment and explore the many cognitive, social, and physical opportunities that a learning space can provide.[1] In a highly interactive and child-led environment, young children learn social skills, as well as thinking skills, and practice solving problems and communicating their ideas.[2] They foster their intrinsic motivation to learn, nurture their curiosity, begin to comprehend autonomy, and have authentic experiences that deepen their relationship to growing numeracy and literacy skills. With careful models, children develop executive functioning skills when they learn to empathize with others;[3] they build working memory,[4] learn to think about consequences before impulsively acting,[5] and gain social competence,[6] all processes that appear to necessitate a physical, social environment to explore.

But what happens when this learning environment is online? Can learning and growth still happen remotely? How do we, as educators, craft a fundamentally social learning experience when our experientially fertile, physical learning environment is transformed into virtual interactions at a distance?

Socialization

Children learn from adults, but they also learn from other children.[7] No matter how much a teacher works with a child to help develop prosocial interpersonal behaviors and integrate an open-minded approach to learning, nothing compares to actual relationships with peers. While an online learning environment may not readily offer a space for these relationships to flourish, our pivot to online learning, prompted by the global pandemic, showed us the online learning environment was not completely foreign. We discovered that despite the lack of physical proximity, we could create a viable preschool classroom with essential elements such as community meetings, read-alouds, explorations, and music that would foster prosocial skills and interpersonal relations. We were able to build a community within our virtual classes through shared practices and community agreements. In our group meetings, students still took turns speaking, listened to and learned from each other, and contributed to ongoing discussions.

> *"Our curriculum is driven by children's curiosity and interest, is adaptive to their needs, and bends to their passions."*

In an inquiry-based preschool curriculum, the teacher's role is not to determine which curricula to explore but to focus on the learning outcomes students will achieve, then backwards plan the curricula, using the students' interests as the

north star.[8] The goal is to be as minimally invasive as possible, gently guiding the students' play and work. In this manner, teachers act as co-pilots with students, intervening only when necessary, with phrases such as "I wonder where skunks have their babies …" or "I wonder if this family could have two big sisters." With tactful intervention, teachers cultivate children's curiosity and propel their interest and learning forward.

We kept inquiry and exploration as key tenets of our online curricula so the curriculum for young learners could be driven by children's curiosity and interest, twist around the students, bend to their passions, and stay nimble and adaptive to the needs and interests of the learners.[9] We created a curricular framework that was simple, clear, and explicit. We set up our online learning platform to inform the adults working with the students (such as their parents or learning guardians who support their learning) about the activities for the day. Working in tandem with the adults helped design our curriculum so it would fit the student, not the other way around.

Children learn to take others' perspectives and build empathy in their social interactions, but building empathy is a social pursuit not easily done in isolation.[10] One day, one of our teachers, who was working with a three-year-old boy, presented this problem: "My student isn't socializing with other children, and I feel the need to help him learn how to interact and work with others. I'm not sure if I should be his teacher or his playmate." As a playmate, she could intentionally present him with challenging quasi-social situations, and as his teacher, she could help manage challenging interpersonal dynamics—but how could we expect her to be both? We decided that in lieu of having access to other children for building his social skills, we would begin a puppet show curriculum, which would allow us to coach him through challenging interpersonal issues. Through the interaction of puppets, the student was able to shift his perspective, consider alternative ideas, and identify reasons why the relationship between the puppets might be breaking down.

Motor Development

The preschool playground is rich with opportunities for whole body movement that are planned into a preschool curriculum. When a preschooler learns how to jump and kick a ball, it allows them to play sports with other kids and opens up their world to new games, skills, and social activities. Motor development involves more than just physicality. While a preschool child is using their body to develop awareness about its position in space, how to balance, and how to move and control it, the brain and the body's muscles are working together to connect with all other parts of a child's system—cognitive, social, and emotional. While such movement can often be fulfilled at the local park or playground, a family with an online student needs to be much more diligent and intentional about fulfilling these bodily needs.

Upholding our belief that the best online curriculum for young learners needs to be centered around a significant amount of asynchronous learning time, we incorporated nature walks, scavenger hunts, physical activities, and explorations into the curriculum. We made sure to intersperse lots of movement breaks, as well as interactive and engaging activities, and never shied away from calling a session early, if it were not in the best interest of the group to continue.

We also quickly discovered that one of the most challenging aspects of running an in-person preschool classroom, managing the class through transitions, was virtually nonexistent. Although these nuances of organization in a preschool classroom (putting on jackets and shoes, getting in a line, following the teacher outside) are ripe with learning opportunities, not having to spend time on them opens up space for other explorations and allows teachers to focus their attention and energy on other aspects of learning for this age group. Gone are the arguments over whose turn it was to be line leader. The group never had to wait on a child who was struggling to put on their shoes. No more logistical issues with moving groups of children from one end of the school to the other. Classroom management took on a new look online, much to the relief of the teachers.

Conclusion

In the end, through the hard work of the teachers, the relationships they built with families, and the support systems we developed, we were able to create a virtual space for our learners to be their best selves. And this end goal is not much different from what one hopes to develop in a brick-and-mortar school. Creating a thriving online learning environment for young children—especially building community—was definitely different. With this experience, we were able to identify a number of strategies and tricks to help teachers and school leaders establish strong connections with their students and also help foster strong connections among students:

Keep the schedule flexible. A flexible allocation of time throughout the day will enable students to meet their diverse needs, providing time for snacks, body and brain breaks, extra time for guided play, and outdoor play.

Keep relationships at the forefront. Learn what's important to your students, say their names repeatedly, and listen actively to find ways to help them feel a sense of belonging. Outside the classroom, bulletins, personal check-ins, newsletters, and family education opportunities are all ways to help families feel connected in a remote setting.

Be engaging. Mix up your approach and keep the session lively through musical interludes, voting through polls, interactive games, and ways to simply have fun.

Be hands on! Students learn about their world through sensory impressions and direct contact with their environment. Help them build this understanding through integrating sensory experiences that light up their tactile, olfactory, gustatory, proprioceptive, and kinesthetic systems.

Use visuals. Pictures help to quickly articulate an idea, provide a framework for a concept, and often communicate effectively when language fails us. Especially with preschool children, going low on text and high on visuals can be a key strategy.

Collaborate and support your fellow educators. It often helps to have a co-pilot, who can run the online session, respond to chat questions, mute or unmute participants, spotlight speakers, and generally run the administrative side of the classroom.

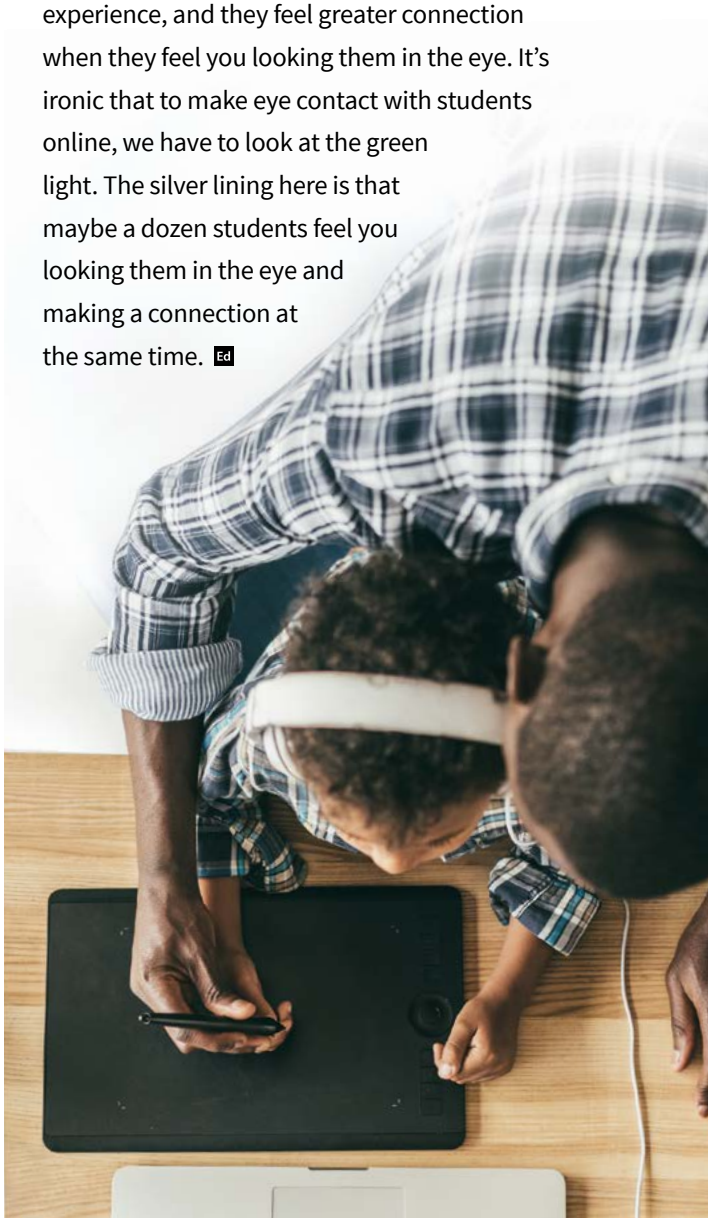
Know your tech. Stock your toolkit with plenty of tools to use at the right time to keep students engaged. When you use an app or technological tool with students, practice using it ahead of time to avoid technical difficulties during synchronous time.

Think in small chunks of time. Though attention spans and executive functioning skills may vary by age and temperament, generally activities should be no longer than fifteen minutes.

Take movement breaks. Feed the body! Taking a break from schoolwork will help to increase focus and concentration, decrease stress, and increase productivity. Breaks also provide opportunities for children to get to know peers in a different manner, as well as promoting social skills.

Make eye contact. No, not with the students—with the little green light at the top of your computer screen. It's all about the student experience, and they feel greater connection when they feel you looking them in the eye. It's ironic that to make eye contact with students online, we have to look at the green light. The silver lining here is that maybe a dozen students feel you looking them in the eye and making a connection at the same time. Ed

Matt Linden has worked in early childhood education at Stanford's Bing Nursery School, at One Fifty Parker Avenue School and the Little School in San Francisco. Matt helped develop and lead the Avenues@Home program. He earned his BA from Stanford and his MA from the University of California, Berkeley.



Endnotes

1. Chris Watkins, "Classrooms as Learning Communities: A Review of Research," *London Review of Education* 3, no. 1 (2005): 47–64, https://doi.org/10.1080/14748460500036276.

2. Olivia N. Saracho, *An Integrated Play-Based Curriculum for Young Children*, 2nd ed. (New York: Routledge, 2020), https://doi.org/10.4324/9780429440991.

3. Rebecca Berliner and Tracy Loye Masterson, "Review of Research: Promoting Empathy Development in the Early Childhood and Elementary Classroom," *Childhood Education* 91, no. 1 (2015): 57–64, https://doi.org/10.1080/00094056.2015.1001675.

4. Kate Cockcroft, "The Role of Working Memory in Childhood Education: Five Questions and Answers," *South African Journal of Childhood Education* 5, no. 1 (2015): 18, https://doi.org/10.4102/sajce.v5i1.347.

5. Nicholas P. Allan et al., "Relations between Inhibitory Control and the Development of Academic Skills in Preschool and Kindergarten: A Meta-Analysis," *Developmental Psychology* 50, no. 10 (2014): 2368, https://doi.org/10.1037/a0037493.

6. Alicia Benavides-Nieto et al., "Basic Executive Functions in Early Childhood Education and their Relationship with Social Competence," *Procedia - Social and Behavioral Sciences* 237 (2017): 471-478, https://doi.org/10.1016/j.sbspro.2017.02.092.

7. Anthony D. Pellegrini and Robyn M. Holmes, "The Role of Recess in Primary School," in *Play= Learning: How Play Motivates and Enhances Children's Cognitive and Social-Emotional Growth*, eds. Dorothy G. Singer, Roberta M. Golinkoff, and Kathy Hirsh-Pasek (Oxford, UK: Oxford, 2006), 36–53, https://doi.org/10.1093/acprof:oso/9780195304381.003.0003.

8. Helen Hedges and Maria Cooper, "Inquiring Minds: Theorizing Children's Interests," *Journal of Curriculum Studies* 48, no. 3 (2016): 303–22, https://doi.org/10.1080/00220272.2015.1109711; Ingrid Pramling Samuelsson and Maj Asplund Carlsson, "The Playing Learning Child: Towards a Pedagogy of Early Childhood," *Scandinavian Journal of Educational Research* 52, no. 6 (2008): 623–41, https://doi.org/10.1080/00313830802497265.

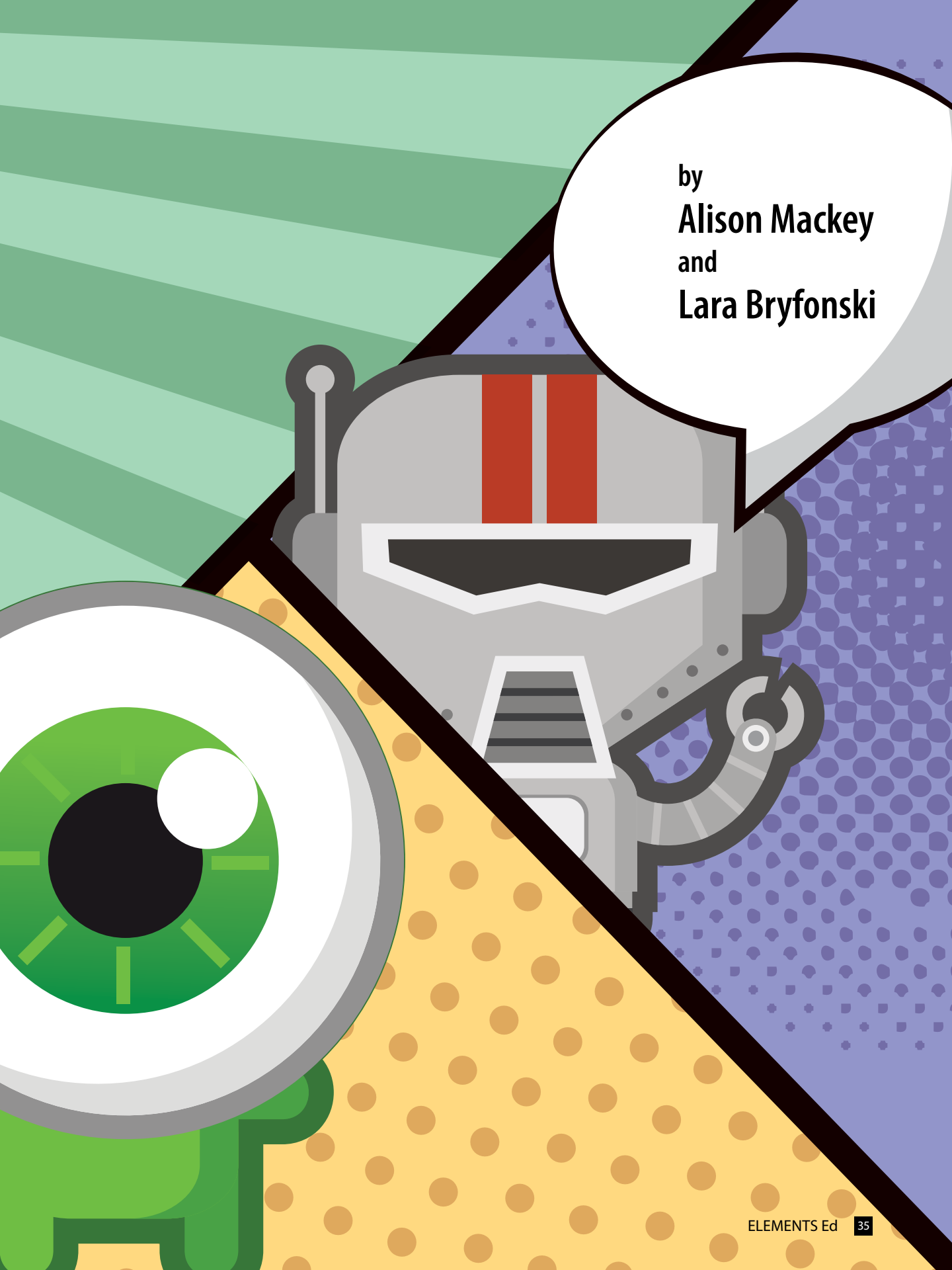
9. Hilary Jo Seitz, "The Plan: Building on Children's Interests," YC Young Children 61, no. 2 (2006): 36; Deb Curtis and Margie Carter, *Learning Together with Young Children: A Curriculum Framework for Reflective Teachers* (St. Paul, MN: Redleaf Press, 2007).

10. Berliner and Masterson.

“There are **places on Earth**, in every country,
where, for various reasons,
good schools cannot be built and
good teachers cannot or do not want to go.”

Sugata Mitra *Computer Scientist and Educational Theorist*


Inspiring
Language Learners
with Online Media
LOOK
WHO'S
TALKING



by
Alison Mackey
and
Lara Bryfonski

Of the many unknowns in how languages are best learned, we know one thing for certain: whether a baby learning a first language or an adult learning a second, humans will not learn a language if they are not exposed to it. But is simple exposure sufficient for language learning?

Decades of research have shown learners must not only have ample exposure to a language but also must use the language in order to develop.[1] Producing language output, either by speaking or writing, is critical for successful language learning; and technology can be leveraged to encourage this language output from students.

Output in Language Learning

Output is one of the four key ingredients for successful language acquisition. The others are (a) access to input (what language learners hear or see), (b) opportunities where learners negotiate for meaning (overcoming comprehension or other language problems through interaction), and (c) the chance to receive and respond to corrective feedback (for example, the corrections learners receive from other speakers). Although information on the other key drivers of learning is available in a range of introductory articles on second language acquisition,[2] output is the most critical.

Output is the learner's production of language—speaking or writing—that occurs during their engagement and involvement in activities and interactions. Encouraging learners to participate, by producing output in a second language, is critical because output is a key element in successful language development. The most helpful sorts of output occur when learners have opportunities to use language creatively, to discuss language, and to encounter and resolve language problems in authentic linguistic situations.

In classrooms, output may consist of learners speaking the second language with the teacher, with their classmates, or with anyone else in the class who speaks the target language, including assistant teachers or visitors. Depending on the school, students may also produce output at special language-related lunch tables, in clubs, or at after-school activities. Learners also produce output in their informal or formal writing in the second language. Research indicates language

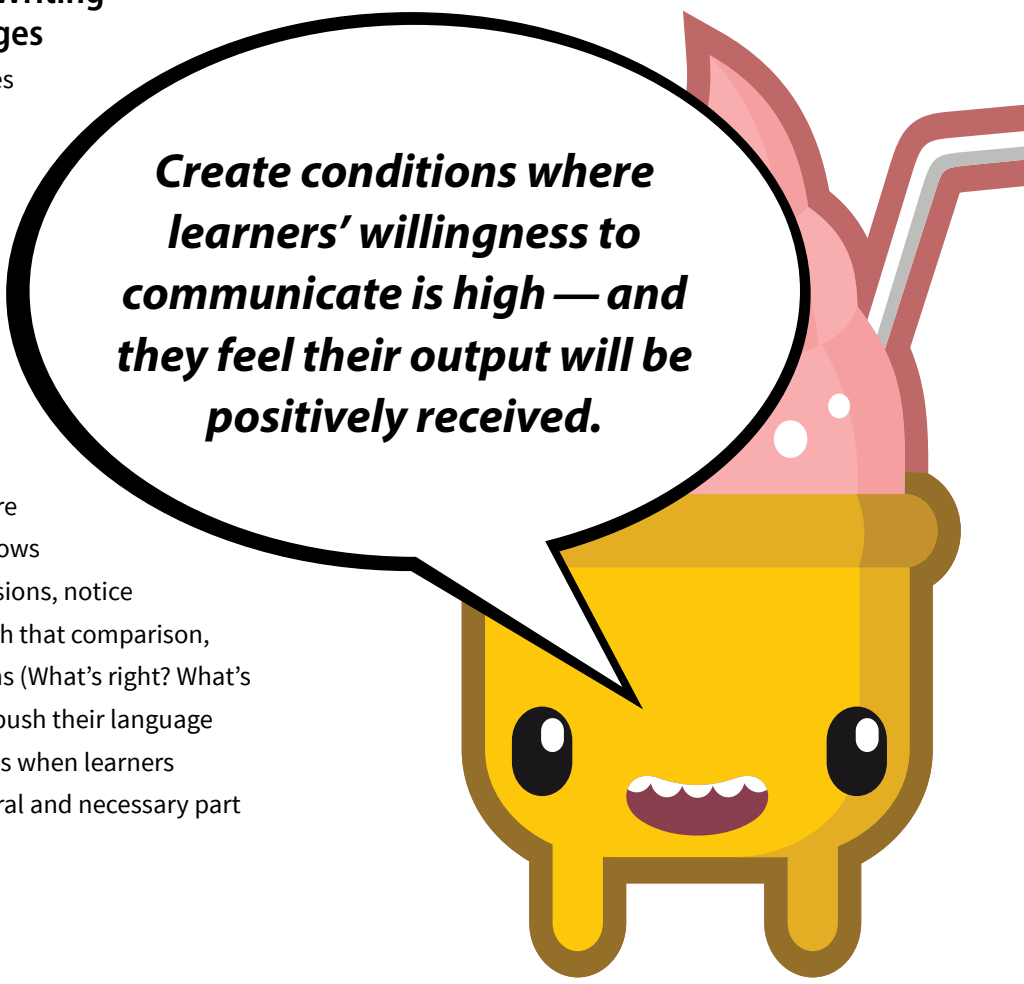
learners need frequent and varied opportunities to produce output through speaking and writing in the second language; and it's not just about having the opportunities — learners actually have to make use of these opportunities, too.

Almost four decades ago, Merrill Swain did foundational work on output, noticing that some learners in French immersion in Canada who studied French grammar, read French texts, and listened to French being spoken did not develop high levels of French proficiency, even after many years. Swain concluded the French learners did not have sufficient opportunities to actually produce French in meaningful communicative environments. Empirical studies backed this up and have continued to focus on various aspects of the output-learning relationship.[3]

Role of Talking and Writing in Learning Languages

Producing output promotes learning in a number of ways. For example, correction of their output provides learners with the opportunity to directly compare what they originally produced with the correction they heard from their teacher or a more proficient speaker. This allows them to weigh the two versions, notice the difference, and, through that comparison, make linguistic connections (What's right? What's wrong?) that support and push their language development. The mistakes when learners produce output are a natural and necessary part of learning — in fact, errors are a huge part of what makes output developmentally helpful.[4]

Producing output helps learners become more fluent in their new language by promoting language automaticity — the everyday routines of language use. The old adage that practice makes perfect is as true of language learning as anything else. A comment by Michael Long, one of the most influential langage-learning researchers, is particularly helpful here: output holds learners' "conversational feet . . . to the fire."[5] Although learners can fake understanding or comprehension—and many of us learning a language do indeed feign understanding sometimes, just to keep the conversation flowing and embarrassment off the table — we can't do that in output. When we have to participate by saying



something, we have to try. And it's through the act of trying that we learn.

Encouraging Learners to Produce Output

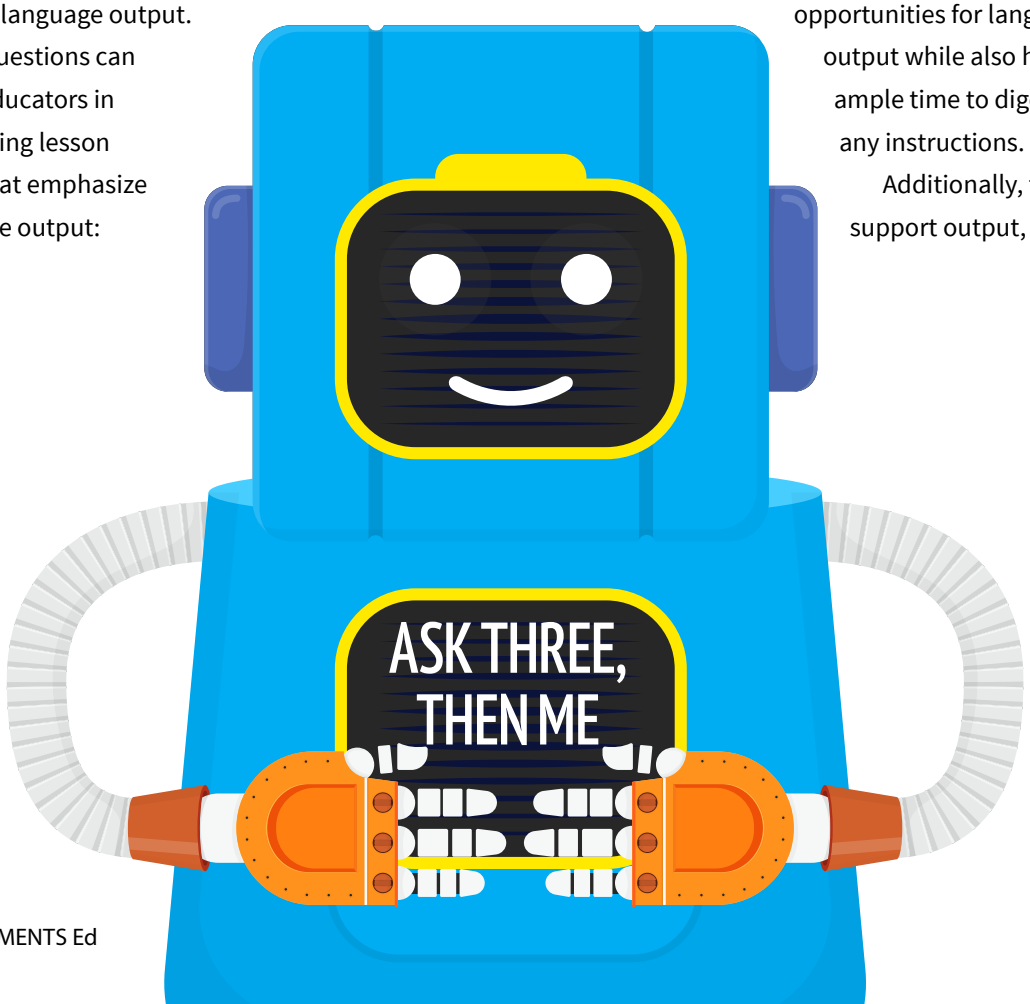
In the production of output, individual differences between learners play an important role—for example in learners' motivation and anxiety (both of which are dynamic and fluctuate), in their ability to think and to solve problems creatively, and in personality characteristics, differences in working memory, and various other factors. We need to be aware that while we can set things up so we hope output will come naturally and usefully, it won't always happen the way teachers plan, due to the many ways learners vary.

Thus, lessons must deliberately include sufficient opportunities for student language output. These questions can guide educators in developing lesson plans that emphasize language output:

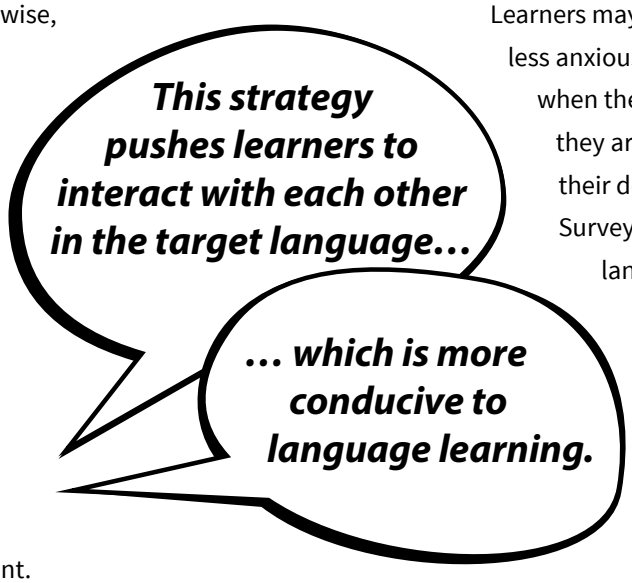
1. What type of output do I hope to see (or hear) from my learners?
2. Am I giving my learners the opportunity to produce the target language rather than solely receive input?
3. When will my learners be silently listening to me or their classmates, and when will they be actively engaging with me or their classmates?
4. How (and how often) will learners be given the opportunity to demonstrate their learning?

By creating a plan, teachers can quickly take stock of how much time they have provided for learners to receive input (listening and reading) versus their opportunities to produce output (speaking and writing) during each lesson, task, or unit. It is important to find balance so all learners can be engaged and have opportunities for language output while also having ample time to digest any instructions.

Additionally, to support output,



learners must be at ease in their learning environments and be encouraged to make mistakes; otherwise, they may be too intimidated or find it too stressful to contribute. Creating conditions where learners' willingness to communicate is high—and they feel their output will be positively received—is paramount. One way to promote this comfortable learning environment is to encourage students to support each other in their language development by collaborating in small groups or in pairs. For example using the "Ask three, then me" pedagogical strategy facilitates independence and resiliency as they produce output by forming questions in the target language, discussing them with peers, and decreasing their reliance on a teacher. "Ask three, then me," means ask three other learners, or consult three other resources, before asking the teacher for help.



This strategy pushes learners to interact with each other in the target language and to consult other sources first, which is more conducive to language learning. This "do-it-yourself" mentality facilitates language acquisition, as students are expected to generate more output in the target language by asking classmates for help and searching to fill potential gaps in their knowledge by seeking out helpful resources. This strategy also fosters learner motivation and investment in their own learning, which research has tied to better language development.

Learners may also be more motivated and less anxious about producing language when they perceive its value in what they are trying to accomplish with their developing language skills. Surveying learners about their language learning needs and wants, as well as their personal interests, can be a useful way to tailor instruction so students feel agency in their own learning. Other practical tips for promoting target language output in the classroom can be found in our book, *The Art of Language Teaching and the Science of Language Learning*.[6] The book provides research-based tips and tools that focus on promoting successful output for teaching and learning languages.

Using Technology to Facilitate Production of Output

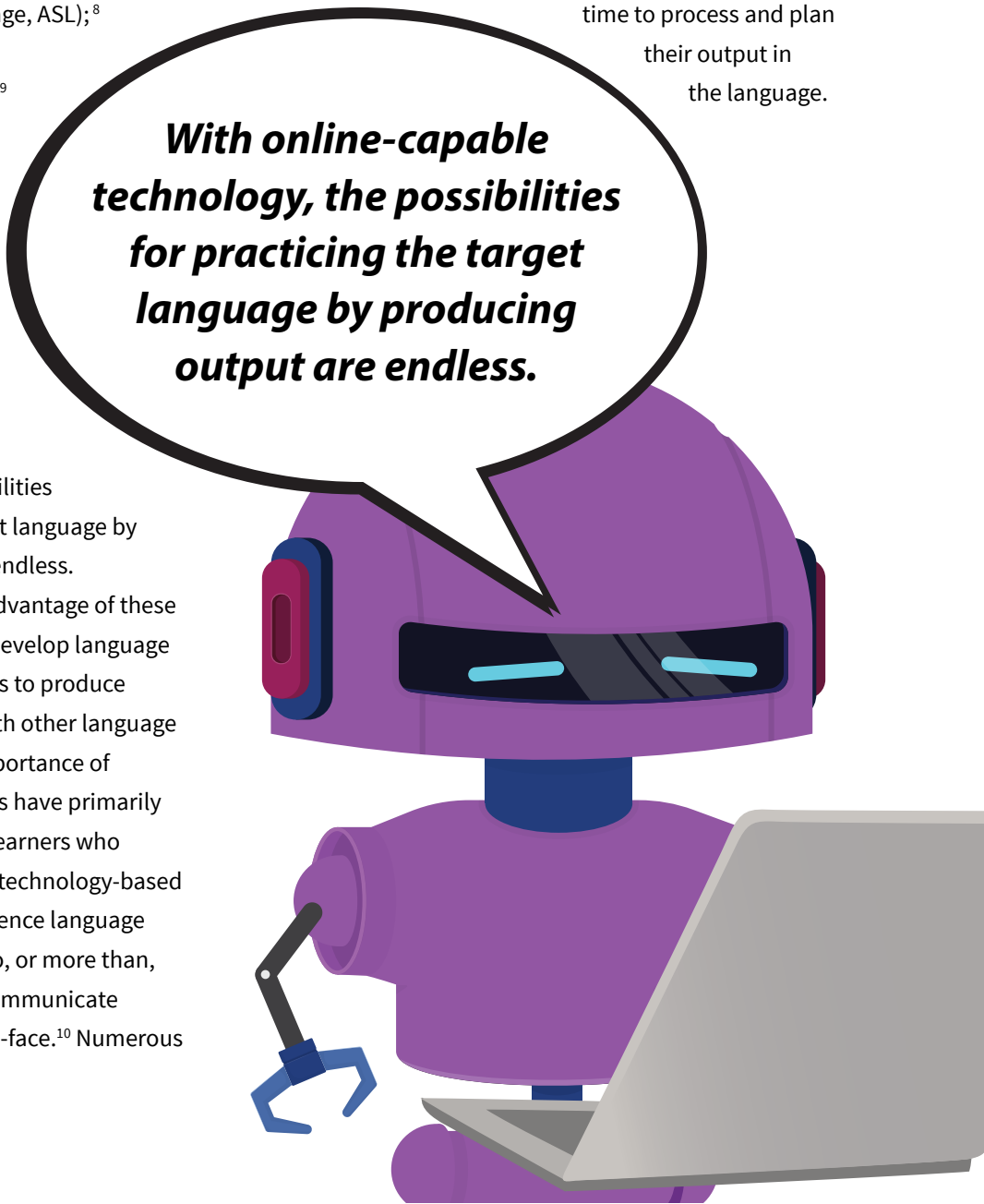
Traditionally, opportunities for language output have occurred within the confines of a physical classroom space, but more recently—both with the advancements of technology and the face-to-face constraints of a global pandemic—people are realizing remote learning technologies can be leveraged to enhance language learning generally and output production specifically.

While learners may spend less time traveling abroad and learning languages in face-to-face, natural environments, the internet has dramatically transformed and exponentially increased the "places" where they can learn, practice, and use

another language. On a daily basis, learners may be exposed to (input) and use (output) language through a variety of different platforms—for example, instant messages, email, social media, and pop culture. Students may quickly scroll through TikTok and Twitter feeds and comment on posts from around the world. They may engage in multiplayer video games with players with diverse linguistic repertoires. They may also be immersed in fandoms surrounding their favorite shows, like *Squid Game* (Korean),[7] movies, like *CODA* (American Sign Language, ASL);[8] or *Lunana: A Yak in the Classroom* (Dzongkha);[9] or they may enjoy listening to and commenting on videos by multilingual musicians, like Bad Bunny (Spanish). With online-capable technology, the possibilities for practicing the target language by producing output are endless.

The key to taking advantage of these opportunities to best develop language skills is to push learners to produce output and interact with other language users. Knowing the importance of interaction, researchers have primarily investigated whether learners who engage in meaningful, technology-based communication experience language development similar to, or more than, that of learners who communicate traditionally, or face-to-face.[10] Numerous studies have shown that technology-based interaction in another language elicits similar negotiation and output patterns to those found in face-to-face interaction. Language learners may experience different types of benefits, based on the way they are interacting using technology.[11] Some research suggests written mediums like text messaging, email, and blogging, may even be more beneficial than speaking, since those mediums provide a visual representation of language and thus provide learners with more time to process and plan their output in the language.

With online-capable technology, the possibilities for practicing the target language by producing output are endless.



Meanwhile, research on speaking has found that online language learning environments can reduce anxiety and provide a less stressful atmosphere for oral language practice. This, in turn, encourages learners to be more active and produce more output than they might otherwise have done in more potentially embarrassing face-to-face interactions. Similarly, other studies have shown that corrective feedback in technology-mediated contexts can be as supportive of language development as in face-to-face interactions—or even more supportive.

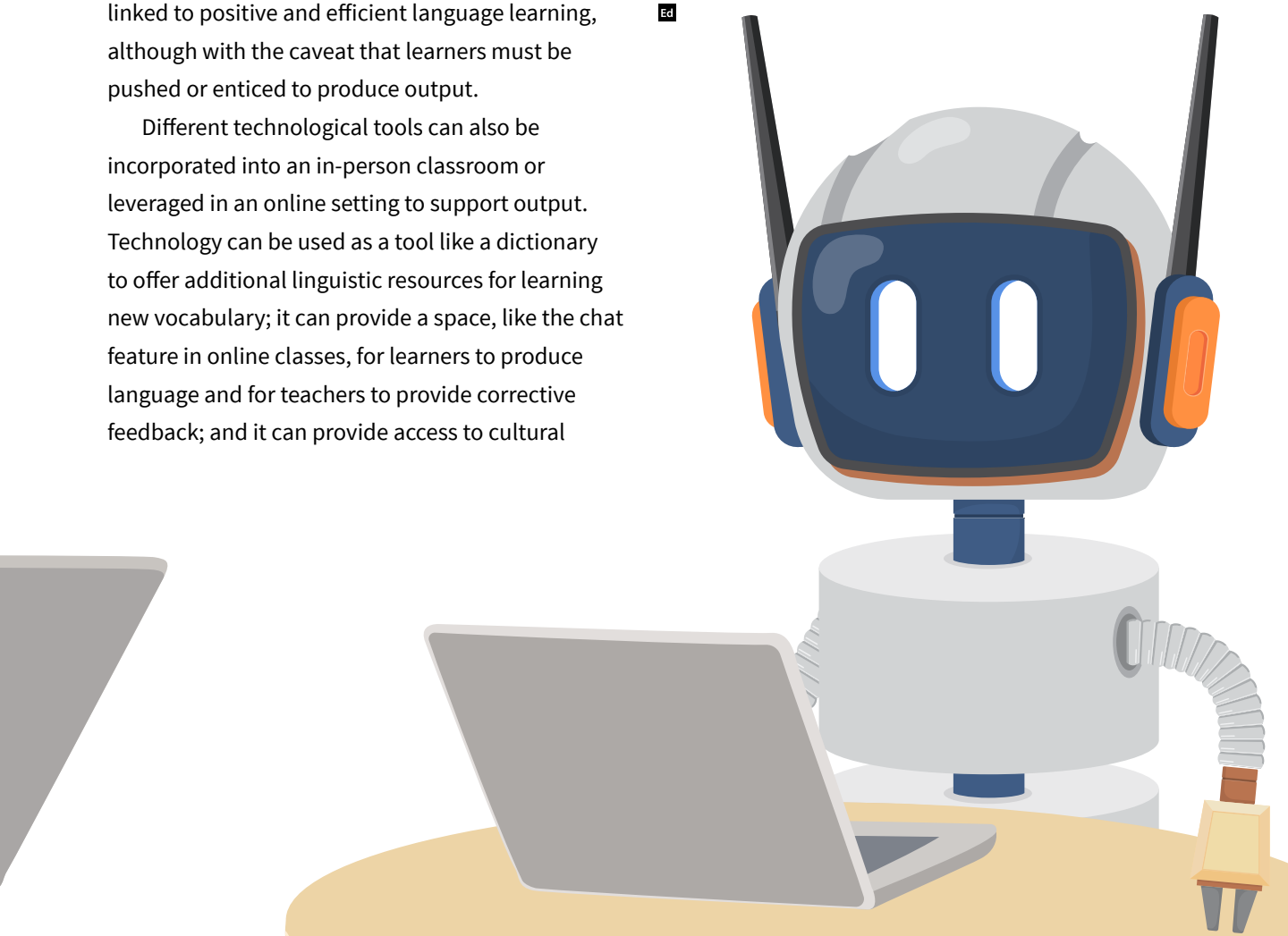
In addition, technology may also help support learners' individual learning differences. For example, teachers can leverage online games, software, and apps to help encourage and motivate shy or introverted learners to produce language with confidence. All these different benefits have been linked to positive and efficient language learning, although with the caveat that learners must be pushed or enticed to produce output.

Different technological tools can also be incorporated into an in-person classroom or leveraged in an online setting to support output. Technology can be used as a tool like a dictionary to offer additional linguistic resources for learning new vocabulary; it can provide a space, like the chat feature in online classes, for learners to produce language and for teachers to provide corrective feedback; and it can provide access to cultural resources, such as newspaper articles, videos, music, and photos, which can provide authentic examples of the target language in use.

Conclusion

As we show in *The Art and Science of Language Teaching*, language output is one of the four essential ingredients of second language development. In this article, we've provided an overview with some examples of what output is, why output is important, and how technology can be leveraged to promote this output. Readers who would like to know more about the art and science of language teaching will find more information in *How Languages Are Learned*,[12] *Second Language Acquisition: An Introductory Course*,[13] and *Input, Interaction and Corrective Feedback in L2 Learning*.[14]

Ed



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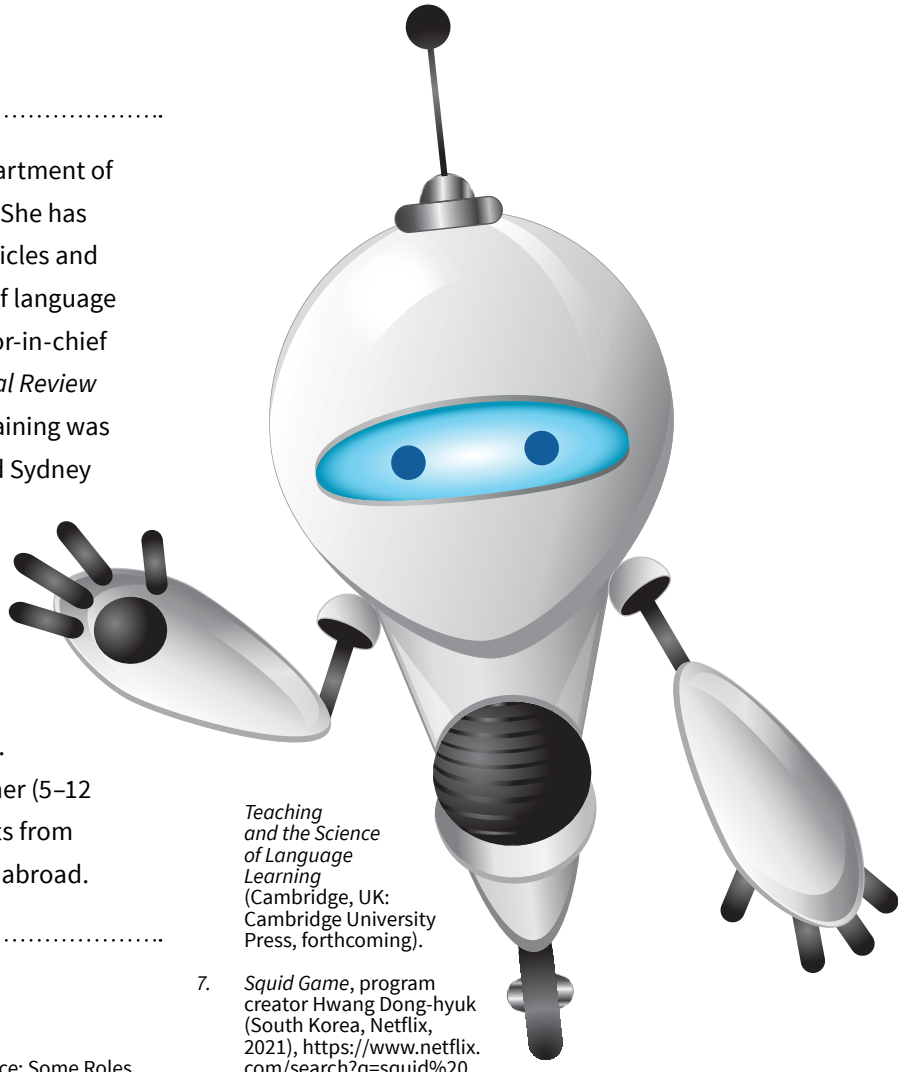


Endnotes

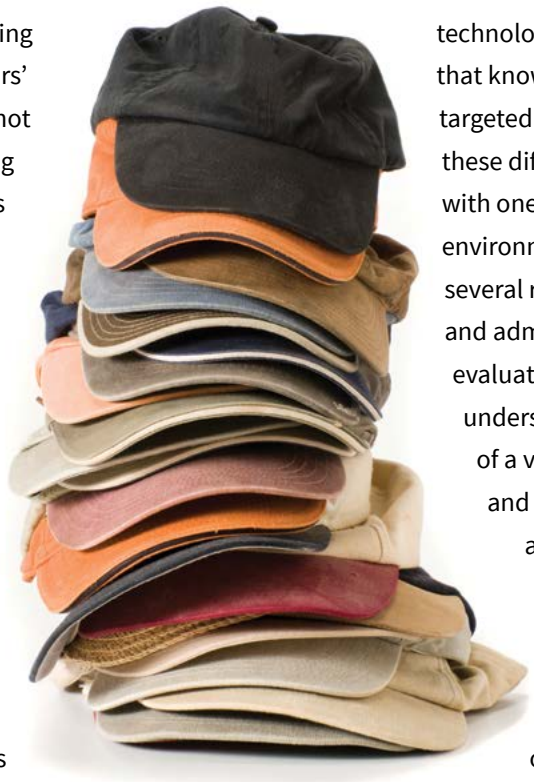
1. Merrill Swain, "Communicative Competence: Some Roles of Comprehensible Input and Comprehensible Output in Its Development," *Input in Second Language Acquisition* 15 (1985): 165–79; Merrill Swain, "Three Functions of Output in Second Language Learning," *Principles and Practice in Applied Linguistics: Studies in Honor of HG Widdowson* (1995): 125–44; Merrill Swain, "The Output Hypothesis: Theory and Research," in *Handbook of Research in Second Language Teaching and Learning*, ed. Eli Hinkel (New York: Routledge, 2005), 495–508.
2. Susan M. Gass and Alison Mackey, "Input, Interaction, and Output in L2 Acquisition," in *Theories in Second Language Acquisition*, ed. Bill VanPatten, Gregory D. Keating, and Stefanie Wulff, 3rd ed. (New York, NY: Routledge, 2020), 192–222, https://doi.org/10.4324/9780429503986-9.
3. Merrill Swain and Sharon Lapkin, "Talking It through: Two French Immersion Learners' Response to Reformulation," *International Journal of Educational Research* 37, no. 3–4 (2002): 285–304.
4. Merrill Swain and Sharon Lapkin, "Problems in Output and the Cognitive Processes They Generate: A Step towards Second Language Learning," *Applied Linguistics* 16, no. 3 (1995): 371–91.
5. Michael Long, "The Role of the Linguistic Environment in Second Language Acquisition," in *Handbook of Second Language Acquisition*, eds. William C. Ritchie and Tej K. Bhatia (San Diego: Academic Press, 1996), 413–468.
6. Lara Bryfonski and Alison Mackey, *The Art of Language Teaching and the Science of Language Learning* (Cambridge, UK: Cambridge University Press, forthcoming).
7. *Squid Game*, program creator Hwang Dong-hyuk (South Korea, Netflix, 2021), https://www.netflix.com/search?q=squid%20&jbv=81040344.
8. *CODA*, directed by Sian Heder (US and France, Apple TV+, 2021), https://tv.apple.com/us/movie/coda/umc.cmc.3eh9r5iz32ggdm4ccvw5igiir.
9. *Lunana: A Yak in the Classroom*, directed by Pawo Choyning Dorji (Bhutan, Dangphu Dingphu:a 3 pigs Production, 2019).
10. Nicole Ziegler, "Taking Technology to Task: Technology-Mediated TBLT, Performance, and Production," *Annual Review of Applied Linguistics* 36 (2016), 136–63, https://doi.org/10.1017/S0267190516000039.
11. Sin Wang Chong and Hayo Reinders, "Technology-Mediated Task-Based Language Teaching: A Qualitative Research Synthesis," *Language Learning & Technology* 24, no. 3 (2020), 70–86, https://www.lltjournal.org/item/10125-44739/.
12. Patsy Lightbown and Nina Spada, *How Languages Are Learned*, 5th ed., Oxford Handbooks for Language Teachers (Oxford: Oxford University Press, 2021).
13. Susan M. Gass, Jennifer Behney, and Luke Plonsky, *Second Language Acquisition: An Introductory Course*, 5th ed. (New York: Routledge, 2020), https://doi.org/10.4324/9781315181752.
14. Alison Mackey, *Input, Interaction, and Corrective Feedback in L2 Learning* 1. publ., Oxford Applied Linguistics (Oxford: Oxford University Press, 2012).

Teachers Wear Many Hats

How Do We Know Which Ones Fit in Online Education?

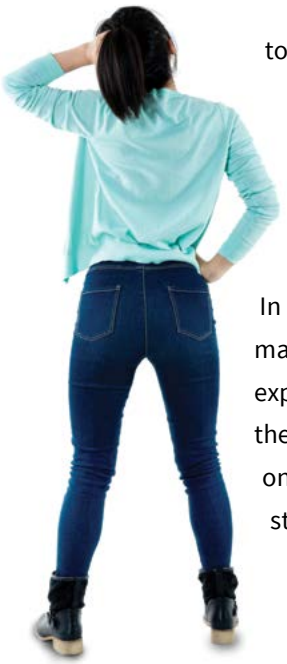
by Işıl Çelimli and Charlie Xavier

In what ways do virtual learning environments change teachers' roles? While "the medium is not the message,"[1] online learning accentuates different aspects of a teacher's role. Teachers are required to wear many hats, no matter the learning context, though the emphasis put on each role shifts when teaching shifts from in-person to virtual. Research on online learning tells us that some tasks—the pedagogical and managerial aspects of online teaching—become more complex when school is online, because teachers cannot rely on standard physical, sensory-based techniques to establish and maintain relationships with their students.[2] To nurture meaningful relationships with students, teachers need to be more intentional in their social role.[3]



Shifting Roles of Teachers

Online learning introduces a shift in what is expected and required to be a successful teacher. Teachers must now develop specific knowledge of the technological tools used and integrate that knowledge with pedagogy and targeted content, understanding how these different components interact with one another.[4] In an online learning environment, a teacher must fulfill several roles: designing, planning, and administering instruction; evaluating students' competency and understanding; leading the creation of a virtual social environment; and facilitating a positive social atmosphere that supports active learning.[5]



While these roles appear to be similar regardless of the medium of teaching, the nature and importance of each in relationship to the others shift in an online learning environment, where teachers and students do not share the same physical space. Instructional design—the planning and delivery of instructional materials and tasks—may look different. In addition to the teachers, other parties may be responsible for creating the learning experience.[6] From a pedagogical standpoint, the limited face-to-face interaction in an online learning environment also means students experience more independence

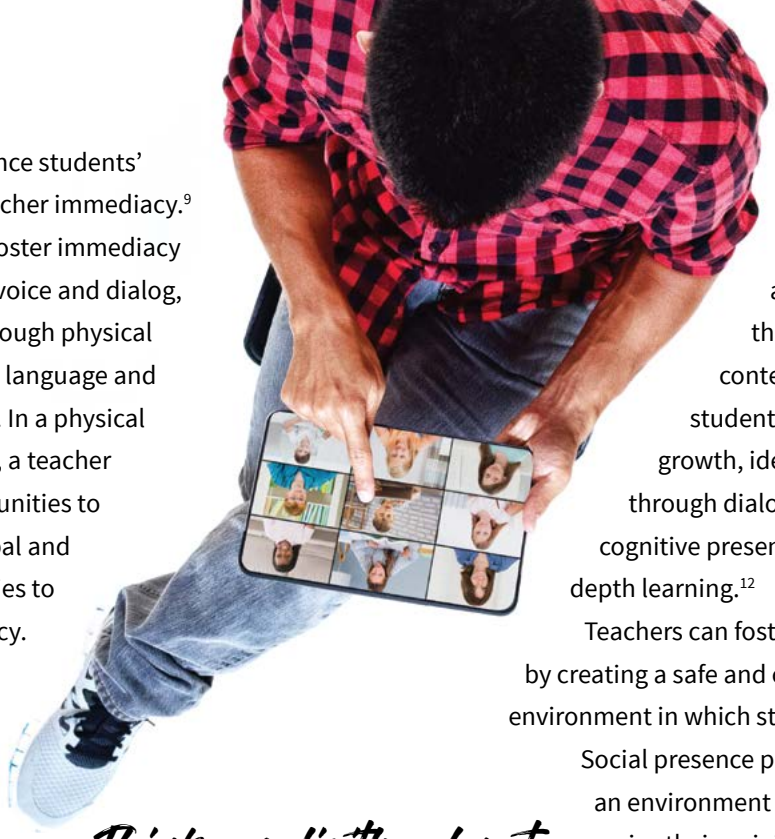
and autonomy. Therefore, the nature of the interaction between the teachers, the students and the content material also shifts.

In online learning, one of the teacher's major tasks is to find ways to engage students, foster meaningful connections, and enable collaboration among students. In a typical physical classroom, there is ample time and space for teacher-student interaction to take place; teachers may have more opportunities to communicate with students to clarify expectations or give informal feedback. In an online classroom, however, interaction may be limited to a few synchronous sessions per week, while students have to work independently. How does a teacher establish meaningful relationships with students when interaction is limited? And how is it possible to communicate expectations so students feel they have clear guidance? Two concepts, immediacy and presence, help us understand how to juggle these diverse roles in online teaching in order to create a meaningful learning experience for students.

Immediacy and Presence

Immediacy refers to the student-perceived connection and closeness between a teacher and their students.[7] Teacher immediacy, along with interpersonal interaction, can lead to better student performance, as well as higher degrees of retention and student satisfaction.[8] A significant aspect of teacher immediacy in an online learning environment is ensuring that students perceive their teacher as a real person, not just a face on a screen. Active engagement with the students in the class, encouraging student participation, addressing students' questions, and expressing emotions

Ensure that students perceive their teacher as a real person, not just a face on a screen.



are ways to influence students' perceptions of teacher immediacy.[9]

Teachers can foster immediacy verbally, through voice and dialog, or nonverbally through physical gestures like body language and facial expressions. In a physical classroom setting, a teacher has ample opportunities to exercise both verbal and nonverbal strategies to increase immediacy. However, online, where face-to-face time with students is limited, teachers need to be more deliberate in fostering immediacy to establish connections.

Think explicitly about how to create and sustain cognitive, social, and teaching presence.

Using animated voice, humor, and pronounced facial expressions in the virtual classroom are all strategies that will help build teacher immediacy and have a positive impact on student engagement.[10] Teachers also may find it helpful to use a variety of strategies to encourage discussion, such as establishing private chat or breakout rooms to create smaller and more intimate groups to help create immediacy.

Presence can also foster a meaningful and collaborative learning experience in a virtual environment. Research highlights three distinct types of presence—cognitive, social, and teaching. Teachers can build cognitive presence by creating a learning environment that will facilitate and cultivate critical thinking skills while students are also absorbing the academic content.[11] By supporting students' intellectual growth, ideas, and challenges through dialogue and reflection, cognitive presence facilitates in-depth learning.[12]

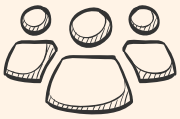
Teachers can foster social presence by creating a safe and comfortable environment in which students can thrive. Social presence provides students an environment in which they can voice their opinions, disagree with one another, and give and accept feedback.[13] By keeping open communication channels, acknowledging students' emotions, and creating a welcoming and cohesive space, teachers in an online setting can establish a sense of belonging and community.[14]

Lastly, teaching presence refers to a wide range of activities, including intentionally designing instructional materials and facilitating the delivery of the material in ways that are personally meaningful to students, educationally enriching, and with specific learning outcomes in mind.[15]

In an online environment, where students have more control over their time, being intentional about presence is crucial. Teachers in an online environment have to think explicitly about how to create and sustain cognitive, social, and teaching presence so students will be motivated and

Clear Instructions

Provide clear instructions to help students understand the class's expectations and learning objectives, as well as the tasks students need to complete both at the outset and throughout the class.

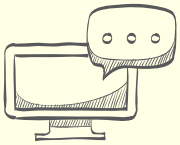


Authenticity

Use synchronous meeting times to establish authentic and meaningful connections with students.

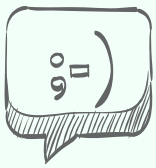
Use immediacy strategies such as addressing students by name and using humor and facial expressions.

Spend time on community building activities and find ways to create a sense of belonging in the classroom.



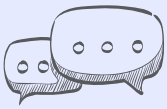
Feedback

Provide frequent and consistent feedback to students to build connections, in addition to one-on-one meetings.



Real People

Create opportunities for your students to get to know you as a real person; embrace moments of vulnerability.



Regular Interaction

Interact with students on a regular basis outside of synchronous learning time through email, regular check-ins, or office hours.

Involvement

Use features such as chats and breakout rooms to involve students in the conversation and encourage collaboration to foster immediacy.

intellectually engaged throughout their learning experience. Some ways to implement different forms of presence are: being intentional about how to compile, organize, and communicate course materials in a way that is easy to navigate and understand; creating opportunities for students to receive formative feedback on their learning rather than waiting until the end of a lesson, chapter or unit; and making room for collaborative learning during synchronous sessions to establish a sense of community.

Conclusion

A good teacher is attuned to the needs of their students and strives to create a welcoming space for students to thrive. Immediacy and presence can be helpful strategies for online teachers to build their teaching practices by allowing them to be authentically present in a virtual space and to foster a productive learning environment. Ed

Işıl Çelimli is a research scientist at Avenues The World School. She has multiple years of teaching experience at college and K–12 levels. Her research areas are qualitative research methods, thinking skills, learning sciences and organizational sociology. Işıl holds a doctoral degree in sociology from Columbia University.

Charles Xavier is a research scientist at Avenues The World School. Trained as an educational psychologist and educational neuroscientist, he is currently studying cognitive biases and how to overcome them through educational intervention. In addition to work in a fMRI laboratory, he has experience as a special education teacher.

Endnotes

1. Rebecca B. Worley, "The Medium Is Not the Message," *Business Communication Quarterly* 63, no. 3 (2000): 93–103.
2. Claire Howell Major, "Do Virtual Professors Dream of Electric Students? University Faculty Experiences with Online Distance Education," *Teachers College Record* 112, no. 8 (August 1, 2010): 2154–2208, https://doi.org/10.1177/016146811011200802.
3. Nancy Walters Coppola, Starr Roxanne Hiltz, and Naomi G. Rotter, "Becoming a Virtual Professor: Pedagogical Roles and Asynchronous Learning Networks," *Journal of Management Information Systems* 18, no. 4 (March 1, 2002): 169–89, https://doi.org/10.1080/07421222.2002.11045703.
4. Brianne L. Moore-Adams, W. Monty Jones, and Jonathan Cohen, "Learning to Teach Online: Systematic Review of the Literature on K-12 Teacher Preparation for Teaching Online," *Distance Education* 37, no. 3 (2016): 333–48.
5. Terry Anderson et al., "Assessing Teaching Presence in a Computer Conferencing Context," *Online Learning* 5, no. 2 (March 19, 2019), https://doi.org/10.24059/olj.v5i2.1875.
6. Evrim Baran, Ana-Paula Correia, and Ann Thompson, "Transforming Online Teaching Practice: Critical Analysis of the Literature on the Roles and Competencies of Online Teachers," *Distance Education* 32, no. 3 (November 1, 2011): 421–39, https://doi.org/10.1080/01587919.2011.610293.
7. Maria Schutt, Brock S. Allen, and Mark A. Laumakis, "The Effects of Instructor Immediacy Behaviors in Online Learning Environments," *Quarterly Review of Distance Education* 10, no. 2 (2009): 135.
8. Shanna Smith Jaggars, Nikki Edgecombe, and Georgia West Stacey, *Creating an Effective Online Instructor Presence*, (Columbia University, Community College Research Center, 2013), https://eric.ed.gov/?id=ED542146.
9. Schutt, Allen, and Laumakis.
10. J.B. Arbaugh, "How Instructor Immediacy Behaviors Affect Student Satisfaction and Learning in Web-Based Courses," *Business Communication Quarterly* 64, no. 4 (December 1, 2001): 42–54, https://doi.org/10.1177/108056990106400405.
11. Terry Anderson, *The Theory and Practice of Online Learning*, 2nd ed (Edmonton: AU Press, 2008).
12. Jessica R. McCarty, "Humanizing Online Learning: A Phenomenological Investigation of Teaching Presence" (PhD Thesis, Frostburg State University, 2020).
13. Anderson.
14. McCarty.
15. Anderson et al.

The ONLINE LEARNING Landscape

SCHOOL	TYPE	FOUNDED	ACCREDITATION	GRADES	STUDENTS	CURRICULUM
The American Academy	private	2007	Cognia	9–12	950	national standards (US)
Apex Learning Virtual School	private	2011	Cognia, NCAA	6–12	–	AP, UC-approved courses
ASU Prep Digital	public charter	2018	Cognia	K–12	7200	state aligned (AZ)
Avenues Online	private	2011	NEASC, NCAA	N–12	150	Avenues World Elements
Broward Virtual School	public	2001	Cognia	6–12	700	state aligned (FL)
California Preparatory Academy	public	2012	WASC	9–12	260	state aligned (CA)
Calvert Academy	private	–	Cognia	K–12	1500	interactive lessons, practical projects, and cumulative tests
Christa McAuliffe Academy School of Arts and Sciences	private	2009	WASC, NCAA	K–12	600	self-paced, mastery-based, personalized online education
Dwight Global Online School	private	2014	CIS, Cognia	6–12	300	AP, IB
Forest Trail Academy	private	2007	SACS CASI, MSA-CESS, Ai, NCPSA	K–12	800	Common Core state standards, AP
George Washington University High School	private	2010	MSA-CESS	8–12	530	Stride K12
Indiana University High School	public	1925	Cognia, NCAA	9–12	1250	state aligned (IN)
International Connections Academy/ Pearson Online Academy	private	2009	MSA, Cognia, NCAA	K–12	2080	US aligned, English-medium
International Virtual Learning Academy	private	2007	Cognia, NCAA	K–12	1012	Accelerate Education, Apex Learning, et al.
iUniversity Prep	public	2013	TEA, NCAA	5–12	1400	AP available, state aligned (TX)

FEEDBACK AND GUIDANCE	DIFFERENTIATOR(S)
Teachers are available during specified business hours.	An individualized, self-paced program granting a diploma, with homeschooling and summer school
Teachers respond to student emails within one business day. Students have access to live help.	Full-time, part-time, and individual course enrollment
Learning success coaches (LSCs) support course planning, goal setting, and college applications and act as a liason between teachers and families.	College prep K–12 curriculum; affiliated with Arizona State University
1:1 instruction is an option.	A custom learning platform paired with a Great Books inspired curriculum; global student body and high levels of flexibility
Teachers and counselors live locally (south FL) to assist in meeting students' diverse needs.	Full-time or part-time enrollment to supplement in-person learning (school or home-based)
Offers a comprehensive counseling program that supports the whole child.	A virtual curriculum blended with face-to-face instruction
A personalized academic support team of teachers, advisors, and counselors is selected to assist the student.	An individualized learning plan based on student's goals, academic standing, and style of learning; one-to-one tutoring is available
Live online classroom, email, telephone, and instant messaging are contact methods. Teachers connect with students weekly or more as needed.	Personalized learning model taking into account student's learning style
All students receive individual attention from a mentor.	Real-time video conference seminars, individual online tutorials, and optional residential experiences
Advisors help each student evaluate goals to create a learning path that accommodates individual academic needs.	Self-paced and student-centered curriculum with an emphasis on rigor and vocational orientation
Faculty members use online classroom software for synchronous class sessions, office hours, tutorials, one-on-one sessions, and conferences.	A partnership between GWU and StrideK12 offers a college prep program through a combination of synchronous and asynchronous learning
Assignments and exams are reviewed by teachers, who provide feedback and are available to answer questions by email, phone, and Zoom.	A self-paced curriculum; students have between 6 weeks and 6 months to complete each course
Teachers lead online classes and work with students' learning coaches (often adult family members) to support and monitor students.	Self-paced classes and sequencing of the curriculum to fit students' needs and interests
A dedicated success coach works to identify the best curriculum, programs, and teaching methods for students. Teachers offer live sessions if needed.	A highly personalized learning experience with access to a variety of curricula to meet students' individual needs
All iUniversity Prep teachers (called professors) are Grapevine-Colleyville ISD teachers dedicated solely to the virtual campus.	Tuition-free, flexible program with the option to learn at home

The ONLINE LEARNING Landscape

SCHOOL	TYPE	FOUNDED	ACCREDITATION	GRADES	STUDENTS	CURRICULUM
K12 Private Academy	private	2000	SACS CASI, NCAA, VCPE	K–12	4743	Stride K12
Kansas Online Learning Program	public	2010	–	K–12	–	Lincoln Empowered (K-5), Edgenuity (6-12)
The Keystone School	private	1974	Cognia, MSACS, WASC	K–12+	12600	Stride K12
Khan World School	private	2022	–	9–12 planned	200	Khan Academy
Laurel Springs School	private	1991	WASC	K–12+	4300	AP, college prep
Learning Post Academy	public	1980	WASC, NCAA	7–12	265	Common Core, utilizing Apex online curriculum provider
Minerva Virtual Academy	private	2020	–	6–12	–	UK iGCSE (International General Certificate of Secondary Education)
Mt. Everest Academy	public	1980	WASC	K–12	290	state aligned (CA)
MUSE Virtual	private	2006	WASC	K–12	–	state aligned (CA)
Orange Lutheran Online High School	private	2004	NLSA, WASC	9–12	1394	AP
Pearson Online Academy	private	2009	Cognia, NCAA, MSA, et al.	K–12	–	AP
Stanford Online (HS)	private	2006	WASC, CAIS, CIS	7–12	900	AP and university level courses
University of Texas High School	public	1999	TX Board of Education	9–12	274	state aligned (TX), honors and AP
Virtual Learning Academy Charter School	public charter	2008	NH Board of Education	9–12	475	Florida Virtual School, eDynamics Learning

FEEDBACK AND GUIDANCE	DIFFERENTIATOR(S)
Early childhood students have a single "homeroom" teacher. In middle school, teachers offer live tutoring sessions. High school students have a team of teachers working together.	Full-time, part-time, and summer school enrollment options; flexible start dates; and an interactive online curriculum
Every student is assigned a Kansas certified teacher, who maintains a minimum of weekly contact with the student.	Alternative for students who have not had their needs met in a traditional educational setting
Teachers are available for connection during specific hours on specific days, depending on the course taught.	A fully self-paced curriculum
Students have daily contact via seminars and/or small group tutorials.	A competency-based instructional model with peer-to-peer tutoring using the Khan Schoolhouse world system, in addition to college-level courses and student-driven mastery projects
All students receive academic counseling at Laurel Springs. Counselors help develop a personalized education plan for each student.	A wide range of courses, including college prep, honors, and AP; students in 6–12 can apply for admission to The Academy at Laurel Springs, a rigorous and advanced program
A supervising teacher helps develop a schedule based on the individual needs of the student.	The option of dual enrollment at student's residence area school
Mentors oversee all aspects of academic progress, student well-being, and involvement in school life.	Smart technology and engaging online resources combined with one-to-one support, active group learning, and exciting multi-disciplinary projects
Students and parents are supplied with educational materials and workshops.	An "independent study" style learning environment for students K–12
Students are assigned teachers and advisors and meet daily in virtual classrooms.	Individualized learning plan combining passion-based learning and core academics with an emphasis on sustainability
Teachers facilitate the live classes. Each teacher holds office hours Monday – Friday.	Integrates faith and learning with an intentional focus on social-emotional learning
Students, learning coaches/parents, and teachers check in throughout the year to review progress.	Allows students to focus on their interests while maintaining geographical flexibility
Academic advisors help plan an individualized course schedule and monitor progress toward graduation.	College-style seminar classes that meet synchronously at least twice weekly
Students interact with their course instructors within the Canvas Learning Management System.	An asynchronous, inquiry-based, online instructional model
Instructors provide feedback on assignments. Students meet with instructors through an online meeting platform.	A flexible learning environment with self-paced curriculum, as well as one-on-one meetings with instructors

Behind Their Screens

An Interview *with* Emily Weinstein

by Julia Higdon

Emily Weinstein is the author, with Carrie James, of *Behind Their Screens: What Teens Are Facing (and Adults Are Missing)*. The book offers readers windows into the issues teens face in their use of technology that are often misunderstood by adults. Drawing our attention away from simple "screen time" and toward the digital habits teens develop around distractions, comparisons, and the pull of the screens, the research provides insights into helping teens navigate their friendships, social conflicts, and online dramas.

JH *The overall goal of your book, which comes through quite powerfully, is to help readers work with teens to navigate this world and make sense of the dilemmas they face, so we can all get past alarming headlines and work toward building better skills and dispositions around technology use.*

I felt enlightened by your book and better equipped to support young people navigating a world that is profoundly connected through online social networks, a world I didn't inhabit as a teen. I'm especially grateful for how prominently you highlighted the perspectives of young people. I felt like I was hearing from them directly as well.

What inspired your interest in this topic?

EW It's pretty amazing that we get to spend our days thinking deeply about the ways social media and technology shape adolescents' lives. A primary emphasis of our work is on the ways adults can better support youth in this landscape, too, which is incredibly motivating because it feels essential and needed. We continue to find that there are real gaps between adults' assumptions and teens' realities. Thus, another focus of our research is figuring out how to narrow these gaps. In the book, we focused on breaking down for adults what's myth, what's reality, and how to have better conversations about tech with the teens in your life, whether you're a teacher, a school leader, or a parent.

"What is it like to grow up with social media and smartphones?"

I'm a psychologist, trained with a focus on adolescent development, and Carrie is a sociologist. We're both fascinated by the ways people think and behave—especially the dynamics of the adolescent years! A little over a decade ago, we started chasing answers to questions like: What is it like to grow up with social media and smartphones? How do these technologies matter for adolescents' lives and development? The technologies keep changing, and so do the ways teens use them. So, we've stayed curious—and busy!

JH *Any look at media coverage of teen use of these platforms and technologies will quickly show that a lot of adults have been asking these same questions. Unfortunately, that coverage doesn't do much to create a shared understanding of what the issues are or what problems may need to be solved. That is a major contribution of your book. What do you think was most valuable about the methods you used for your research?*

EW We involved teens at just about every step of the way. We used traditional methods—like a large-scale survey of over 3,500 middle and high schoolers—but also non-traditional methods. Most notably, we had a teen advisory council of twenty-two teens from diverse contexts, identities, and backgrounds. They worked with us over several months to co-interpret insights from survey data. They helped us get a teen-level view of issues like social conflict and drama, civic pressures online, sexting culture, and more.

JH *You concluded each chapter in your book with a summary of what teens want adults to know about the topic of the chapter. In a similar vein, what do you most want parents and teachers to know about young people's experiences with social media?*

EW Teens really want and need you to talk with them about tech and about the digital dilemmas they're facing. And you have real wisdom to offer. It's true that a lot is new and different. Frankly, Carrie and I are still baffled by all the new kinds of social information for teens to analyze and worry about. They puzzle over whether being the only "untagged" friend in a picture was an oversight or an intentional slight. They see Venmo transactions between friends and wonder why they weren't invited. They navigate ever-changing compositions of group text chats that formalize who's "in" and who's "out" of particular jokes and plans. And there's so much more! It's easy to feel like we just can't even figure out where to start when it comes to offering support and guidance. But beneath new technologies lie familiar feelings. We do know what it feels like to be left out. We do know what it feels like to wonder if friends are closer to each other than to us. Or to worry about how others see us. When we lean into the familiar feelings and connect back to our own adolescent experiences, it's easier to access empathy that fuels connection, validation, and support.

JH *How has your own parenting changed since you started doing this research?*

EW There are so many answers, but one is that I've really started paying much more attention to my own tech habits. I recently worked on a study with my colleague

Sarah Coyne. Among the adolescents we surveyed, about 50 percent reported that their parents are distracted by technology in ways that undermine parent-child relationships. I know that two things are true for me: there are times when it's really hard to resist the urge to check my email notifications or to respond to texts and I really don't want my daughter to feel like there's constant "technoference" in our relationship. So I've started using strategies like leaving my phone in another room and having very intentional times when I make sure she has my focused attention and tech isn't part of the equation.

JH *We are all truly struggling with many of the same issues.*

This quote struck me: "I am afraid people will lose the real world by spending too much time in the virtual world," said a [young person in your study]. "That terrifies me because we're destroying our planet, losing our empathy for those around us, and forgetting the beauty of simplicity."

It highlighted what is really a shared concern that both adults and young people have about the possible effects of too much time in virtual spaces. Based on your research, how might we work with young people to address some of these fears?

EW Adults often default to this us-versus-them battle with teens over screens, where we're like referees who blow the whistle when they're over time or issue a penalty when they do something wrong. But we found that teens share many of our concerns—they don't want to feel addicted to tech, dysregulated, or disconnected from things they care about. And yet, the pulls to their devices are real. There are design pulls (notifications! endless scroll!) and there are social pulls, like the desire to connect with friends or a concern about being left out or out of the loop. These layer on one another in ways that do make it hard to disconnect.

But adults

misinterpret the pull teens feel to their phones as a sign they just don't care about pulling away or that they're not worried about what they're losing out on by staring at their screens.

We've found adults are better positioned to deliver support if we recalibrate our roles and think of ourselves less like referees and more like coaches who support skill building and guidance and strategize around the hard plays. The idea of a coaching role gets us closer to an us-and-them approach to screen time that recognizes this battle against persuasive design is one we're all fighting.

JH *One of the ways we might be valuable as coaches is in helping teens develop digital metacognition. In your book you wrote, "We miss the chance to help [young people] develop digital metacognition: moving from mindless use to more active awareness. Managing the pull of the screen requires a mind shift—for us all." Would you tell us more about digital metacognition and how we might work together with young people to promote active awareness?*

EW Digital metacognition is about boosting our awareness about tech and the thoughts and behaviors we have related to it. Rather than mindlessly defaulting to our usual tech habits and routines, we want to shift to a more mindful place where we're aware of what we're doing, when we're doing it, and what we might want to do instead. Our research team has been fascinated by how we can help teens move from mindless to more mindful tech use. We created a digital habits check-up that helps educators guide teens through taking stock of habits and experimenting with changes. It's based on the insight that it's powerful

> "... adults are better positioned to deliver support if we recalibrate our roles and think of ourselves less like referees and more like coaches..."

for teens to reflect on their tech habits and realize they can change habits that aren't serving them.

We're also currently creating a few new learning activities that we're excited to make available for free later this fall. Once they're available, you'll be able to find them through our book website, behindtheirscreens.com.

High-level, one of the simplest things adults can do is actually modeling and narrating some of our own thoughts, pulls, and choice points. Saying things like "Oh, I'm feeling really distracted by my phone today, I'm going to put it on silent and move it across the room" or "I'm experimenting with turning off notifications this week." We can also ask questions like "How do you manage tech distractions when you really want to focus?"

For those who work with teens in schools, we can hold discussions about our use of technology during class, openly discuss advantages and pitfalls, and co-design norms to help support each other to learn and stay focused. You might also highlight some strategies that teens in our research described using when they want to stay focused while studying, such as creating online channels and chats or Zoom-based study groups. These kinds of guiding questions and practices encourage young people to reflect on what they do that works, as well as strengthening awareness and commitment to adaptive strategies.

JH *You also talk in your book about supporting the development of digital agency in young people. Can you summarize the concept of digital agency and the most important ways we can support it?*

EW In so many areas of digital life, we saw evidence from teens of a struggle to feel and to be in control. We write about these in our book. The struggle shows up as they fight to regulate digital habits amid powerful design pulls and developmental sensitivities. It surfaces when features like Snapchat streaks compel ongoing exchanges they may not want to keep up. When they're asked for nudes and don't know how to say no or manage requests.

> *"... by **anticipating** and discussing different dilemmas **before** they arise, we can help **lessen anxiety** and create ways to scaffold communication skills."*

When they care about a civic issue but recognize the perils of posting and of staying silent. In the book, we talk about a variety of different paths to support agency. One is building personal agency by supporting skills and strategies related to these situations. For example, helping teens learn about persuasive design and how strategies like turning off notifications can help them take back control over their attention. But also, by anticipating and discussing different dilemmas before they arise, we can help lessen anxiety and create ways to scaffold communication skills. With our colleagues at Common Sense Media, we've created a free set of digital dilemma scenarios and some thinking routines that can be used alongside them to help do this kind of anticipatory exercise and actually help teens identify language for what they could say or do in a particular situation.

JH *What do you think is most important for people leading online schools to take into consideration when creating policies or guardrails around young people's use of online platforms during and outside of school?*

EW We advocate schools taking a disposition-centered approach to preparing youth for digital life. For sure, we need to help students build specific skills—for example, media literacy skills, how to use privacy settings, etc. But we also need to build dispositions if we actually want them to put those skills to use in their real lives when digital dilemma situations arise.

When we use the term disposition, we're drawing on our Project Zero colleagues' dispositions framework, which has three key pieces: skills (the things we know how to do), sensitivity to moments when those skills are relevant, and inclination to follow through and actually use them.

Let's say you have a skill to know how to "report" when someone is cyberbullying. If you don't notice that it's happening, your skill doesn't get used due to a failure of sensitivity. If you notice it and you know what to do, but you don't follow through for one reason or another, that's an inclination issue.

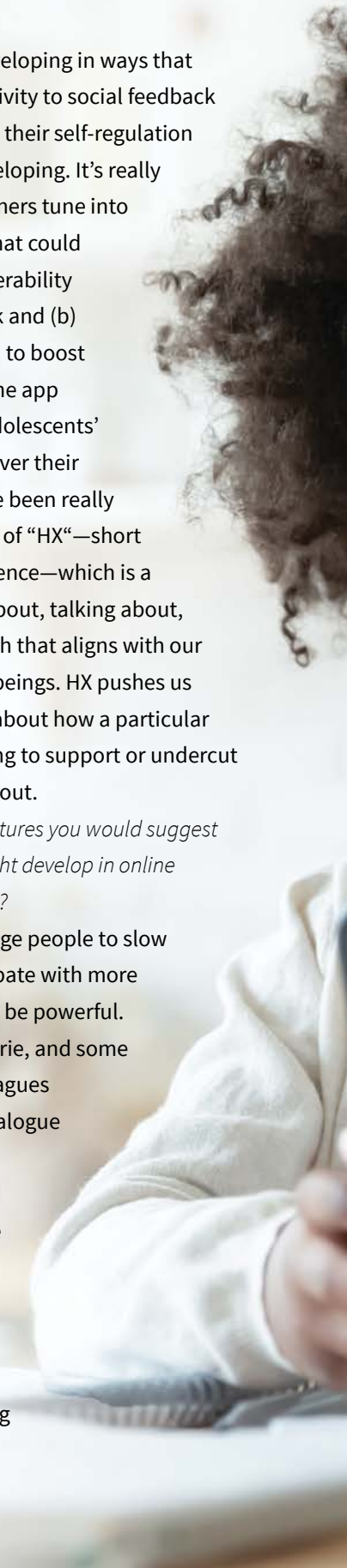
Dispositions to slow down (especially when tech is designed to move fast), to explore and care about others' perspectives, to seek facts and evidence, to envision options and impacts, and to take action thoughtfully all feel especially essential in a digital age. Carrie James and I are working now on our next book, which is focused on these essential dispositions for digital life. It will be out next year from Jossey-Bass and, in the meantime, you can read about some of our early thinking on dispositions for digital life and how it informed the Common Sense Digital Citizenship Curriculum.

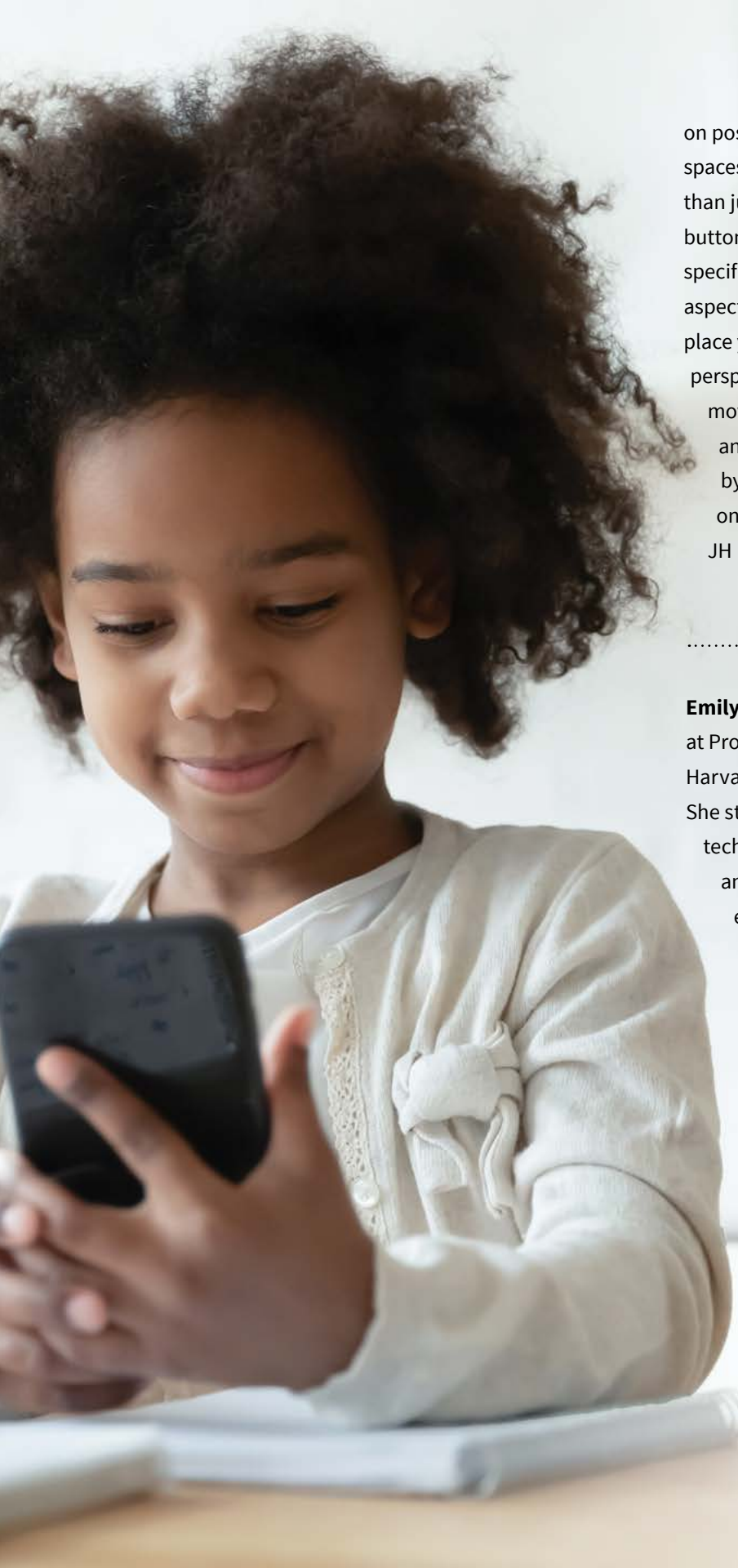
JH *What do you think is most important for designers creating online learning platforms to know about child and adolescent development? Are there platform features that should be avoided?*

EW Adolescents are especially vulnerable to many design "tricks" that are often used to boost engagement: their brains are changing and developing in ways that elevate the sensitivity to social feedback and rewards, plus their self-regulation skills are still developing. It's really critical that designers tune into (a) any features that could prey on that vulnerability to social feedback and (b) features designed to boost engagement on the app but undermine adolescents' sense of control over their own habits. We've been really drawn to the idea of "HX"—short for human experience—which is a way of thinking about, talking about, and designing tech that aligns with our needs as human beings. HX pushes us to ask questions about how a particular technology is going to support or undercut values we care about.

JH *What are some features you would suggest that designers might develop in online learning platforms?*

EW Features that nudge people to slow down and participate with more intentionality can be powerful. My co-author, Carrie, and some of her other colleagues have created a Dialogue Toolkit to directly support slow, intentional online discussions. The toolkit contains a series of moves for consideration when commenting





on posts and discussing issues in digital spaces. For example: Appreciate. Rather than just clicking the "like" or "love" button, say what you appreciate and be specific. Another move: Name. Name the aspects of your identity, experiences, or place you live that are influencing your perspective on an issue. Deploying these moves can help bridge the distance and uncertainty ("What do they mean by that?") that youth can often feel in online exchanges.

JH *Thank you for taking the time to chat about your research and book.* Ed

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Growing Parent Involvement in Online Learning

by **Drew Cortese** and **Amy Young**

Stakeholders across the board (policymakers, researchers, and educators) have come to agree that parent involvement is critical for students' academic success.[1] Some researchers have even suggested that the socio-psychological environment in the home has more impact on student achievement than socioeconomic factors of the parents and family.[2]

Additionally, research shows that parents' active involvement in their children's education has a higher impact on social, emotional, and academic growth than more passive involvement—for example, teaching specific literacy strategies vs. reading to the child.[3] Verbal interactions between parents and children, reading at home, expectations and aspirations of parents for achievement, affective relationships between parents and children, communication between parents and children about school, and parental beliefs about the child, as well as discipline and control strategies, are among factors enabling parents to positively influence their children's academic success.[4]

But what does it mean for parents to be "actively involved"? As it turns out, researchers have answered this question. One study found parent participation in learning and supportive parenting were more highly correlated to student achievement than other forms of active involvement such as homework supervision, monitoring school progress, and even communication with school and teachers.[5] In fact, this study found homework surveillance, restrictions for disappointing grades, and external rewards were negatively correlated with student achievement. Similarly, parent aspirations and expectations had the most impact on children's

achievement, whereas parental monitoring of homework, time watching television, and time with friends had a negative effect on the aspirations of adolescent students.[6]

Schools play a big role in facilitating parental involvement. Research has shown that parents' perceptions of their role in their child's life and their self-efficacy in helping their child succeed are key factors in their involvement, combined with parents' perceptions of general invitations, demands, and expectations from their children's school.[7] Parents' perception of a welcoming school environment and informative home-school communication is positively related with their heightened sense of responsibility to be involved, which in turn is positively associated with parents' actual involvement.[8]

Research on parental involvement shows that when parents are brought on board as partners, everyone benefits—most of all the students. Further, parental support is a dynamic process, one that can be vital for school success when it is intentional and well-guided.[9]

How, then, can we leverage these concepts in online learning environments? We will address three key areas from the literature for which parent involvement is especially crucial in virtual learning contexts: how to build habits while supporting autonomy, student social-emotional well-being, and communication.

Instilling Habits, Supporting Autonomy

One of the most distinguishing characteristics of online learning is that the schedule offers tremendous flexibility, much like what students will find in higher education.[10] In this flexible environment, parents play a key role in creating and facilitating physical spaces, schedules, and organizational systems to enhance their child's learning and overall success.[11] From the outset, one of the crucial tasks for online school educators and administrators is to make parents aware that, depending on a student's age, they must anticipate playing an active and sustained role in supporting their child develop autonomy and positive work habits.

Helping design a schedule that provides enough structure and guidance while supporting the student's sense of autonomy is one aspect of this role. A deliberate structure that will encourage students to complete their work but also allow them to work independently, help them learn to solve problems on their own, and ask for help when needed, is vital for success in online learning environments.

> *"Establish clear routines, set expectations for time spent, and understand which spaces in the home can support school work."*

Helping parents understand that while it isn't necessary, or even advisable for all children, to replicate the schedule of a traditional school day or even the structured experience of a classroom, it remains important to establish clear routines, set expectations for how students spend their time, and understand which spaces in the home can support school work. In particular, educators can encourage parents and children to collaborate on how the student's days

and weeks will be structured to ensure learning is occurring and assignments are completed and submitted on time.

Self-determination theory has long established that autonomous motivation is best supported in environments where students' basic psychological needs for competence, relatedness, and autonomy are fulfilled.[12] Research shows us that higher levels of autonomous motivation are associated with positive educational outcomes and student well-being.[13] In a school setting, educators use a variety of strategies to support student autonomy by allowing students to take charge of their learning, creating opportunities to explore and test new ideas without pressure, and providing effective and clear feedback. Parental support of student autonomy also fosters the growth of intrinsic motivation in students and thereby factors in self-regulated learning.[14] Parental support for autonomy is crucial in virtual learning environments, as students are often new to and inexperienced in building these habits on their own and may find it challenging. Through acknowledging negative feelings, providing meaningful rationale for school work, using non-controlling language, offering choices, and nurturing motivational resources, parents and educators can work together to support children's autonomy.

Supporting autonomous learning and establishing predictable routines are also essential for building study habits and achievement.[15] Dedicated workspaces in the home for the various types of activities in which students engage throughout the day will help them establish routines. Encouraging parents to work with their child to identify quiet spaces with minimal distractions that will be conducive to reading, research, and video calls, while also identifying appropriate spaces for working on projects that require building, construction, art, or lab work, will be a great asset in students' learning. It is also important to arrange organized storage for school materials, books, work artifacts, and reference materials so students can retrieve things quickly and without help and the materials don't get lost.

Parents can help their children understand that their devices are also school workspaces. Navigating this is challenging for students because they also use their devices for personal activities, entertainment, and communicating with friends. Another important role for parents is to help children organize their devices (desktops, folders, web browsers, and bookmarks) so school materials are easily located and distinct from non-school activities.

Families can establish "use agreements," such as avoiding social media and texting during designated "school hours," to help students stay focused. Using an app such as SelfControl to regulate access to websites during designed times and turning off all notifications when focusing on school are strong recommendations.

> *"Parents benefit from having a clear understanding of how to communicate with teachers and the school."*

In addition to arranging physical spaces conducive to productive work time, research shows that literacy-rich environments are beneficial for students' language and literacy development.[16] This concept refers to both formal literary experiences such as explicitly teaching letters and words and informal ones such as shared book reading.[17] While research does indicate that the impact of these experiences on language and reading development can vary by cultural context,[18] encouraging parents to engage their child in formal literacy activities will help students develop these skills.

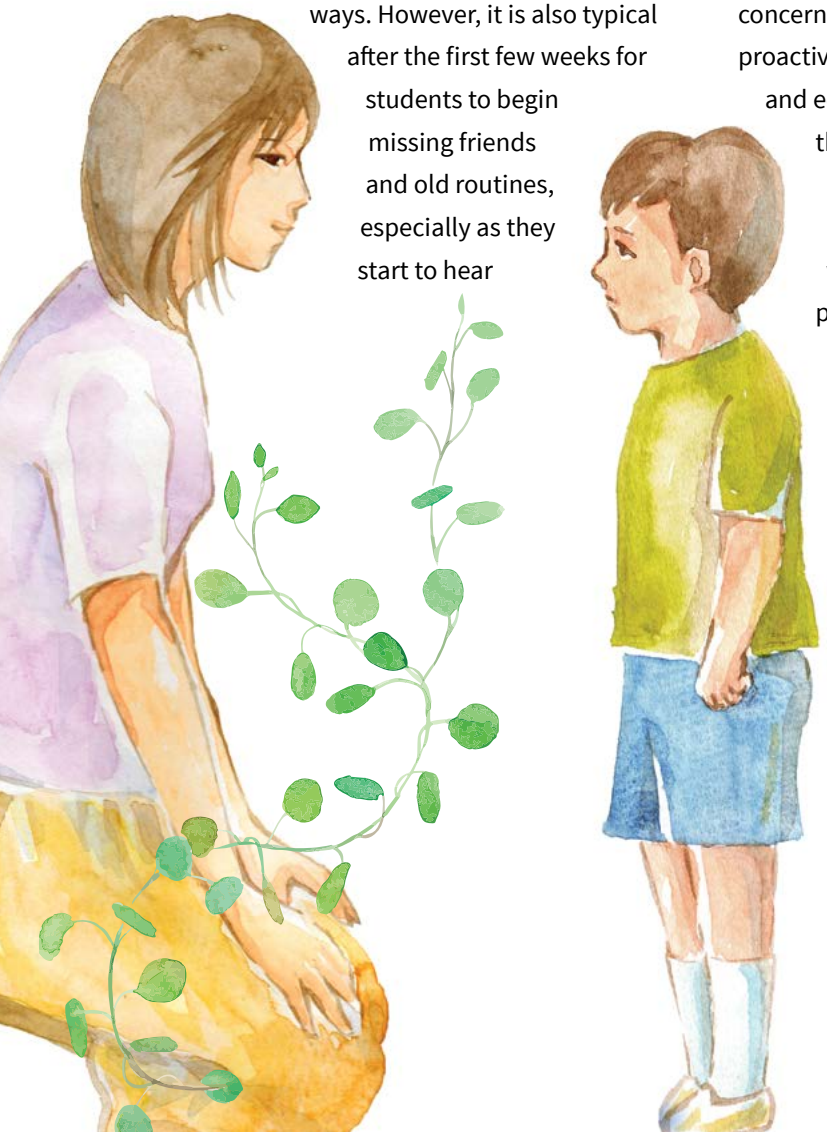
Throughout the year, teachers and school leadership can initiate conversations with families to identify the conditions most conducive to the student's concentration and productivity. These conversations can help students reflect on the conditions and situations where they have been most productive and the contexts where they have been distracted. For some students, listening to music can help them concentrate on what they are doing or reading; for others, listening to music can slow them down or diminish their comprehension of material.[19] Similarly, during what hours of the day is the student most alert and productive? How long can a student focus productively on a task? How often do they need breaks and how long is enough to rest their minds and move their bodies? How can they best manage their time to ensure work is completed and submitted by due dates? Educators can assure parents that levels of student productivity and lengths of periods of focus vary significantly by student and by grade level and can change over the course of an academic year. Similarly, teachers can help families by comparing answers to these questions with the school's expectations for how much synchronous and asynchronous time should be allotted to school each day.

Social and Emotional Considerations

Often, one of the first concerns prompted by the idea of online education is that students will lack access to the social and emotional support needed for a healthy childhood and adolescence. It is true that in-person schooling provides pathways for social engagement and interacting with peers that are not easily replicated due to the nature of online learning.[20] Nonetheless, online schools can help parents anticipate and meet the social-emotional needs of their child by ensuring their child has access to relationships and activities that will be

nurturing and rewarding. Online schools need to set an expectation that parents of children in full-time online learning identify local opportunities for their child to build connections and friendships and to interact with other young people. These activities may include playgroups, sports and other competitive teams, community groups, religious organizations, studio and performing arts programs, and service activities.

It is typical for students who are entering full-time online learning for the first time to experience emotional highs and lows. At the beginning of the semester, students often are excited about the flexibility in their schedules, connecting with teachers and peers, and using their devices in new ways. However, it is also typical after the first few weeks for students to begin missing friends and old routines, especially as they start to hear about events happening at other schools. These feelings should pass as they become more deeply involved in their online programming and begin forming new friendships. But if after two months a child continues to appear sad or not gain traction in their academics, it is important for the family and the school to address the student's well-being and academic trajectory.



Communication

Maintaining regular and open communication with families is a critical role for any online school. Parents benefit from having a clear understanding of how to communicate with teachers and the school about academic or social-emotional concerns. This requires teachers to take a proactive role in establishing these connections and educating families about the channels that exist to facilitate communication and provide support. Educators should communicate how and when the school will contact parents about a student's work, performance, and well-being. Online schools can also provide training so parents feel confident navigating all the learning platforms, portals, and passwords associated with their child's learning.

Teachers should also inform parents about how students access assignments and instructional resources, how students submit work and communicate with teachers, and how teachers communicate with the students. This information will allow parents to provide help when children are frustrated, having difficulty navigating instructions, or need assistance submitting assignments. Teachers can also coach parents to help

> *"Without opportunities to passively observe children through the day, teachers must rely on strong communication from home—from parents and children..."*

students develop the confidence and self-awareness to reach out when they need help. Finally, it is critical in an online environment for parents to notify teachers if they see their child struggling significantly in any aspect of their school experience. Without opportunities to passively observe children through the day, teachers must rely on strong communication from home—from parents and children—to make sure students are getting the academic, social, and emotional support they need. Recognizing that parental involvement is a continuum,[21] too little involvement can be detrimental to a student's learning and well-being, while over-involvement and too much intrusion can similarly be an obstacle. Educators and parents should seek the right balance to leverage optimal parental support.

Conclusion

Without the benefit of the active engagement and observation that happens with in-person learning, online schools must partner closely with parents to ensure the online experience is paired with excellent support in the home. Educators can coach parents to support online learners by:

- Setting up **dedicated workspaces** to support the various activities in which students will engage, including spaces to organize school material and device chargers, for easy access.
- Helping students **organize devices** to keep school materials separate from personal materials and free of distraction.
- **Holding ongoing conversations** with their child throughout the year to identify conditions most conducive to productivity.
- **Establishing routines, schedules, and structures** to ensure students 1) know when they should be focusing on their school work, 2) are making progress to submit assignments when they are due, and 3) have sufficient time for non-school related activities.
- **Monitoring their child's well-being and academic performance** to ensure they are engaging in their work and developing connections with teachers and peers.
- **Ensuring their child has access to in-person extracurricular activities** where they can create strong social bonds and identify adult mentors.
- **Becoming familiar with communication channels and resources** available to parents and their child to access assistance. Ed

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Endnotes

1. Lisa Boonk et al., "A Review of the Relationship between Parental Involvement Indicators and Academic Achievement," *Educational Research Review* 24 (2018): 10–30, https://doi.org/10.1016/j.edurev.2018.02.001.

2. John Hattie, *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement* (London: Routledge, 2008), https://doi.org/10.4324/9780203887332; Barbara K. Iverson and Herbert J. Walberg, "Home Environment and School Learning," *The Journal of Experimental Education* 50, no. 3 (1982): 144–51, https://doi.org/10.1080/00220973.1982.11011815.

3. Christa L. Green et al., "Parents' Motivations for Involvement in Children's Education: An Empirical Test of a Theoretical Model of Parental Involvement," *Journal of Educational Psychology* 99, no. 3 (2007): 532–44, https://doi.org/10.1037/0022-0663.99.3.532; Monique Sénéchal, "Testing the Home Literacy Model: Parent Involvement in Kindergarten Is Differentially Related to Grade 4 Reading Comprehension, Fluency, Spelling, and Reading for Pleasure," *Scientific Studies of Reading* 10, no. 1 (2006): 59–87, https://doi.org/10.1207/s1532799xssr1001_4.

4. Boonk et al.

5. Charlotte J. Rosenzweig, *A Meta-Analysis of Parenting and School Success: The Role of Parents in Promoting Students' Academic Performance* (Hofstra University, 2000).

6. Sehee Hong and Hsiu-Zu Ho, "Direct and Indirect Longitudinal Effects of Parental Involvement on Student Achievement: Second-Order Latent Growth Modeling Across Ethnic Groups," *Journal of Educational Psychology* 97, no. 1 (2005): 32–42, https://doi.org/10.1037/0022-0663.97.1.32; William H. Jeynes, "The Relationship Between Parental Involvement and Urban Secondary School Student Academic Achievement: A Meta-Analysis," *Urban Education* 42, no. 1 (2007): 82–110, https://doi.org/10.1177/0042085906293818.

7. Kathleen V. Hoover-Dempsey and Howard M. Sandler, "Why Do Parents Become Involved in Their Children's Education?," *Review of Educational Research* 67, no. 1 (1997): 3–42, https://doi.org/10.3102/00346543067001003.

8. Sira Park and Susan Holloway, "Parental Involvement in Adolescents' Education: An Examination of the Interplay among School Factors, Parental Role Construction, and Family Income," *School Community Journal* 28, no. 1 (2018): 9–36.

9. Joyce L. Epstein, *School, Family, and Community Partnerships: Preparing Educators and Improving Schools*, 2nd ed. (New York: Routledge, 2019), https://doi.org/10.4324/9780429493133.

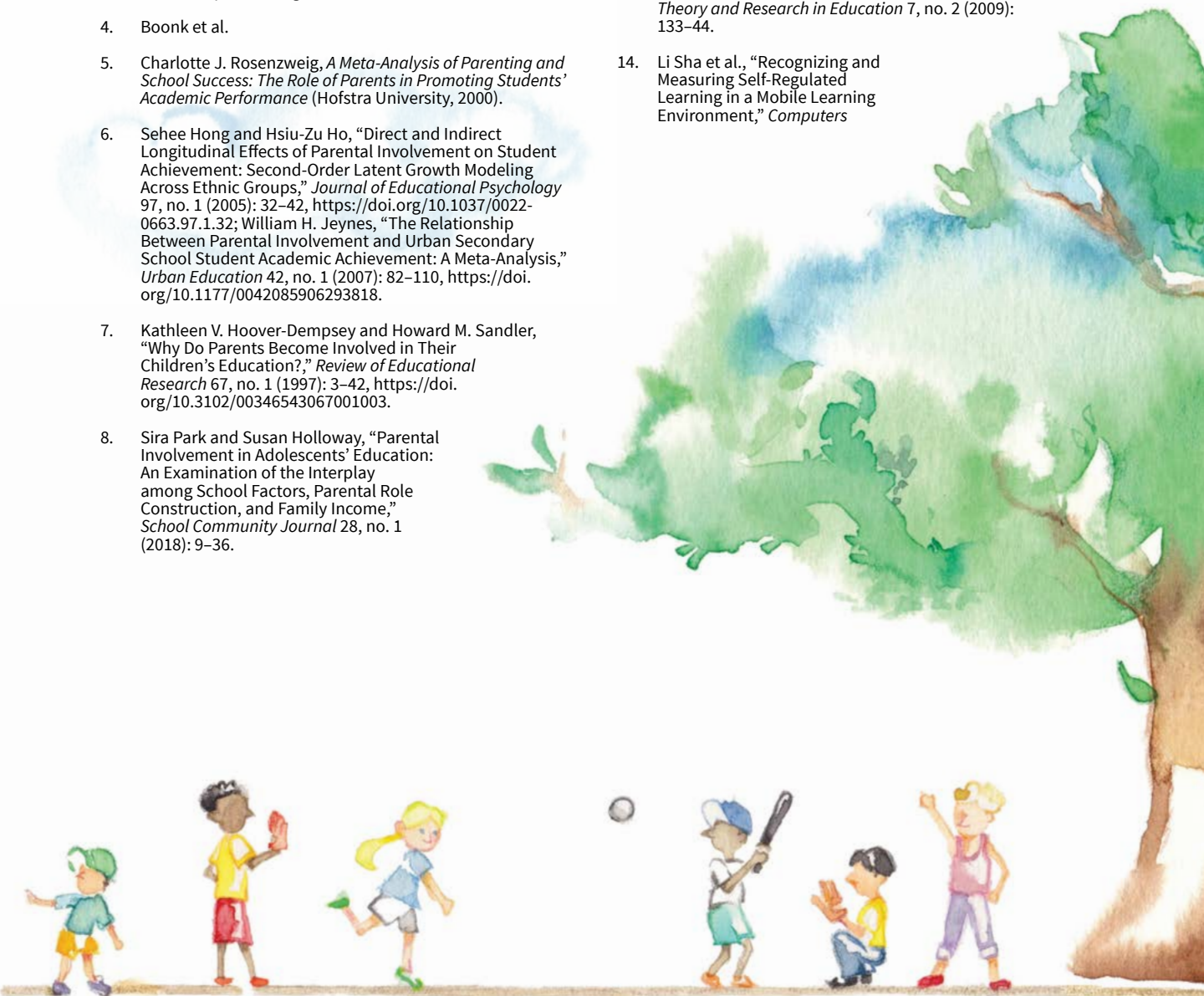
10. Barbara Means et al., *Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies* (US Department of Education, 2009), https://eric.ed.gov/?id=ED505824.

11. Erik W. Black, *An Evaluation of Familial Involvements' Influence on Student Achievement in K–12 Virtual Schooling* (University of Florida, 2009).

12. Edward L. Deci and Richard M. Ryan, "Facilitating Optimal Motivation and Psychological Well-Being across Life's Domains," *Canadian Psychology/Psychologie Canadienne* 49, no. 1 (2008): 14–23, https://doi.org/10.1037/0708-5591.49.1.14.

13. Christopher P. Niemiec and Richard M. Ryan, "Autonomy, Competence, and Relatedness in the Classroom: Applying Self-Determination Theory to Educational Practice," *Theory and Research in Education* 7, no. 2 (2009): 133–44.

14. Li Sha et al., "Recognizing and Measuring Self-Regulated Learning in a Mobile Learning Environment," *Computers*



in Human Behavior 28 (2012): 718–28, https://doi.org/10.1016/j.chb.2011.11.019.

15. Lixin Ren and Jieqiong Fan, "Chinese Preschoolers' Daily Routine and Its Associations with Parent-Child Relationships and Child Self-Regulation," *International Journal of Behavioral Development* 43, no. 2 (2019): 179–84, https://doi.org/10.1177/0165025418811126; Junsheng Liu et al., "Daily Routines, Parent–Child Conflict, and Psychological Maladjustment among Chinese Children and Adolescents during the COVID-19 Pandemic," *Journal of Family Psychology* 35, no. 8 (2021): 1077–1085, https://doi.org/10.1037/fam0000914.

16. Michelle Hood, Elizabeth Conlon, and Glenda Andrews, "Preschool Home Literacy Practices and Children's Literacy Development: A Longitudinal Analysis," *Journal of Educational Psychology* 100, no. 2 (2008): 252–71, https://doi.org/10.1037/0022-0663.100.2.252.

17. Sénéchal, "Testing the Home Literacy Model"; Monique Sénéchal and Jo-Anne LeFevre, "Parental Involvement in the Development of Children's Reading Skill: A Five-Year Longitudinal Study," *Child Development* 73, no. 2 (2002): 445–60, http://www.jstor.org/stable/3696368.

18. Su-Zhen Zhang et al., "How Does Home Literacy Environment Influence Reading Comprehension in Chinese? Evidence from a 3-Year Longitudinal Study," *Reading and Writing: An Interdisciplinary Journal* 33, no. 7 (2020): 1745–67, https://doi.org/10.1007/s11145-019-09991-2.

19. Alice-Ann Darrow et al., "Effect of Preferred Music as a Distraction on Music Majors' and Nonmusic Majors' Selective Attention," *Bulletin of the Council for Research in Music Education*, no. 170 (2006): 21–31; Fumiya Mori, Fatemeh Azadi Naghsh, and Taro Tezuka, "The Effect of Music on the Level of Mental Concentration and Its Temporal Change," in *CSEDU* 1, 2014, 34–42.

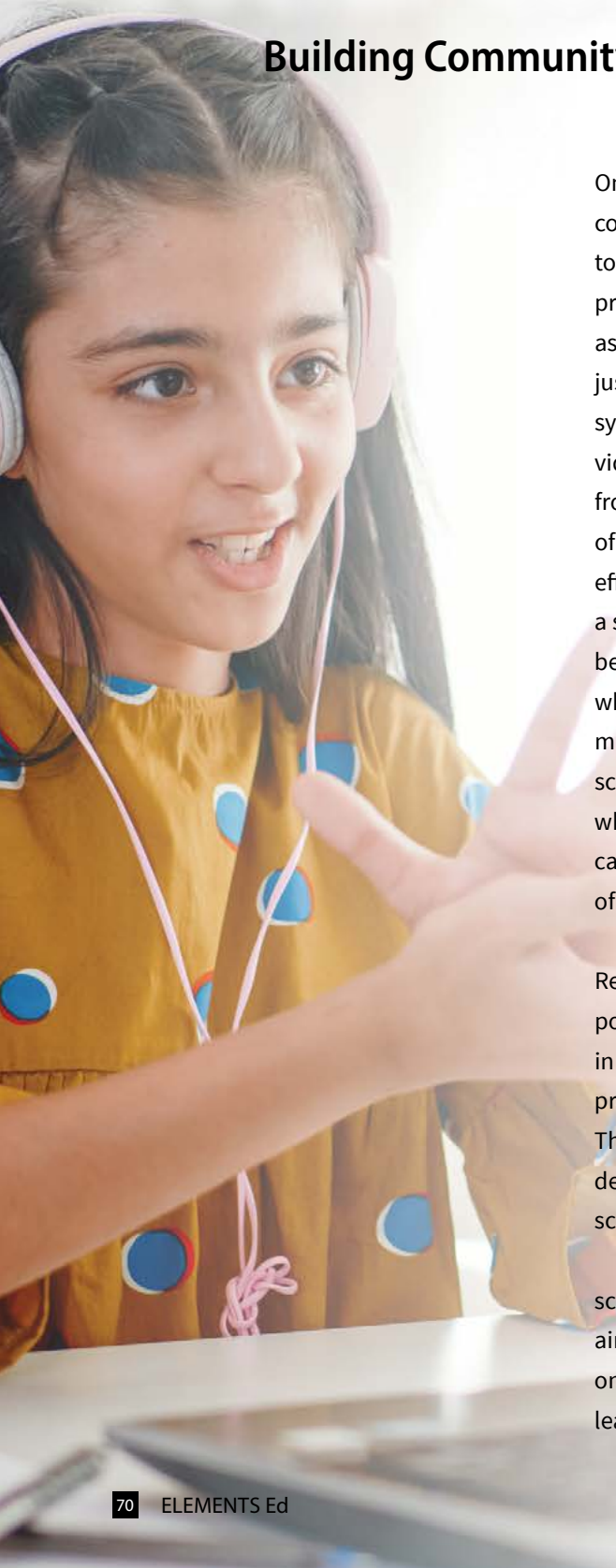
20. Tami Oliphant and Jennifer Branch-Mueller, "Developing a Sense of Community and the Online Student Experience," *Education for Information* 32, no. 4 (2016): 307–21.

21. Mark Stevens and Jered Borup, "Parental Engagement in Online Learning Environments: A Review of the Literature," in *Exploring Pedagogies for Diverse Learners Online* 25, Advances in Research on Teaching (Emerald Group Publishing Limited, 2015): 99–119, https://doi.org/10.1108/S1479-368720150000027005.

Social Connections

Building Community in Online Learning Environments

by **Amanda Williams and Tamar Adegbile**



One of the first questions that comes to mind when considering online learning is how students will be able to make social connections in the absence of physical proximity. A significant portion of online learning happens asynchronously, where students might be separated not just by location but also by different time zones. Further, synchronous time with teachers and peers is mediated by video or chat features. However, opportunities to learn from each other and the psychological support and safety of a positive social community are important elements of effective learning experiences.[1] A strong sense of belonging in a school community has positive impacts on students' well-being, academic engagement, and achievement.[2] Students who feel safe and empowered to take risks and make mistakes, and who feel connected to their peers and to their school community, learn more.[3] A positive school climate, in which friendships flourish and members of the community care for, support, and help each other is an essential feature of highly effective learning environments.[4]

This is also true of online learning environments. Researchers have found that students' sense of community positively impacts their engagement and academic success in these contexts as well.[5] However, the absence of physical proximity and in-person interaction can be challenging. Therefore, online educators and administrators need deliberate effort and strategies to cultivate a thriving online school community.

These efforts can happen in the form of integrating school-wide and classroom-based strategies explicitly aimed to foster community. With these features, effective online environments are not just centered around academic learning but also focused on developing the social and

emotional skills of students and establishing a sense of community.[6]

School-Wide Strategies

In a brick-and-mortar school, the physical proximity and the structure of the school day afford natural opportunities for community building and social and emotional learning. From explicitly carving time and space throughout the school day for social connection to organic opportunities such as lunch time, transitions between classes, or time at recess, in-person school settings are ripe with opportunities for spontaneous interactions.

In an online school, deliberate and concerted effort is necessary to ensure students have these same opportunities. The most effective approach is to institute strategies across the entire school as part of the routine experience for all students. The deans program we built into our online school is an example of this kind of strategy. In this program, each student has a designated dean, assigned at the beginning of the year, who serves as a mentor and provides support for the student. In addition to meeting individually with their deans, students meet in small groups with other students on a regular basis and use this time to discuss current events and school happenings and to learn about their social and emotional selves. They get a chance to play games and interact naturally with their peers, forming connections and strengthening bonds. The productive bond forged between students and their deans and the opportunity afforded to students to meet and socialize with their peers in an informal manner help build community and social ties. That this program is a deliberate aspect of the school experience for all students helps ensure there is consistent attention toward these goals.

In addition to structured programs such as the deans' program, creating space in student schedules for extracurricular activities is also germane to community building. Empowering students to create and organize clubs

to explore topics of personal interest or bringing the entire student body together in assemblies or game and movie nights help bring the school community together. Aligned with what researchers have found, we also found that opportunities fostering informal communication between students was an important precursor to building a sense of community and belonging.

Classroom-Based Strategies

While the lack of physical connection can be challenging, various classroom-based strategies, in addition to school-wide strategies, can facilitate student interactions and community building. Using some part of synchronous class time for community building activities, building community-forming components into the structure of online classes, and providing clear guidelines and community norms for online communication are ways to create and foster social connections and a thriving learning community.[7]

Intentional facilitation of student interactions also helps build a strong online classroom community.[8] Two types of interactions are important to consider: socio-emotional-driven interactions and task-driven interactions. Task-driven interactions are oriented toward learning goals and are typically initiated by teachers to direct and guide student learning. Socio-emotional-driven interactions are oriented toward social goals and are often initiated by students to form connections with teachers and their peers. These can include sharing personal information, experiences, and empathetic messages. Mutual sharing of personal information strengthens students' sense of classroom community through increasing trust, support-seeking, and satisfaction.[9] To support these goals, teachers should not focus exclusively on task-driven interactions and should allow time for social-emotional-driven interactions to occur. Thus, it is helpful to block out time in a student's schedule to meet with other students, to work collaboratively on projects, and to allow some time for these interactions during synchronous class discussions. These strategies enable students and

teachers to work together toward a common goal, which is a fundamental aspect of a cohesive classroom environment.[10]

Overall, creating spaces for students to be their authentic selves, allowing them to collaborate with one another as much as possible, and providing ample opportunities for interactions are effective strategies to build community in online classrooms. Further, ensuring connections through school-wide programs can lead to a thriving community in online schools. In addition to this general guidance, we offer these additional strategies for online educators and administrators seeking to foster community in their online learning environments:

Set community guidelines and clarify expectations at the outset. It is important that online communities communicate unified expectations around meaningful engagement to both students and parents. Ideally, policies around violations should also be made clear to all members of the community. Clear guidelines regarding the use of cameras, tardiness, and discussion participation help establish clear expectations.

Perform a temperature check at regular intervals. When interaction happens in person, it can be easier to recognize changes in body language or energy, which may not be as obvious in online learning environments. Creating a quick but meaningful way of checking in with students can help with engagement and relationship building.

Maximize opportunities for participation. Designing opportunities for students to respond to quick questions in the chat feature helps keep students engaged. Allowing students to respond in the chat creates a way for everyone to participate and for students to hear from each other.

Don't let the chat feature become a distraction. While the chat feature can be an asset to engage students, it can also become a distraction if not appropriately monitored. Communicate when it is appropriate to use the chat feature and when the focus should be on the speaker.

Create opportunities for informal gatherings among students. Student clubs can be a great way for students to

get connected to their peers. Likewise, school organized events such as movie or game nights are great ways to build community. Ed

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Endnotes

1. Jean Lave and Etienne Wenger, *Situated Learning: Legitimate Peripheral Participation. Learning in Doing: Social, Cognitive and Computational Perspectives* (Cambridge: Cambridge University Press, 1991), https://doi.org/10.1017/CBO9780511815355.

2. Victor Battistich et al., "Caring School Communities," *Educational Psychologist* 32, no. 3 (1997): 137–151, https://doi.org/10.1207/s15326985ep3203_1; Karen F. Osterman, "Students' Need for Belonging in the School Community," *Review of Educational Research* 70, no. 3 (Sept. 2000): 323–367, https://doi.org/10.3102/00346543070003323.

3. Chris Watkins, "Classrooms as Learning Communities: A Review of Research," *London Review of Education* 3, no. 1 (2005): 47–64, http://dx.doi.org/10.1080/14748460500036276; Andrea Harkins Parrish, "Building Community in Online Learning Environments," *IDEALS Insights on Teaching & Learning* (blog), accessed March 24, 2022, https://education.jhu.edu/wp-content/uploads/2020/10/IDEALS_Insights_on_Teaching_and_Learning.pdf.

4. John Hattie, *Visible Learning: A Synthesis of Meta-Analyses Relating to Achievement* (London: Routledge, 2008).

5. William Sadera et al., "Success in Online Learning and the Role of Community," in *Proceedings of SITE 2009—Society for Information Technology & Teacher Education International Conference*, eds. Ian Gibson et al. (Charleston, SC: Association for the Advancement of Computing in Education (AACE)), 515–518, accessed March 28, 2022, https://www.learntechlib.org/primary/p/30647/.

6. Agatha Beins, "Small Talk and Chit Chat: Using Informal Communication to Build a Learning Community Online," *Transformations: The Journal of Inclusive Scholarship and Pedagogy* 26, no. 2 (2016): 157–175, https://doi.org/10.5325/trajincschped.26.2.0157.

7. Joanne M McInnerney and Tim S Roberts, "Online Learning: Social Interaction and the Creation of a Sense of Community," *Journal of Educational Technology and Society* 7, no. 3 (2004): 73–81, http://www.jstor.org/stable/jeductechsoci.7.3.73.

8. Alfred P. Rovai, "Building Sense of Community at a Distance," *The International Review of Research in Open and Distributed Learning* 3, no. 1 (2002), https://doi.org/10.19173/irrodl.v3i1.79.

9. Rovai.

10. Hattie.

REMOTE Teaching *and* Learning *in the* English Language Arts

by Sean Ruday, Jenn Cassidy, and Taylor Jacobson

The proliferation of remote and distance learning has led to a great deal of reflection about how to adapt in-person instructional strategies to this new learning environment. As we've thought about our work with students, two primary questions have guided our reflections:

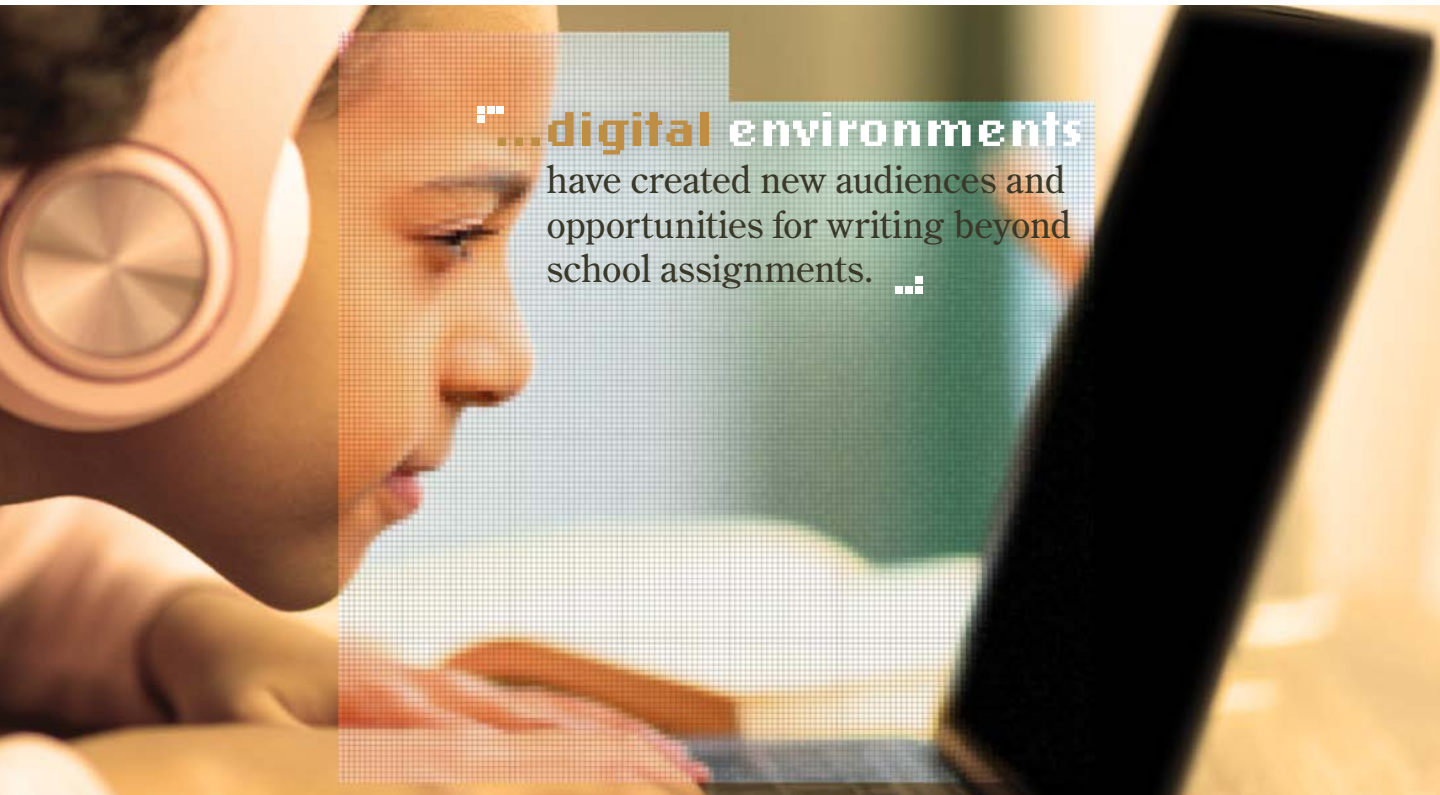
> ***How can remote English language arts instruction incorporate research-based instructional practices?***
>
> ***How can we incorporate culturally relevant and sustaining instructional practices that center students in remote English language arts instruction?***

With deliberate planning and intentional scaffolding, English language arts (ELA) can leverage well-established, research-based strategies, as well as the opportunities that remote learning offers to maximize the efficacy of instruction. In this article, we address these questions, as well as ELA instruction in remote and virtual learning environments.

Remote Writing and Grammar Instruction

Effective writing instruction is important for students because "in today's increasingly diverse society, writing is a gateway for success in academia, the new workplace, and the global economy, as well as for our collective success as a participatory democracy."[1] The 2016 National Council of Teachers of English (NCTE) document *Professional Knowledge for the Teaching of Writing*[2] states that our students' writing skills are essential to their successes in a number of important contexts and that writing is an important way students are able to participate in our modern society. Specifically, writing can be used to enhance students' personal growth, and digital environments have created new audiences and opportunities for writing beyond school assignments.

Effective writing and grammar instruction is an active process both for students and teachers. Examples such as strategy-focused mini-lessons, discussions of mentor texts, engaged students



working on drafts, conferences between students and teachers, and other demonstrations of active learning are telltale signs of effective, active writing and grammar instruction. While the delivery and medium for collaboration may differ, these components of effective writing instruction can also be achieved in remote learning. Through the purposeful and strategic use of technological resources, educators can provide students with writing instruction that utilizes research-based practices. Remote teaching and learning can facilitate key aspects of student-centered writing instruction by utilizing short, focused periods of direct instruction on a platform such as Google Meet or Zoom, followed by opportunities for students to work autonomously, which will allow students to actively engage with the writing lessons.

In *Writing Workshop: The Essential Guide*, Fletcher and Portalupi compare strong writing instruction to an industrial arts class or to a ski lesson in which the instructor models and explains a concept or strategy and then creates opportunities for the students to try it out on their own, checking in with them individually while they are doing so.[3] Remote writing and grammar instruction can provide this same student-focused context in which students work on their writing and teachers check in with and support them throughout the process. The modalities may be different from what many of us are used to, but the foundational principles of effective writing instruction still apply in remote learning. When teaching grammatical concepts, for instance, focused mini-lessons and the use of a mentor text are just as effective in remote environments as they are in a physical classroom.

By creating opportunities for students to examine mentor texts, apply writing strategies in authentic ways, receive individualized instruction from teachers, and share work with real-world audiences, we can provide students with outstanding writing instruction — regardless of whether they are learning in-person or remotely.[4]

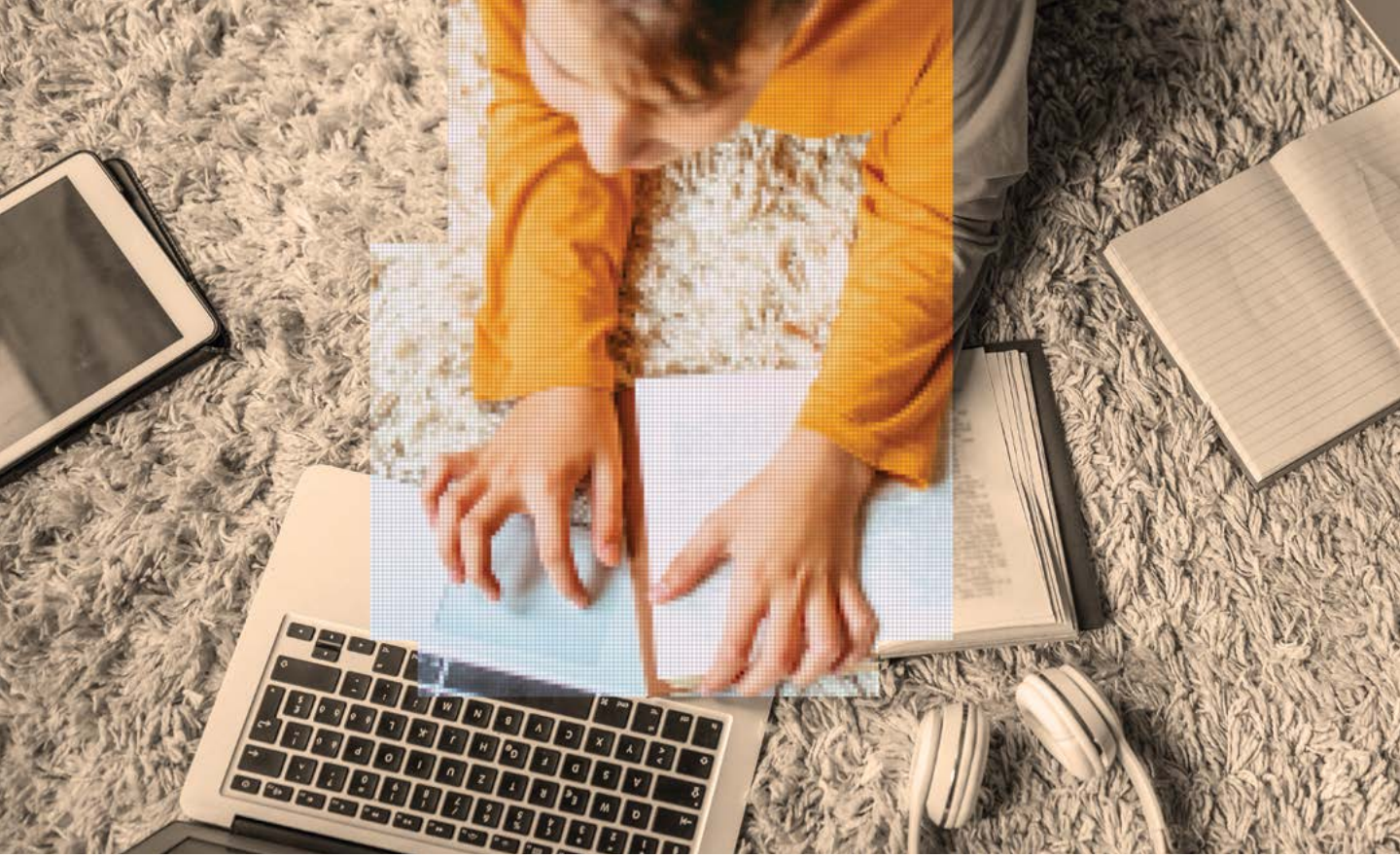
> …focused mini-lessons and the use of a mentor text are just as effective in remote environments…

Literature Instruction in the Remote Environment

These three components of literature instruction — enter, explore, and extend — work together to provide students with engaging, thought-provoking, and relevant experiences with the literature they read.[5] For each component, teachers who are teaching remotely can make use of a variety of strategies to engage students.

Enter

In the "enter" stage, students engage in activities designed to activate their prior knowledge about key issues in the text and to provide student-centered entry points to the works. While these activities can be in different forms, their common feature is that they "are designed to activate students' thoughts, experiences, and feelings about something essential in the text that follows or to build background knowledge necessary for reading it."[6] By using instructional practices that connect to students' insights and establish understanding



of relevant contextual information, students begin their reading experiences in engaging and meaningful ways.

Remote instruction provides a number of appealing opportunities for students to "enter" a piece of literature. For example, students can use Google Docs to write reflections on key issues they encounter in a text; if a book relates to the importance of challenging societal assumptions, students can reflect on societal assumptions they have challenged or would like to challenge. This experience can activate students' prior knowledge of a topic and provide them with an accessible point of entry into the text. Students can then use the Google Doc responses to read one another's ideas and note connections between their peers' ideas and their own.

> …features of remote learning provide students with useful **useful points of entry** into a literary work.

A number of other ways to use collaboration and instruction tools feature in remote instruction to help students initially engage with and reflect on key ideas in a work of literature. For example, student groups can create Google Slides about contextual information that will help the class access the piece. While specific practices and tools will vary, different features of remote learning provide students with useful points of entry into a literary work.

Explore

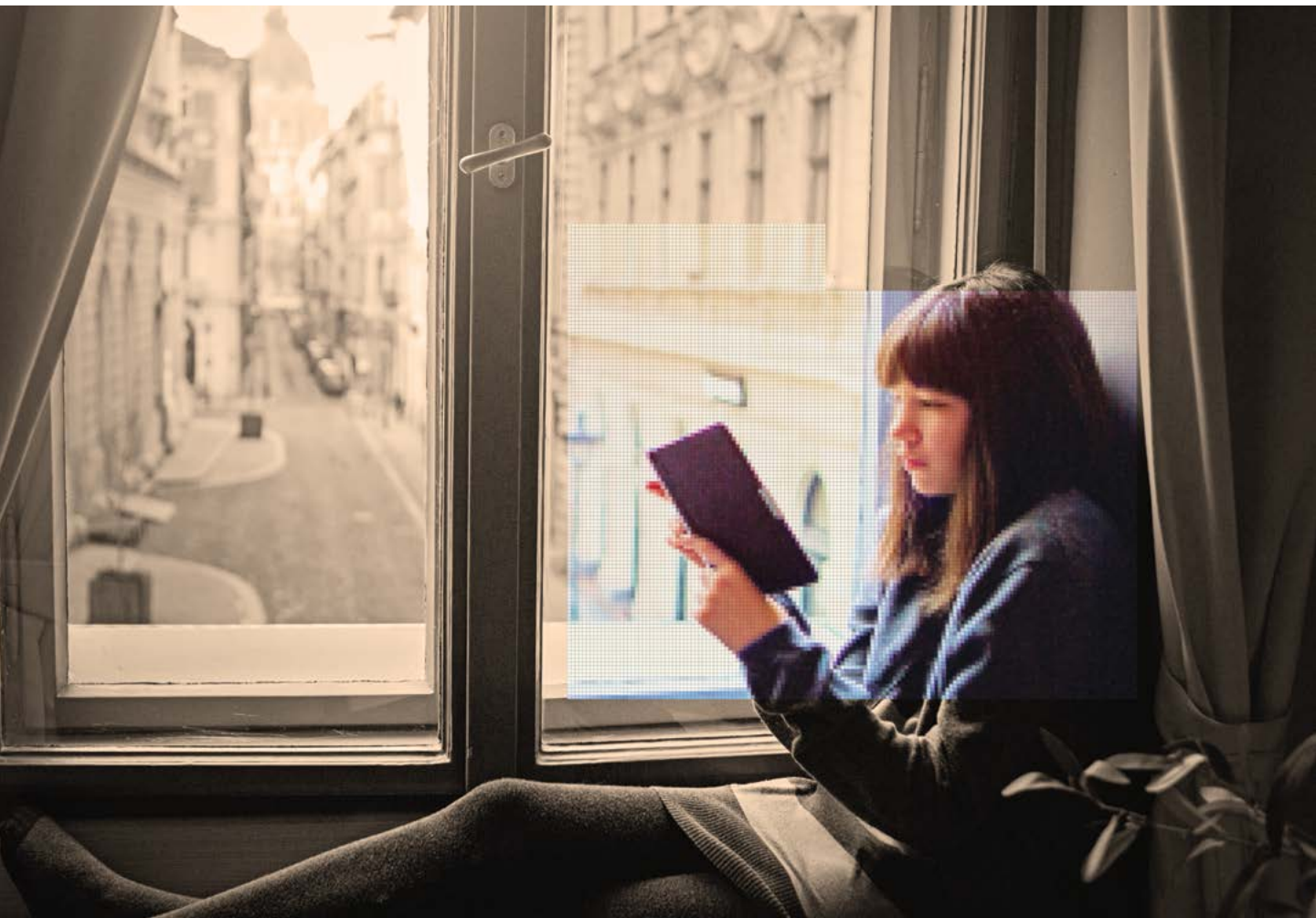
The "explore" stage of literature instruction focuses on student "response, interpretation, formal analysis, and critical synthesis."[7] ELA teachers can facilitate students' interpretations and analysis

in a variety of ways. Focusing on students' unique responses and reactions to literature in activities and instructional practices will help center students in the curriculum. These practices can help students connect to and analyze literature on their own, instead of viewing literary analysis as a teacher-directed activity in which students' individual insights are not relevant. Emphasizing students' unique responses will help facilitate explorations of literature meaningful to students.

Remote instruction provides a range of ways for students to explore literary texts in student-centered ways. Students can use remote learning tools to respond to a text individually, analyze them collaboratively, and develop their own conclusions. For example, when students make personal connections to a text, they can respond using tools that facilitate the types of connections they're being asked to make; shorter, more immediate responses can be shared through quick-access features like Zoom chat or other instant messaging apps, while longer responses are better suited for online discussion boards and other asynchronous media. Similarly, students can collaborate in Zoom breakout rooms or create shared projects using tools such as Google Docs or Google Slides.

Extend

In the "extend" stage, students take the responses, ideas, and analyses they've developed in the first two stages and use those insights to connect the text to the world around them. Milner et al. explain "the extension phase should lift students beyond an egocentric focus and into an awareness of



themselves within larger social, cultural, political, and moral worlds."[8] When engaging in extension activities, students use the text as a foothold that facilitates their reflections on these different types of "worlds." In addition, extension activities that facilitate these types of connections help establish the ELA classroom as a safe place where students can reflect on and process the complicated world issues that face them on a daily basis.

> …create ways for students to extend ideas found in literature to the worlds around them.

ELA teachers can utilize the features and attributes of remote instruction to create ways for students to extend ideas found in literature to the worlds around them. For example, educators can create opportunities for students to research real-world events, issues, and movements, connecting the key aspects of those events and issues to important topics and themes in the literature they've read. Students can connect contemporary cultural and political issues with the sociopolitical context in a particular novel and compare the way individuals today work for change to the ways characters in texts attempt to bring about change to their communities. Through these kinds of activities, students can reflect, explore, and research issues that matter to them while exploring how similar issues are addressed in important works of literature.

By providing students with opportunities to *enter texts, explore key aspects, and extend their understanding*, educators can ensure that students in remote contexts can engage in high-quality literature instruction. The National Council of Teachers of English and the International Reading Association's *Standards for the English Language Arts*[9] call for students to read "a wide range of literature from many periods in many genres to build an understanding of the many dimensions (e.g., philosophical, ethical, aesthetic) of human experience" and "a wide range of print and non-print texts to build an understanding of texts, of themselves, and of the cultures of the United States and the world."

These statements illustrate the personal, academic, and societal benefits associated with effective literature instruction. By creating instructional opportunities for students to meaningfully engage with a variety of texts and have meaningful, multifaceted experiences with those works, educators can provide the instruction that will benefit them in a variety of ways throughout their lives.

Culturally Relevant and Sustaining ELA Teaching and Learning

In her seminal article "But That's Just Good Teaching! The Case for Culturally Relevant Pedagogy," Gloria Ladson-Billings[10] explains that "culturally relevant pedagogy rests on three criteria or propositions: (a) Students must experience academic success; (b) students must develop and/or maintain cultural competence; and (c) students must develop a critical consciousness through which they challenge the status quo of the current social order."[11] Instructional practices incorporating these three criteria can take a number of forms. Ladson-Billings shares that the teachers she studied who implemented culturally relevant teaching not only used a variety of strategies and methods but also shared a number of commonalities: they felt

invested in the communities in which they taught, strongly believed all students could succeed, and centered students in the curriculum through "fluid and equitable" relationships that created space for students to share their ideas and perspectives in the classroom.

Django Paris[12] builds on Ladson-Billings's work and suggests shifting the phrasing and practice from "culturally relevant" to "culturally sustaining," asserting that pedagogy that effectively centers students will work toward sustaining their cultures and identities: "The term culturally sustaining requires that our pedagogies be more than responsive of or relevant to the cultural experiences and practices of young people—it requires that they support young people in sustaining the cultural and linguistic competence of their communities while simultaneously offering access to dominant cultural competence."[13]

Instruction that is culturally relevant and culturally sustaining is characterized by instructional practices that value and center students' identities, helping create opportunities for students' academic success. We can make our classroom culturally sustaining by providing students with opportunities to make authentic connections between academic concepts they learn in school and aspects of their out-of-school lives. In ELA instruction, students can apply their knowledge of reading strategies, writing tactics, and word-study components to texts with which they authentically interact in their cultures, communities, and lived experiences.

Teachers can use the principles of culturally relevant and sustaining pedagogy to center students' identities and experiences by constructing opportunities for students to apply this concept to texts they encounter in authentic contexts. In this type of instruction, the teacher could begin by sharing a mini-lesson on figurative language and providing a range of examples of its use. Students could then reflect on the importance of figurative language and the reasons authors use it.

Next, students can identify examples of figurative language they encounter in their out-of-

school lives and share those with their classmates, using the tools of remote learning. Instructional practices such as this center students' unique experiences and prioritize the forms of literacy with which they engage in out-of-school environments.[14]

Culturally relevant and culturally sustaining pedagogy is essential to creating equitable learning experiences for students. Instructional practices that facilitate authentic connections to students' lives are also integral to equity-minded instruction in all contexts. For remote ELA instruction, the features and principles of culturally relevant and sustaining pedagogy are essential concepts for teachers to consider when organizing remote learning experiences. Since this pedagogy centers students in the curriculum and values their cultures and identities, it presents a natural connection to remote learning, in which students are not bound by the traditional structures and spaces of school. In traditional schooling, students leave their homes to enter a distinct physical place. By contrast, in remote learning, students are engaging in at least some of their academic work from their homes. Additionally, the opportunities that remote learning presents for students to learn in their community create outstanding connections to culturally relevant and sustaining pedagogy because students are physically in their communities while they learn. Educators can incorporate aspects of these communities (personal interests, cultures, and backgrounds) into their lessons and create space for students by recognizing and valuing their realities, perspectives, and identities.[15]

The Role of Inquiry

Inquiry-based pedagogy is a form of teaching and learning that centers on thought-provoking, big-picture essential questions that students investigate.[16] An essential question, according to Grant Wiggins, "lies at the heart of a subject or a curriculum."[17] A good essential question should possess all or most of these seven attributes:[18]

- is open-ended
- is thought-provoking
- calls for higher-order thinking
- points toward important, transferable ideas
- raises additional questions and sparks further inquiry
- requires support and justification, not just an answer
- recurs over time or can be revisited frequently

By utilizing essential questions, ELA teachers can incorporate the features and benefits of inquiry-based learning in their instruction.

While essential questions can be applied to a range of subjects, they are especially useful and beneficial in ELA because of the ways they provide opportunities for students to think about relevant and engaging issues present across the works with which they interact. The approach therefore "positions authentic, real-world questions, not specific texts at the center of your English curriculum."[19] With inquiry-based instruction, students are able to engage with essential questions that facilitate authentic connections with their lives and real-world issues, as well as drawing on their experiences with a wide range of texts as they reflect on and construct their responses to those questions.

> …An essential question lies at the heart of a subject or a curriculum.

The opportunities remote learning provides for students to work independently and in self-directed ways match up well with the nature of inquiry-based learning. Since this instructional approach prioritizes students' unique experiences investigating questions and topics that have real-world connections, it lends itself to individualized explorations that can take place through a number of learning modalities and structures. While students work on these inquiries remotely, teachers can support them in a variety of ways—for example, sharing video mini-lessons on important ideas to keep in mind, giving feedback on their work through Google Docs, holding one-on-one conferences with them through Zoom, and constructing ways for students to offer virtual support to each other. Ultimately, once they've completed their inquiries, students can share the results of their investigations through virtual presentation tools.

Inquiry-based instruction is important to remote ELA teaching because the engagement and achievement it facilitates addresses key challenges of remote learning, such as decreased student engagement and academic performance.[20] By providing students with opportunities to conduct multi-textual inquiries that revolve around essential questions, teachers can construct learning opportunities for students that excite and help enhance academic achievement. When teachers pose essential questions and challenge their students to use a variety of texts to respond to those questions, they can construct meaningful, relevant, and engaging learning opportunities. Thought-provoking, engaging, and relevant essential questions also facilitate higher-order thinking, require complex analysis, and improve students' learning experiences in remote ELA classes.

Final Thoughts

The best remote ELA instruction is not rooted in a specific app, program, or website but instead in thoughtful decisions that carefully consider relevant learning goals and student needs. Teachers will certainly need to consider available resources and instructional contexts in this decision-making process, but the best remote instruction maximizes student learning and uses available programs as vehicles for that learning. The following recommendations (next page) can help teachers put the research-based practices of ELA into action in remote learning contexts.

Conduct short, focused video mini-lessons that describe key literacy strategies and grammatical concepts and provide examples of their authentic, real-world uses.

Provide students with engaging opportunities to reflect on key issues in a text prior to their reading it.

Use mentor texts to illustrate how published authors use these strategies and concepts authentically.

While students read, create opportunities for them to make personal connections to a text.

Help students analyze the importance of writing strategies and grammatical concepts to effective writing.

Ask students to find real-world examples of literacy strategies and concepts and consider their significance.

Provide students with opportunities to share the real-world examples from their own communities they identified and analyzed.

Design ways for students to engage in collaborative work about the texts they read.

Use technological collaboration tools to confer with students as they apply writing strategies and grammatical concepts to their own works.

Ask students to reflect on how specific strategies and concepts enhance the effectiveness of their writing.

Utilize virtual collaboration tools to help students present the results of their inquiries and analyses.

Ed

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Endnotes

1. The National Writing Project and Carl Nagin, *Because Writing Matters* (Hoboken, NJ: Jossey-Bass, 2006), 2.

2. National Council of Teachers of English, "Professional Knowledge for the Teaching of Writing," February 2016, http://www.ncte.org/positions/statements/teaching-writing.

3. Ralph Fletcher and Joanne Portalupi, *Writing Workshop: The Essential Guide* (Portsmouth, NH: Heinemann, 2001).

4. The National Writing Project and Nagin.

5. Joseph O. Milner, Lucy F. Milner, and Joan F. Mitchell, *Bridging English*, 5th ed. (Boston, MA: Pearson, 2012).

6. Milner, Milner, and Mitchell, 121.

7. Milner, Milner, and Mitchell, 122.

8. Milner, Milner, Mitchell, 122.

9. National Council of Teachers of English & International Reading Association, *NCTE/IRA Standards for the English Language Arts* (National Council of Teachers of English, 1996).

10. Gloria Ladson-Billings, "But That's Just Good Teaching! The Case for Culturally Relevant Pedagogy," *Theory into Practice* 34, no. 3 (1995): 159–165.

11. Ladson-Billings, 160.

12. Django Paris, "Culturally Sustaining Pedagogy: A Needed Change in Stance, Terminology, and Practice," *Educational Researcher* 41, no.3 (2012): 93–97.

13. Paris, 95.

14. Jeffrey Duncan-Andrade and Ernest Morrell, "Turn Up That Radio, Teacher: Popular Cultural Pedagogy in New Century Urban Schools," *Journal of School Leadership* 15, no.3 (2005): 284–304.

15. Jamila Lyiscott, *Black Appetite. White Food.* (New York: Routledge Eye on Education, 2019).

16. Jay McTighe and Grant Wiggins, *Essential Questions: Opening Doors to Student Understanding* (Alexandria, VA: ASCD, 2013).

17. Grant Wiggins and Jay McTighe, *Understanding by Design*, 2nd ed. (Upper Saddle River, NJ, Pearson, 2005), 342.

18. McTighe and Wiggins.

19. Sean Ruday and Katie Caprino, *Inquiry-Based Literature Instruction in the 6–12 classroom: A Hands-On Guide for Deeper Learning* (New York, Routledge Eye on Education, 2021).

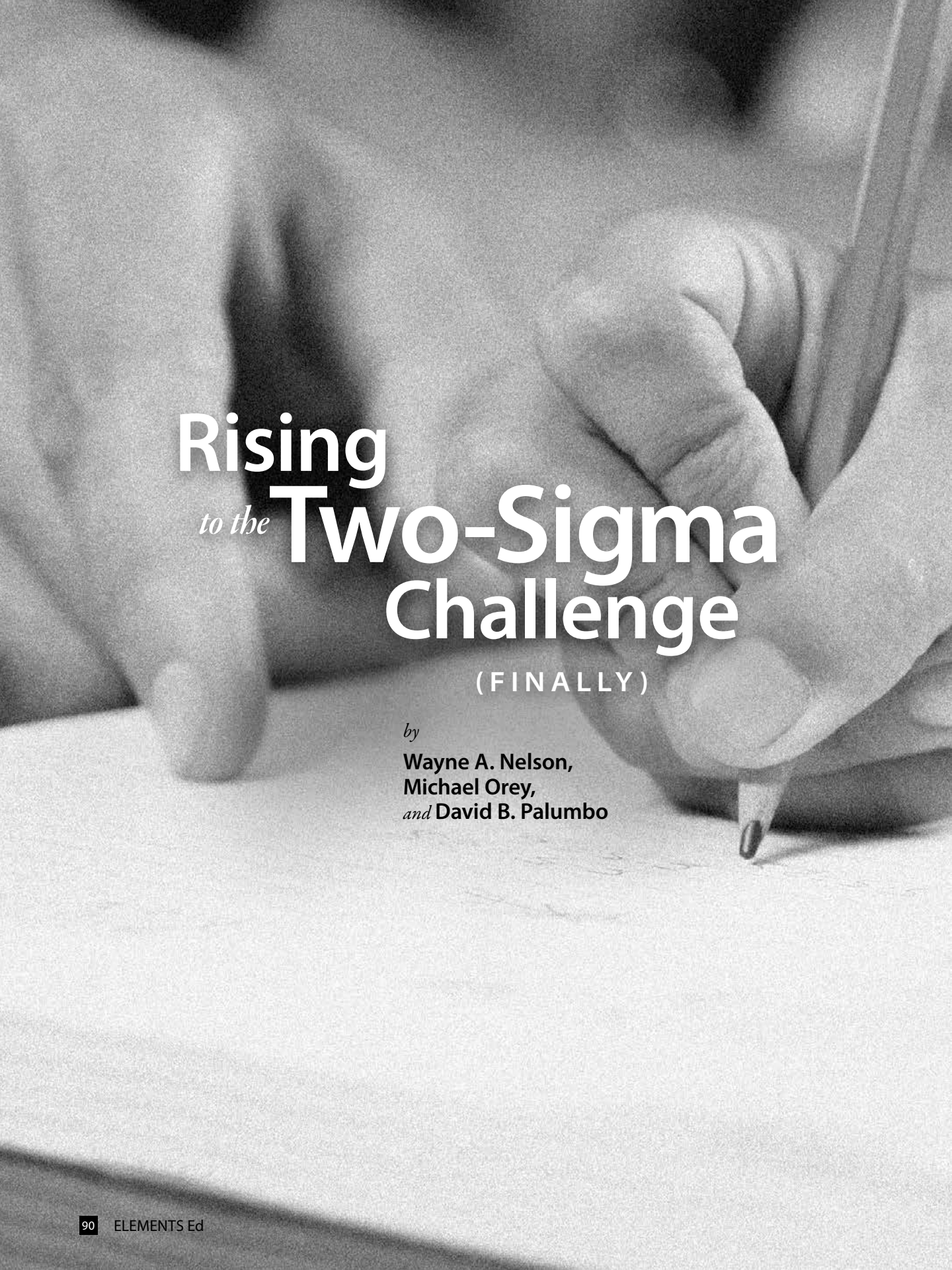
20. Amelia Nierenberg, "Students, Parents and Teachers Tell Their Stories of Remote Learning," *The New York Times*, October 14, 2020.

LMS Explorer

A Brief Guide to Learning Management Systems

LMS	PUBLISHER	FOUNDED	EFFORT TO IMPLEMENT	USERS	PRICE
Alma	Alma	2014	low	implementation in 45 states and 50 countries	$500/year for basic implementation; $30,000/year for platinum
Blackbaud	Blackbaud	1981	high	300 US private schools use the LMS module	not publicly available
Blackboard	Anthology (Blackboard)	1997	medium	150 million users worldwide	$300 per classroom; $9000 per school
Brightspace	D2L	1999	medium	24.5 million users globally	fewer than 2500 users: $6.50/user; up to 15,000 users: $4.50/user; up to $15,000/institution
Buzz (Agilix)	Agilix	2015	low	More than 10,000 institutions and 10 million users in 200 countries	$5/student or teacher by district; $5.50/student or teacher by building
Canvas	Instructure	2011	high	30 million users	$150 per 50 student licenses, moves up from there
Edmodo	NetDragon	2008	low	100 million users worldwide, 190 countries	free — training and professional development services are extra
Edsby	CoreFour	2010	medium	Canadian focused	priced per user for implementation, analytics, and integration of 3rd party tools/data

LMS	PUBLISHER	FOUNDED	EFFORT TO IMPLEMENT	USERS	PRICE
Google Classroom	Google	2014	low	150 million users	free
its Learning	Sanoma Learning BV	1998	n/a	7 million teachers and learners globally	not publicly available
Moodle	GNU Open Public License	1999	medium	213 million users globally; 13,490 sites in US	open source; free under GNU General Public License
Otus	Otus	2012	medium	240 districts in US	free for teacher and students — service costs extra
PowerSchool Unified Classroom	PowerSchool	1997	high	45 million students. 90% of the largest US districts	begins at $5/ student per month
Quizlet	Quizlet	2005	low	60 million active users. 2/3 of US students have used Quizlet	freemium (ad supported)
Schoology	PowerSchool	2009	medium	7 million students; 60,000 schools globally	one time $10/student implementation fee; currently free for not-for-profit schools
Twine	Aptiris	1998	low	not publicly available	$100 per month per implementation



Rising *to the* Two-Sigma Challenge

(FINALLY)

by

Wayne A. Nelson,
Michael Orey,
and **David B. Palumbo**

One cannot be immune to the debate about whether online learning can be as effective as in-person learning. The most recent round of this debate emerged in response to the experience of rapidly transitioning from in-person school-based learning to emergency remote teaching due to the COVID-19 pandemic. This pivot should not be seen as particularly innovative nor grounded in an aspiration to develop more effective and efficient learning environments. We should be cautious in the assessment of the outcomes of this period in the evaluation of how, when, and where technology can support the teaching and learning process.

Educational history, philosophy, and research literature are full of treatises from individuals who dedicated their talent, energy, and passion to educational innovation. A common theme in these works from Aristotle to Skinner, from Plato to Piaget, and from Dewey to Thorndike, has been to design and deliver an educational system that scaled beyond the private, expert tutoring models afforded by aristocrats to provide educational content and experience to all children. The development of new technologies of instruction are innovations that can help design the most effective learning system to support advanced learning at scale.

The Goal of Developing Genius at Scale

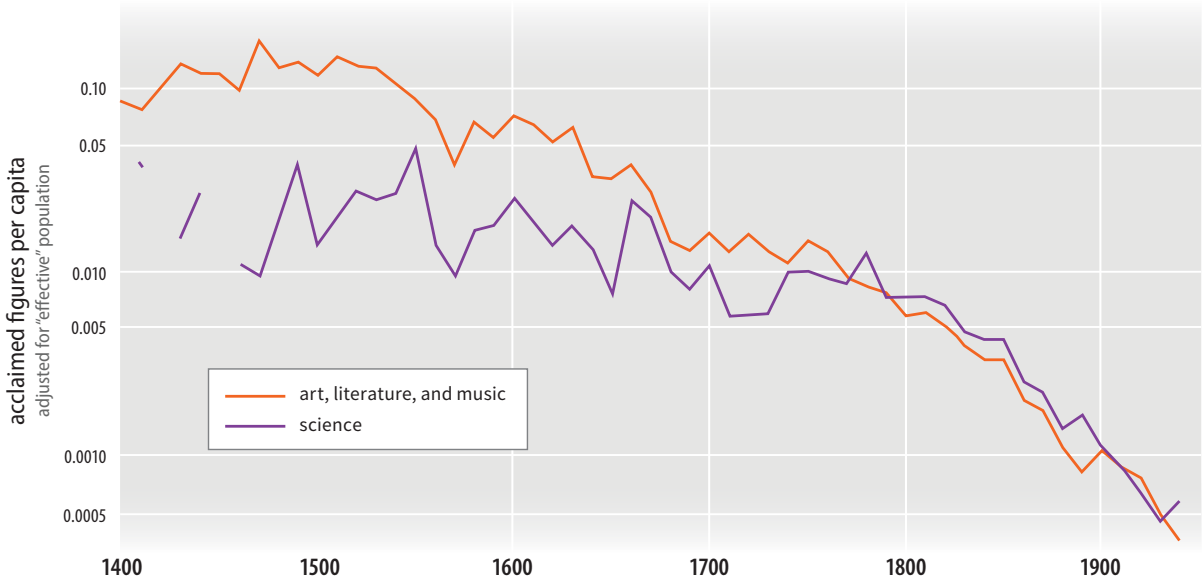
One might say the audacious goal of educational systems is to develop individuals with advanced learning who are exceptionally talented or even geniuses. The salient missing piece to that definition is to explicitly identify the audience of potential learners. As size and variance of the audience of learners grow, demonstrable impacts seem to lessen.

In a recent article, "Where's Today's Beethoven?", Holden Karnofsky presents an analysis of the number of people considered at the genius level in science, literature, and the arts.[2] He suggests a steady decline in genius production at the same time as a steady increase in broader scale educational access. Is it true that as we increase access to education, we lower the bar in terms of educational attainment? In our attempt to make education more available, have we lost the "magic" that early tutor-intensive experiences provided?[3] Certainly, this is not the intent of a long history of educational innovators nor of those who continue in a quest to make systems both more effective and efficient as we broaden access.

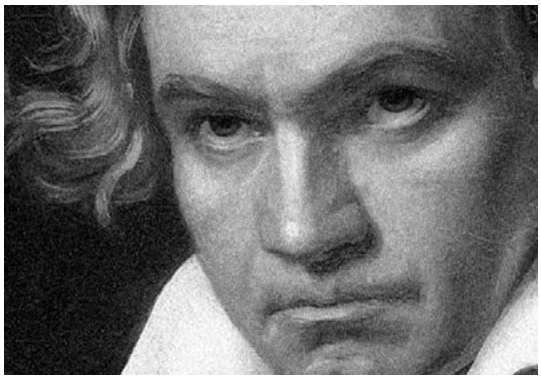
The Goals of Educational Research

To support the mission of educational innovators, the field of educational research emerged in the mid-1850s to help quantify and qualify the results of different educational systems and practices. In 1971, Holly Knox called out four major periods in

Figure 1. Critically acclaimed figures in art, literature, music, philosophy, and science from 1400–1950[1]



the emergence of educational research as a field of study.[4] The first was the accepted understanding that education was indeed a field where research could and should be conducted (1855–1895). The second era was the emergence of empiricism in education (1895–1938). In the third era, education adopted a pragmatic orientation (1938–1958). The most recent era focused on accountability, including external mandates, sponsors, requirements, and funding for educational research (1959–present).



The audacious goal: "...to develop individuals with advanced learning who are exceptionally talented or even geniuses."

One of two current focus areas of educational research measures learning growth and proficiency against a set of defined goals and benchmarked targets. Outcomes research typically answers the question, "does it work?" by measuring the change from a beginning to an end point on a particular set of behavioral measures. The second focus, comparative research, answers the question, "which is better?" by comparing learners' performance in different learning systems against a common set of measures.

The Goals of Effective and Efficient Learning Environments

Benjamin Bloom's innovations and research, which began in the 1950s, came at a time when learning technology was being influenced by systems theory (inputs, processes, and outputs) and behavioral science. Millions of copies of his *Taxonomy of Cognitive Skills and Outcomes*[5] were sold—a work still highly influential more than sixty years after its publication. He also devised and advocated for the process of mastery learning, where instruction is organized in small units with assessments at a unit's end, followed by feedback and reteaching of any outcomes not achieved.

Many researchers built on Bloom's work, focusing as he did on direct instruction in classroom settings. The idea was to create various conditions for learning[6] that could be developed by following a series of events for instruction. These events help gain the attention of students, orient them to the learning task, and elicit performance through guided practice. Like Bloom's taxonomy levels (See Bloom's Taxonomy), Robert Gagné identified several different types or levels of learning, from simple to more complex (verbal information, intellectual skills, cognitive strategies, motor skills, and attitudes).[7] In Gagné's approach, learning hierarchies provide a basis for the sequencing of instruction and the development of learning tasks. Madeline Hunter was another proponent of a similar model for direct instruction.[8]

When the practical task is designing an effective and efficient learning environment, we try to apply knowledge about learning and teaching so learners might attain specific outcomes after experiencing the series of teaching and learning events we design and implement. All this work happens before the students and teacher walk into the classroom. Bloom's research focused on

identifying the prerequisites that could help achieve the targeted improvement in student performance. As his concept of mastery learning evolved, other features developed, including individualized instruction, which allows learners to follow individual paths through the curriculum, set the pace of instruction, or both.

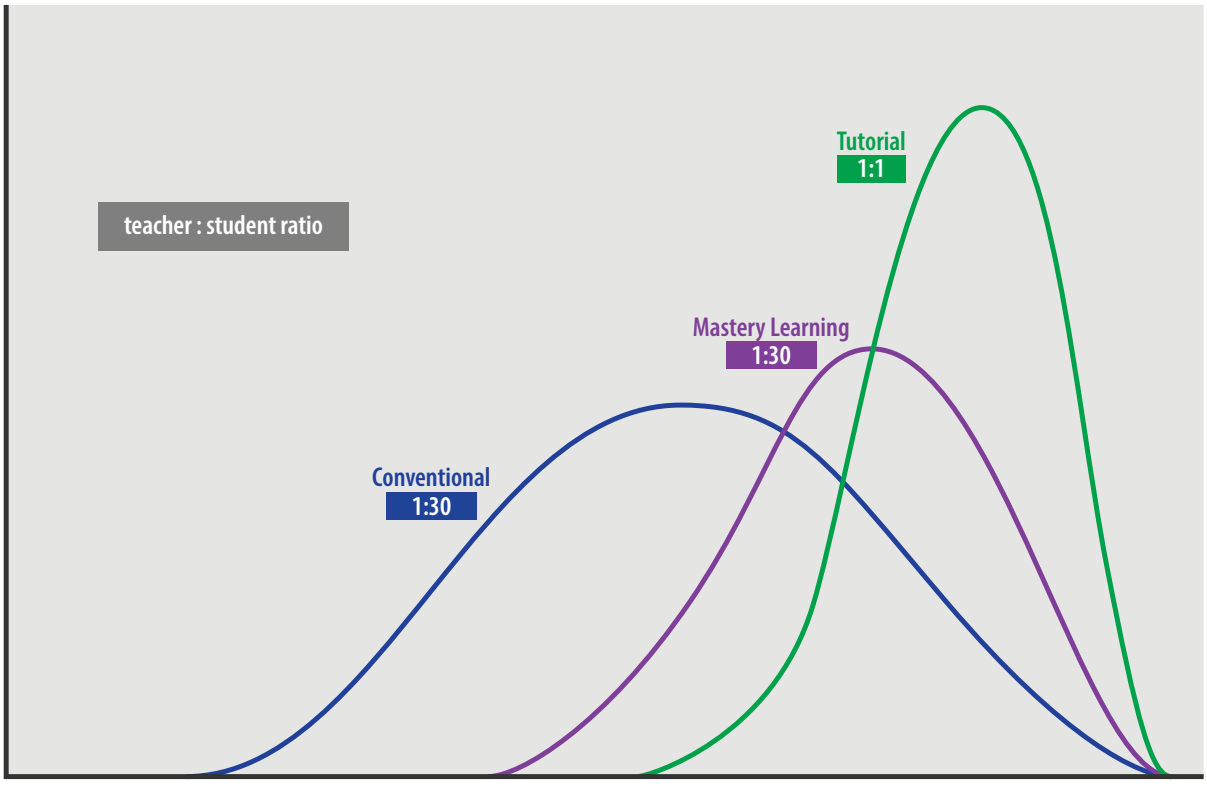
As both an innovator and researcher, Bloom looked for ways to validate the effectiveness and superiority of his mastery learning program. In one of the first comprehensive meta-analyses of educational outcomes, Bloom compared many educational research studies on the impact of (1) whole-group instruction (with a teacher/student ratio of 1:30), (2) mastery learning programs (with a similar teacher/student ratio of 1:30), and (3) individual tutoring (with a one-on-one teacher/student ratio).[9]

He found that, compared to conventional learning programs, more students in mastery learning programs had higher end-of-unit, or summative, scores, and fewer students had low levels of performance. However,

The Challenge

"Can we devise teaching-learning conditions that will enable the majority of students under group instruction to attain levels of achievement that can at present be reached only under good tutoring conditions?"

Figure 2. Achievement Scores[10]



he also found more students in one-on-one tutorial learning programs still substantially outperformed students in group instruction, both in terms of how much they learned and how many students achieved these higher levels of performance. Analyzing these data, Bloom posited what is now referred to as his two-sigma challenge: "Can researchers and teachers devise teaching-learning conditions that will enable the majority of students under group instruction to attain levels of achievement that can at present be reached only under good tutoring conditions?" This is a problem that, decades later, remains unsolved.

"For much of the recent past, many people associated instructional technology with audiovisual instruction."

Technology, Educational Technology, and the New Technologies of Learning

The definition of technology can take on different meanings in the field of education, as well as more generally in society. Ask the ubiquitous "person on the street" to define technology's use in education and you are likely to hear descriptions of machines and devices—laptops, netbooks, mobile phones, video conferencing systems, tablets, iPads, and even twitch devices and game consoles. In one definition, technology is a word that describes various kinds of machines or devices (the "hardware" components of educational technology). In another definition, technology means "technique."

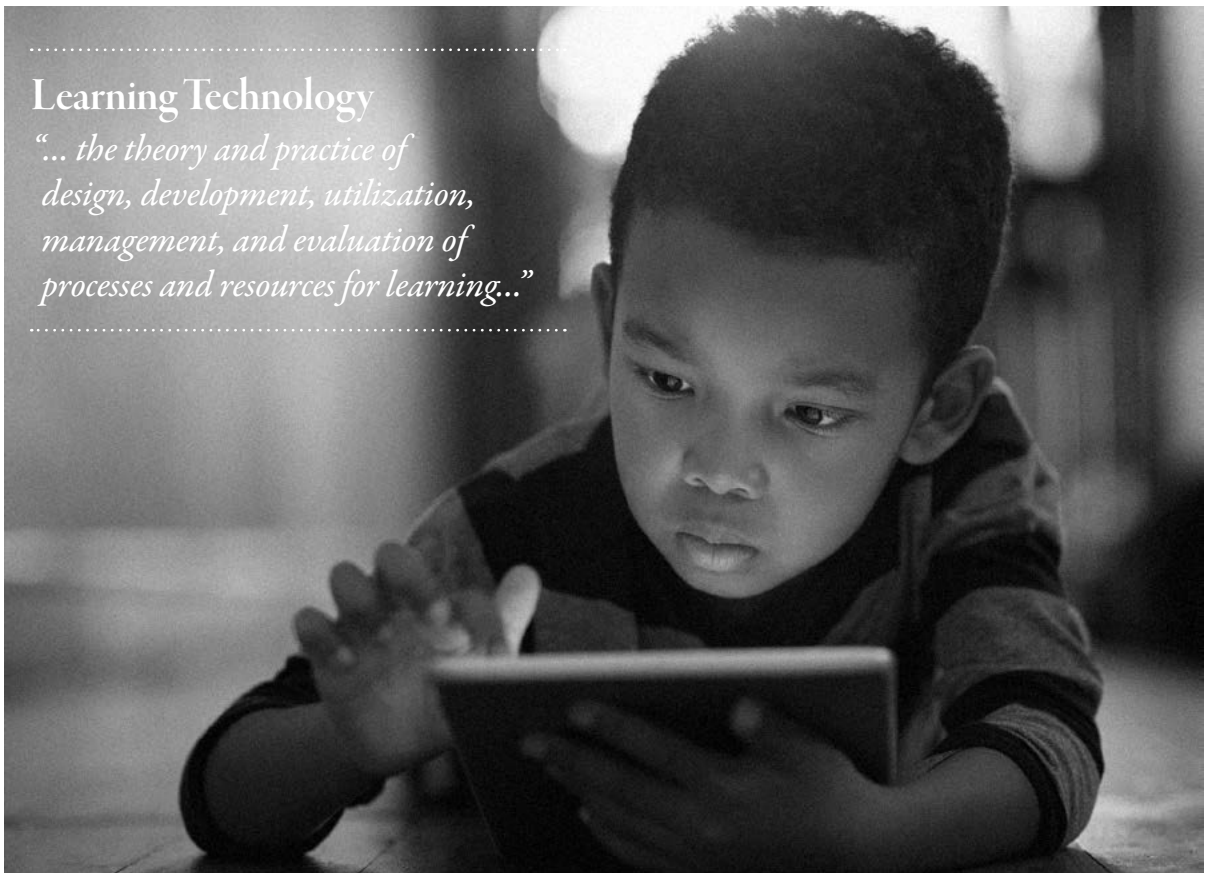
In general terms, technology can be defined as "the systematic application of knowledge to practical tasks."[11] In this sense, various technologies might be classified as either "hard," "soft," or "connected,"[12] or as "resources," "processes," and "networks."[13] "Hard" technologies are developed through the application of physical science and engineering concepts, resulting in new devices meant to accomplish practical tasks.[14] Planes, trains, and automobiles, as well as devices used in education such as chalkboards, televisions, and computers, are all examples of hard technologies. "Soft" technologies are process-oriented, applying research from the behavioral sciences to improve human performance.[15] Methods such as needs assessment and task analysis, or various instructional strategies and tactics, are examples of soft technologies used to design, develop, and deliver education and training solutions.

For much of the recent past, many people associated instructional technology with audiovisual instruction. With the massive and rapid movement to online educational experiences, technology has again been viewed as a media delivery platform. Nearly half a century of research has focused on media and its resulting effects on learning.[16] Early attempts to define the field of learning technology incorporated a distinction

between media and method. Thus, learning technology was characterized as "the efficient utilization of EVERY medium and method to promote learning"[17] or as the "media born of the communications revolution which can be used for instructional purposes," along with a "systematic way of designing, carrying out, and evaluating the total process of learning and teaching."[18]

Bloom was doing much of his research at times when educational technology was quite rudimentary compared to today. However, Bloom also noted these distinctions in identifying the knowledge sources, resources, and activities that constitute the field of learning technology. His definition focused on a concern for the "conditions necessary for effective learning," including both communications to learners that are "frequently delivered by equipment and its associated procedures, commonly referred to as media," and concern for the techniques of instruction that "systematically aim for effective learning, whether or not they involve the use of media."[19]

The more recent definition of instructional technology provided by the Association for Educational Communications and Technology is more comprehensive, reflecting the maturity of the field. Instead of distinguishing between media and method, the field of learning technology is now seen as encompassing "the theory and practice of design, development, utilization, management, and evaluation of processes and resources for learning," rather than the comparison of various media delivery systems on a set of common measures.[20] This definition allows us to evaluate the



impact of emerging technologies that are aligned to learning outcomes, including not only resources and processes (hardware and software) but also the knowledge sources and practices of the people who design, develop, utilize, manage, and evaluate them.

The work of Bloom and his behavioral colleagues can thus be used as a model to explore newer technologies in hardware and software, as well as current advances in the social and brain sciences, for the widest variety of learning environments.

Hardware technologies used in education should be viewed as tools, and tools can be used in different ways.

Educational Hardware: the Media for Learning

Educational hardware had barely evolved beyond chalk on slate during the 1950s when Bloom began his research. Of course there were textbooks, along with some use of instructional films and overhead projectors. In 1954, Skinner tried to develop a "teaching machine" that would produce "programmed instruction" based on a drill-and-practice model of learning. Instruction using this model included repetitive practice, incremental advancement, branching based on assessment, and practice with tailored feedback. Bloom mentioned the PLATO computer-based instruction project, which was one of the first large-scale educational applications of technology during the 1970s at the University of Illinois, as a promising example of a drill-and-practice technology that could be used to model his ideas of a mastery learning program.

The biggest innovation in technology hardware in the twentieth century was the development of the internet. Coupling this network with computing power that has increased dramatically, some say we now carry computing power in our pockets that is a million times more powerful than was used to send Apollo missions to the moon. And this power is nearly completely ubiquitous, allowing unprecedented access for educators and students.

Other hardware innovations with some utilization in education include virtual reality goggles and rooms and augmented reality experiences with mobile devices. Cloud storage has emerged as a secure way to keep data readily available and has replaced other kinds of storage devices, such as floppy disks and USB drives. New input/output devices such as detectors for eye movement, brain wave sensors, computer vision, and audio dictation capabilities have vastly changed possible computer-based hardware for education. Do we even still need QWERTY keyboards? Probably not for long.

The various hardware technologies used in education should be viewed as tools, and tools can be used in different ways. For example, a hammer can be used to delicately shape a metal sculpture, as well as to pound nails into a house. Same tool, different outcomes.

Educational Processes: the "Software" for Learning

In education, software includes both applications running on computers or servers and the strategies, methods, and processes that facilitate learning. At the time of Bloom's work, an important movement in educational methods—Constructivism—emerged from the research on developmental psychology conducted by Piaget and others in the 1950s. Constructivism was based on a philosophy of knowledge that proposed learners construct their own knowledge from their current situation and the people with whom they were interacting in that situation. In its most basic form, Piaget noticed that children learned through discovery. Their discoveries can be guided by a teacher or peer, but ultimately the knowledge they acquire is personally constructed in their minds, rather than being transmitted from teacher to student.

Building on the notion of individual knowledge construction, Lave and Wenger developed a theory known as "situated cognition" in the 1990s. In this explanation of learning, any knowledge learned is inseparable from the context in which it is learned (the situation) and is strongly influenced by the participants in the situation. Hence, effective learning is "situated," based on authentic tasks where the learner moves through "legitimate peripheral participation" in the task by engaging in a "cognitive apprenticeship" led by an expert in the practice, the teacher.

In "anchored instruction," authentic contexts were presented as stories and learners were challenged to solve problems posed in the stories. Group problem solving was a major feature of anchored instruction, as students were encouraged to explore information and test hypotheses that could aid in solving the problem. The suggestions made by proponents of situated cognition and anchored instruction have been implemented in schools through various forms of case-based

"With the emergence of socially connected learning environments, we may see the opportunity not just to match the impact of one-on-one tutoring but to surpass it."

or project-based instruction and group activities where students take on various roles in the project. Similarly, authentic assessment emerged as a way to evaluate student learning that is anchored in specific situations.[21]

The 1990s also saw tremendous growth in the number of companies developing and selling educational software for both homes and schools. Computer software emerged with rabbits teaching reading and spaceships blasting numbers out of the sky. Textbook companies began to package additional resources on CD-ROM with their books and eventually provided additional resources online. Many textbook companies also provided assessment materials and student gradebooks to accompany their texts.

Most of these software companies were new to the educational landscape. However, game-based software was found to motivate student learning well. In part, this was because game designers focused on creating engaging experiences that could produce a "flow state" for the learners. Conditions that produce flow include a clarity for the goals and procedures of the activity, clear and immediate feedback indicating progress, and a balance between perceived challenges and the skills needed to meet the challenge.

Analytics has become a buzzword in many fields, including education. Early efforts involved using extensive formative assessments to guide a learner's path through programmed instruction. In the 1970s, new approaches, using techniques borrowed from artificial intelligence (AI) research, were developed to model student knowledge and skills in real time, comparing the current state of student learning to an "expert model" and using this information to determine paths through the curriculum. Termed "intelligent tutoring," some promising results were achieved, but the momentum for this research has waned

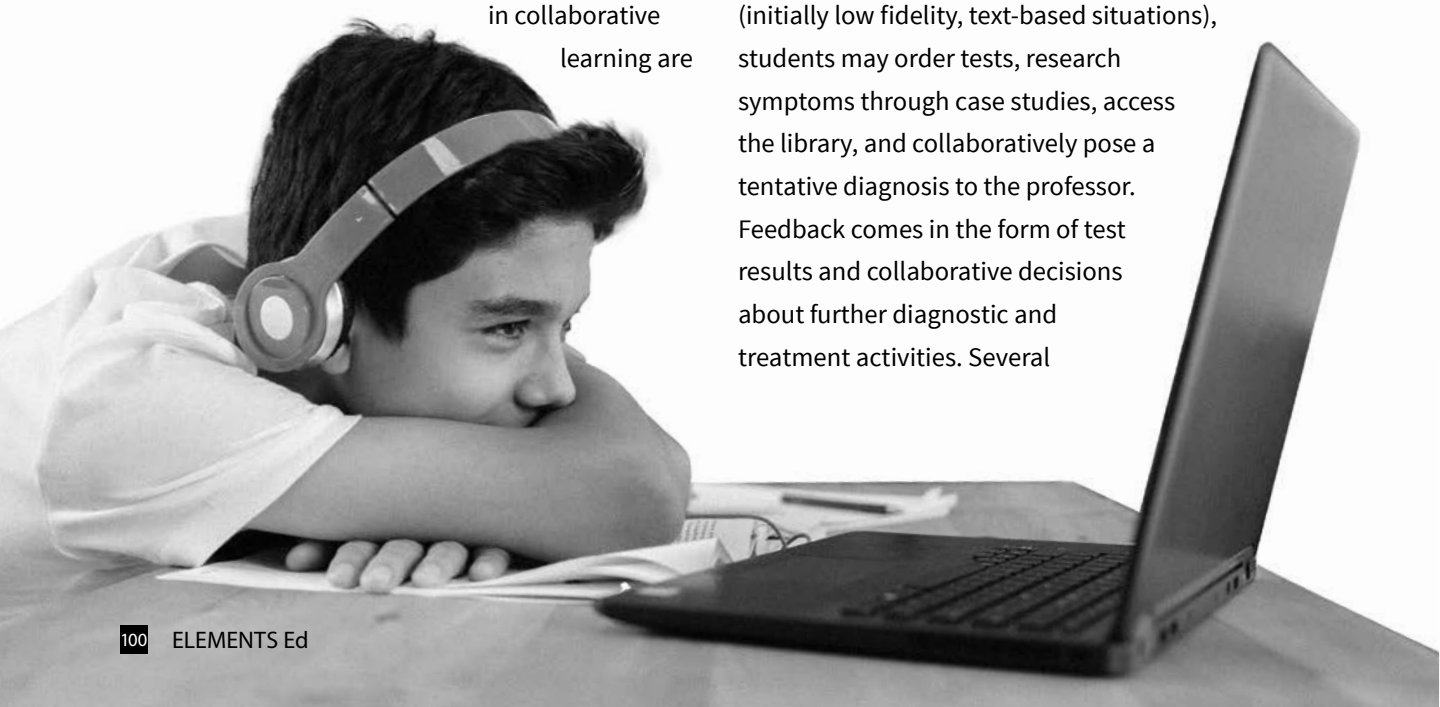
in recent years. AI remains important, however, as learning management systems begin to integrate aspects of this technology. This kind of integration will further efforts to personalize learning and provide tutoring and skills practice, especially when integrated into quiz or testing applications that can manage adaptive testing. The future may also see a continuation of more "superficial" technological changes that expand the utilization of artificial intelligence in education, the development of informal learning environments, and the expansion of information technologies and networks.[22]

Educational Communication: The Power of Social Connections

With the emergence of socially connected learning environments, we may see the opportunity not just to match the impact of one-on-one tutoring but to surpass it. The importance of communication in mediating learning processes has been recognized for decades, even back to the turn of the century when Lev Vygotsky began working on his theories on social development.[23] Both collaborative and cooperative learning have been studied; the difference is that the learning groups and tasks in collaborative learning are organized by the students themselves, while the teacher directs activities and roles in cooperative learning groups. Communication is a two-way process, so situations must facilitate communicative activities, not simple transmission of information from one person to another. This is the essence of interactive instruction that was a feature of educational technology developments.

As a component of his two-sigma research, Bloom also recognized the power of peer interaction to facilitate learning. While he doesn't elaborate, other theorists examined the effects of communication in a number of ways. For example, Vygotsky recommended "scaffolding" learning through the support of knowledgeable others (teachers, parents, or experienced peers). Communication and the social aspects of learning are closely tied to the concepts of situated cognition and anchored instruction, in a form of cognitive apprenticeship that both organizes and promotes learning. Students benefit from learning from an expert within situations that are authentic.

In health science education, groups of learners are challenged to diagnose a medical problem in collaborative ways. In these medical simulations (initially low fidelity, text-based situations), students may order tests, research symptoms through case studies, access the library, and collaboratively pose a tentative diagnosis to the professor. Feedback comes in the form of test results and collaborative decisions about further diagnostic and treatment activities. Several



medical schools have implemented this approach to the medical curriculum throughout their entire program.

Educational technologies for communication are developing quickly, moving in just a few decades from email chains to online video communication capabilities. Vast amounts of information (whole libraries, galleries, and other archives) are available at the click of a mouse. However, the power of these technologies lies in the ability of individual learners to access collaborative and cooperative learning opportunities, rather than in one-on-one tutoring. The future is bright.

The Updated Question

"Will learning systems provide an opportunity for students to extend beyond levels of achievement from the very best one-on-one in person tutoring systems?"

Updating Bloom's Two-Sigma Challenge

Bloom was most influenced by the behaviorists of his time, both Skinner and Keller. It is of little wonder, therefore, that the psychological underpinning of both his mastery learning approach and his two-sigma problem framed the systems in behavioral psychology.

In the nearly forty years since he first issued his comparative challenge, human understanding of the biological and social aspects of learning has increased significantly, from cognitive theory to cognitive science to brain and learning sciences. We can now measure more than just observable behaviors while not having to rely on untestable theories of learning.

Updating Bloom's grounding allows us to look at the intersection of brain, behavioral, and social science to conceive, develop, and execute innovative learning systems. These systems can easily extend beyond the lowest common denominator of learned behaviors and instead can address concepts like extending the capacity of working memory, the development of fluid intelligence, and neuroplasticity. Thus, an updated question is "Will learning systems provide an opportunity for students to extend beyond levels of achievement from the very best one-on-one in person tutoring systems?" As online learning systems continue to evolve in hardware, software, and connectivity to add machine learning, data analysis, and engagement measures, it is not just possible but probable they will provide extraordinary results for more learners.

Conclusions

Predictions of the future of education within a technological society suggest basic systemic changes will continue as we expand existing communication and information networks, focus on curricular revision and accountability, restructure schools, and explore the implications of new

learning theories and interactivity methods.[24] The impact of technology on various aspects of society, including education, is growing at a rapid pace. Many of these advances have been positive. We should not over-generalize our collective experience during 2020–2022 but should look beyond the rapidly implemented Zoom lessons and Google Classroom. As we look back through decades of thought leadership and research and ahead to future well-grounded innovations in learning systems, we see decades of significant progress and substantial potential. It is in this atmosphere of technological access that efforts to improve education and instruction continue to develop.

The access, power, and connectivity of today's online learning tools allow us to envision, design, and deploy solutions that deliver both effective and efficient learning outcomes. With this power also comes the ability to personalize these learning systems in ways that even the best human tutors can't manage. The raw volume of combinatorial data requires the processing power that only today's technology can provide.

In order to solve the updated two-sigma problem, we must base new developments in learning technology on sound theoretical principles such as those provided by Bloom. Bloom's work, as well as the work of other innovators, has influenced the development and utilization of technology for instruction. Sometimes this was a direct influence resulting from Bloom's work in a particular area, and at other times it was an indirect influence based on his theoretical work. We should continue to explore these and other areas where Bloom's ideas might prove beneficial as new technologies emerge and as we devise new uses for existing technologies. But above all, we must avoid the "technology for technology's sake" mentality and continue to employ technology to improve and optimize the processes of learning for all students. Ed

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Endnotes

1. Holden Karnofsky, "Where's Today's Beethoven?," *Cold Takes*, January 4, 2022, https://www.cold-takes.com/wheres-todays-beethoven/.
2. Karnofsky.
3. Erik Hoel, "Why We Stopped Making Einsteins," *The Intrinsic Perspective*, March 16, 2022, https://erikhoel.substack.com/p/why-we-stopped-making-einsteins.
4. Holly Knox, *A History of Educational Research in the United States*, 1971, https://eric.ed.gov/?id=ED088800.

5. Benjamin S. Bloom, *Taxonomy of Educational Objectives: The Classification of Educational Goals* (New York: Longmans, Green and Company, 1956).

6. Robert M. Gagné, *The Conditions of Learning*, 4th ed. (New York: Holt, Rinehart, and Winston, 1985).

7. Robert M. Gagné, Leslie J. Briggs and Walter W. Wager, *Principles of Instructional Design*, 4th ed. (Fort Worth: Harcourt Brace Jovanovich College Publishers, 1992).

8. Madeline C. Hunter, *Mastery Teaching*, 1st ed. (El Segundo, CA: TIP Publications, 1982).

9. Benjamin S. Bloom, "The 2 Sigma Problem: The Search for Methods of Group Instruction as Effective as One-to-One Tutoring," *Educational Researcher* 13, no. 6 (1984): 4–16, https://doi.org/10.3102/0013189X013006004.

10. Bloom, "The 2 Sigma Problem," 5.

11. Robert Heinich et al., *Instructional Media and Technology for Learning* (Pearson Education Ltd, 2002).

12. Robert Heinich et al.

13. Barbara B. Seels and Rita C. Richey, *Instructional Technology: The Definition and Domain of the Field* (Washington, DC: Association for Educational Communication and Technology, 1994).

14. Paul Saettler, *A History of Instructional Technology* (New York: McGraw-Hill Book Company, 1968).

15. Saettler.

16. Richard E. Clark, "Reconsidering Research on Learning from Media," *Review of Educational Research* 53, no. 4 (1983): 445–59.

17. Donald P. Ely, "The Changing Role Of The Audiovisual Process In Education: A Definition And A Glossary Of Related Terms," *TCP Monograph No. 1. AV Communication Review*, Supplement No. 6, (1963).

18. Commission on Instructional Technology, "To Improve Learning: A Report to the President and the Congress of the United States," Washington, DC: Government Printing Office, (1970).

19. Bloom, "The 2 Sigma Problem," 6–7.

20. Seels and Richey.

21. Grant Wiggins, "A True Test: Toward More Authentic and Equitable Assessment," *Phi Delta Kappan*, 70, no. 9 (1989): 703–13.

22. Robert Heinich et al., *Instructional Media and the Technologies for Learning*, 6th ed. (Upper Saddle River, NJ: Merrill/Prentice Hall, 1999).

23. Lev S. Vygotskiĭ and Michael Cole, *Mind in Society: the Development of Higher Psychological Processes* (Cambridge: Harvard University Press, 1978).

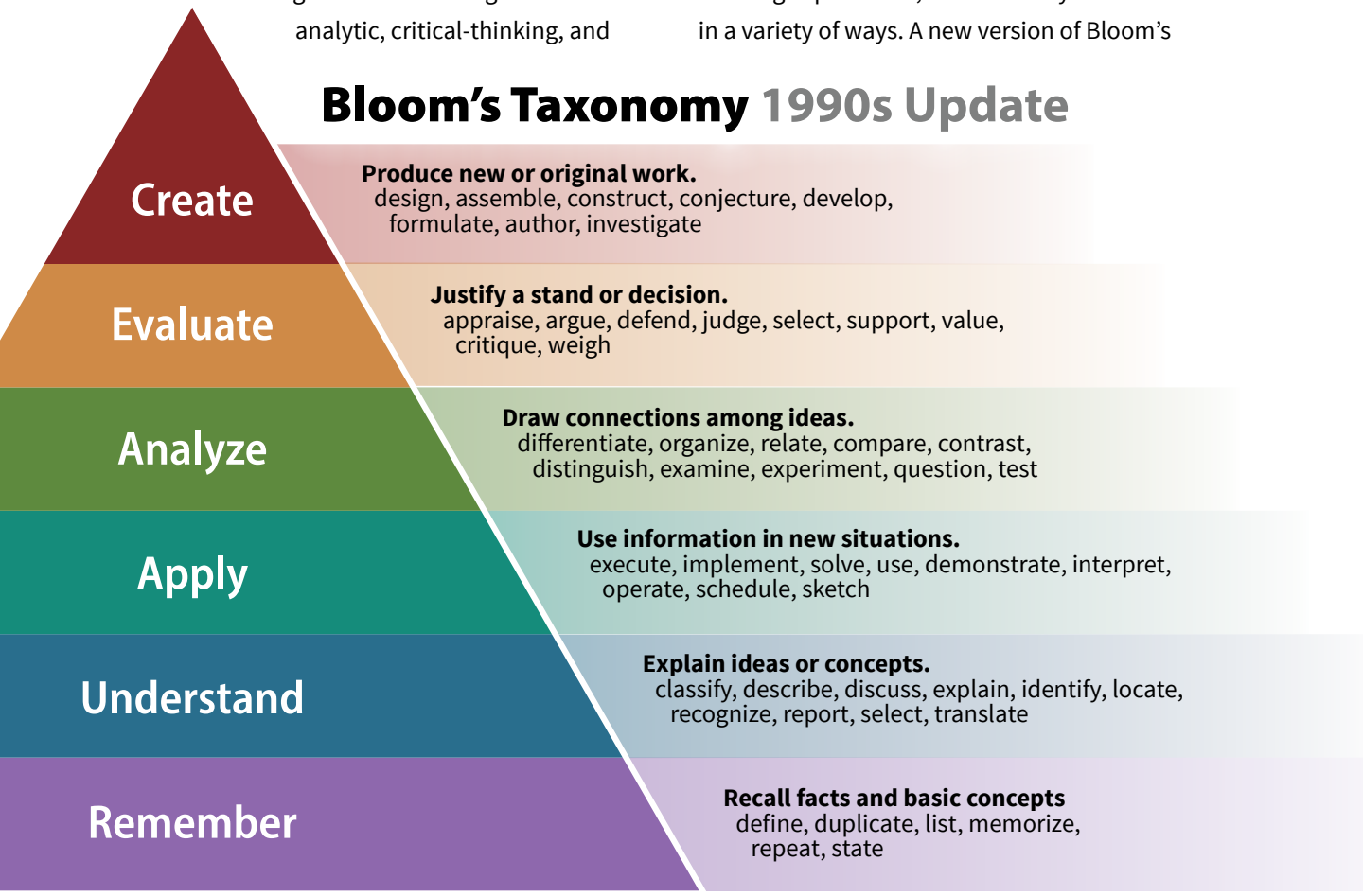
24. Lewis J. Perelman, *School's Out : Hyperlearning, the New Technology, and the End of Education*, 1st ed. (New York: William Morrow, 1992).

Bloom's Taxonomy

Benjamin Bloom and his colleagues first created what is now known as Bloom's Taxonomy in the 1950s.[1] This taxonomy was divided into three domains: cognitive, affective, and psychomotor. The primary goal of the taxonomy in the cognitive domain was to provide educators with a framework to classify and evaluate the level of thinking involved in activities or assessments or required to meet specific learning outcomes. It was also designed to help teachers ensure they were providing opportunities for learners to practice higher-order thinking skills or analytic, critical-thinking, and creative skills, in addition to the foundational skills involved in lower-level thinking.

This illustration shows Bloom's Taxonomy as it was updated in the 1990s.[2] Among other changes, the purpose of the update was to highlight the actions—or verbs—involved in each level of cognitive skill. The goal of this taxonomy was the same: to help educators ensure they were providing opportunities for students to actively engage in all levels of thinking, not just in the lower levels.

As we incorporate various technologies into learning experiences, students may use these tools in a variety of ways. A new version of Bloom's



Taxonomy for the digital world has been developed to categorize different types of technology by the level of thinking students tend to use most often when working with the tools.[3] The goal of this taxonomy was again to help make decisions about the kinds of tools provided to students, especially ensuring access to tools that support the development of higher-order thinking skills. Most importantly, the emphasis of Bloom's Digital Taxonomy was on the thinking the tools facilitate, instead of on the tools themselves. Ed

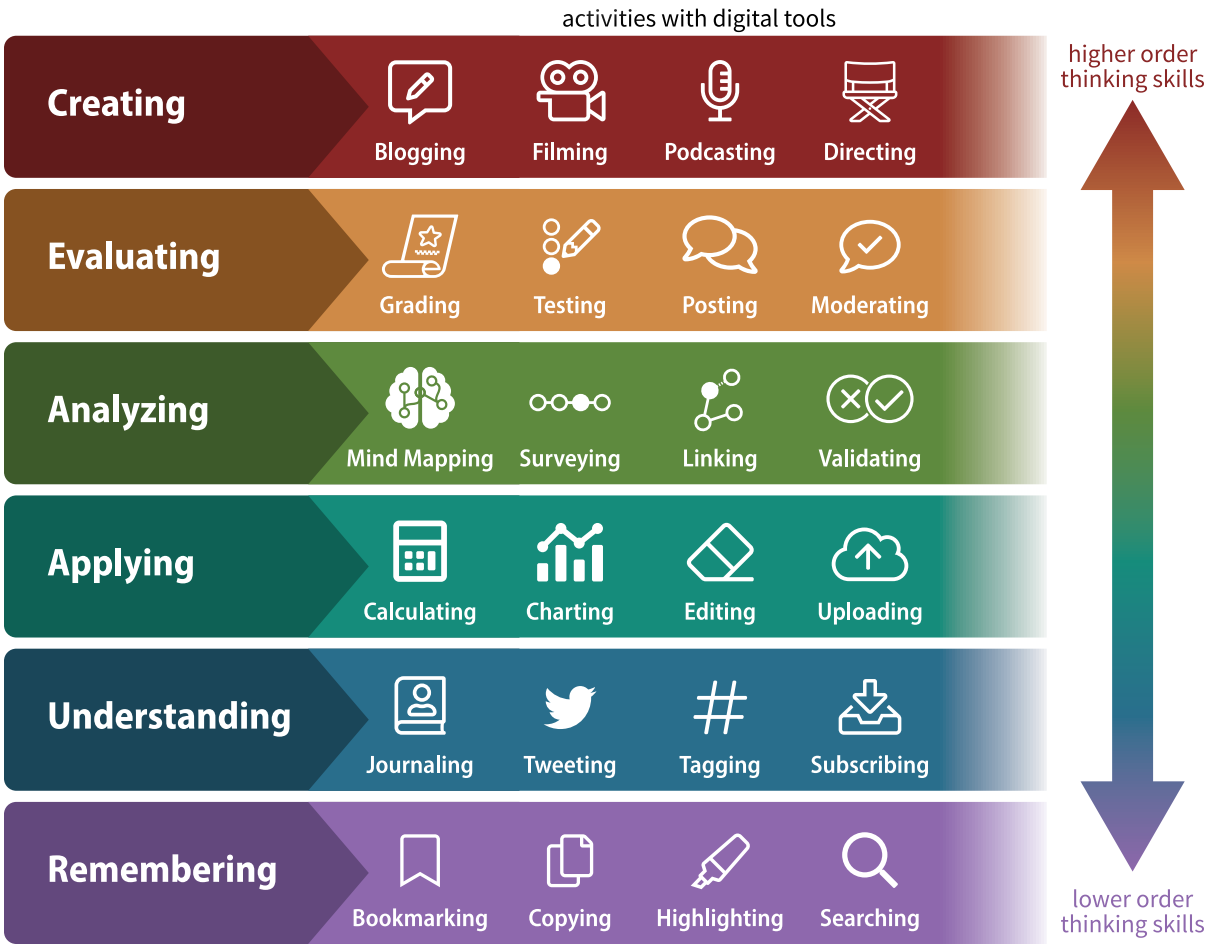
Endnotes

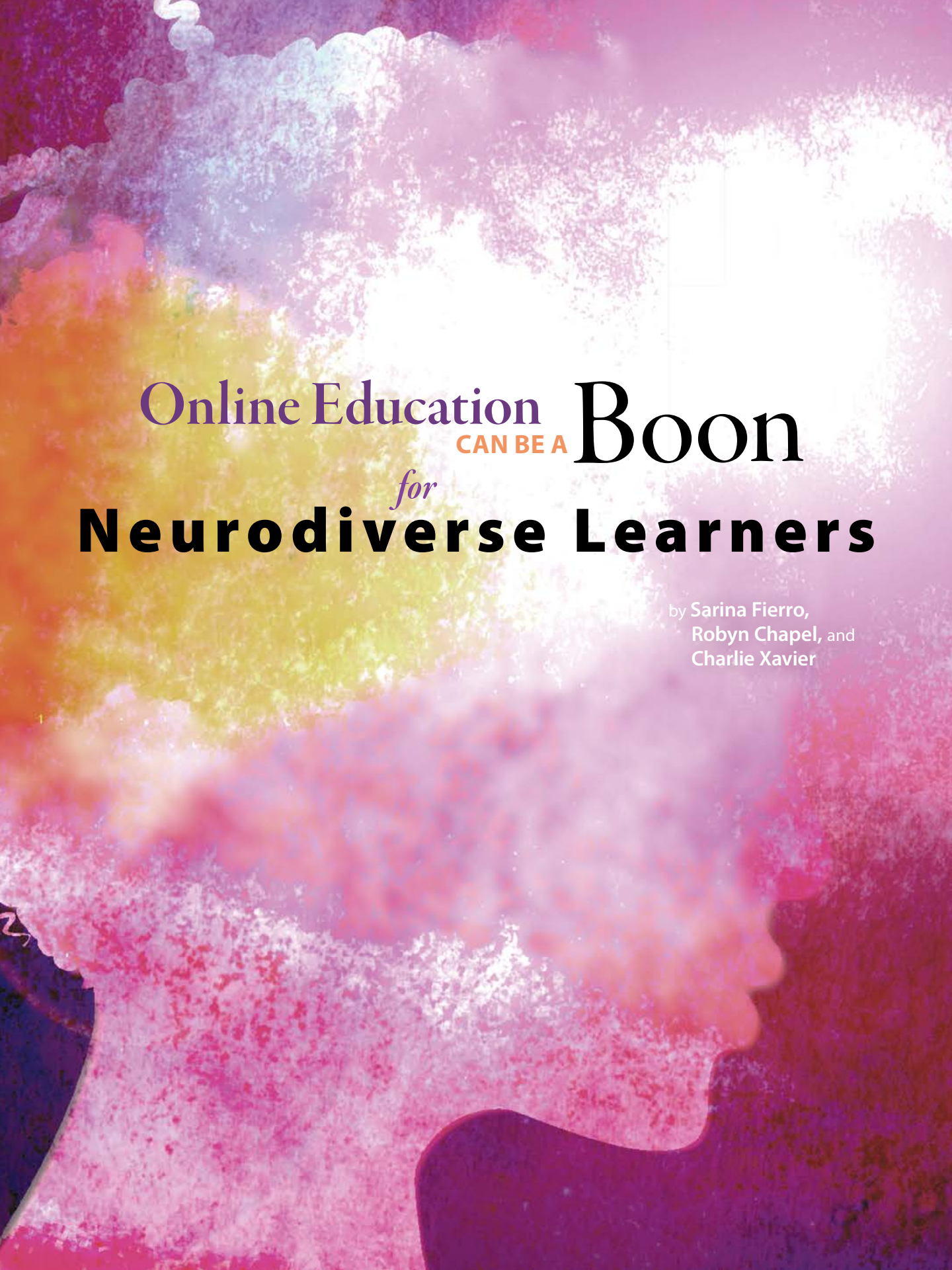
1. Benjamin S. Bloom, *Taxonomy of Educational Objectives: The Classification of Educational Goals* (New York: Longmans, Green and Company, I956).

2. Lorin W. Anderson and David R. Krathwohl (eds.), *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives* (New York: Longman, 2001); Patricia Armstrong, "Bloom's Taxonomy," Vanderbilt University Center for Teaching, 2010, https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/.

3. Obiageli Sneed, "Integrating Technology with Bloom's Taxonomy," Arizona State University, Teach Online, May 9, 2016, https://teachonline.asu.edu/2016/05/integrating-technology-blooms-taxonomy/.

Bloom's Digital Taxonomy





Online Education CAN BE A Boon *for* Neurodiverse Learners

by Sarina Fierro, Robyn Chapel, and Charlie Xavier

How best to support and teach students with unique learning needs is critical for educational researchers, practitioners, students, and families. Neurodiversity, which describes variations and differences in the human brain that can lead to unique learning needs,[1] is a challenge in all academic settings. Ideal approaches emphasize student strengths and facilitate curricular design decisions that acknowledge this natural diversity and the need for differentiation to appropriately meet the needs of each student.[2]

The recent significant growth in online K–12 learning environments impacts neurodiverse learners in new ways.[3] Online learning has helped unleash innovation and creativity in learners due to the "greater societal acceptance that learning can, and should, happen everywhere."[4] Galvanized by this opportunity, the online learning environment, in both structure and flexibility, provides a purposeful set of advantages and levers for neurodiverse learners.[5]

Agency, Autonomy, and Choice

Researchers have long known that students' agency and autonomy have a significant impact on their academic performance and perceptions of the learning experience,[6] especially in virtual learning environments. An online environment with a competency-based learning approach is particularly well suited to promote student agency and autonomy. In this approach, learners work independently on one competency at a time, moving on only when they have mastered the specific competency.[7] The flexibility of a competency-based model empowers students to demonstrate their understanding of the content in a way that best suits their needs, making personalization and differentiation a built-in feature of these environments[8] and thus allowing teachers to meet students where they are.

Even with a competency-based approach, neurodiverse learners still need to be accessing the most challenging curriculum. The personalized nature of a competency-based approach can undermine the deliberate strategies and interventions that have been helpful in special education environments.[9] Instead of implementing accommodations that make age-appropriate curriculum accessible for neurodiverse students, competency-based learning models can limit students to content that is below grade level. Teachers thus must play an active role in connecting the personalized, competency-based lessons to the highest learning goals for each student.

Online learning programs that leverage a different method, such as a task-based approach where disparate lessons amalgamate into weekly projects, can also be conducive to teaching a neurodiverse population. This type of learner-centered program can help cultivate 21st century habits of mind, such as divergent thinking on global problems, dialogic discourse in STEAM book clubs, and communication in problem-based math work.

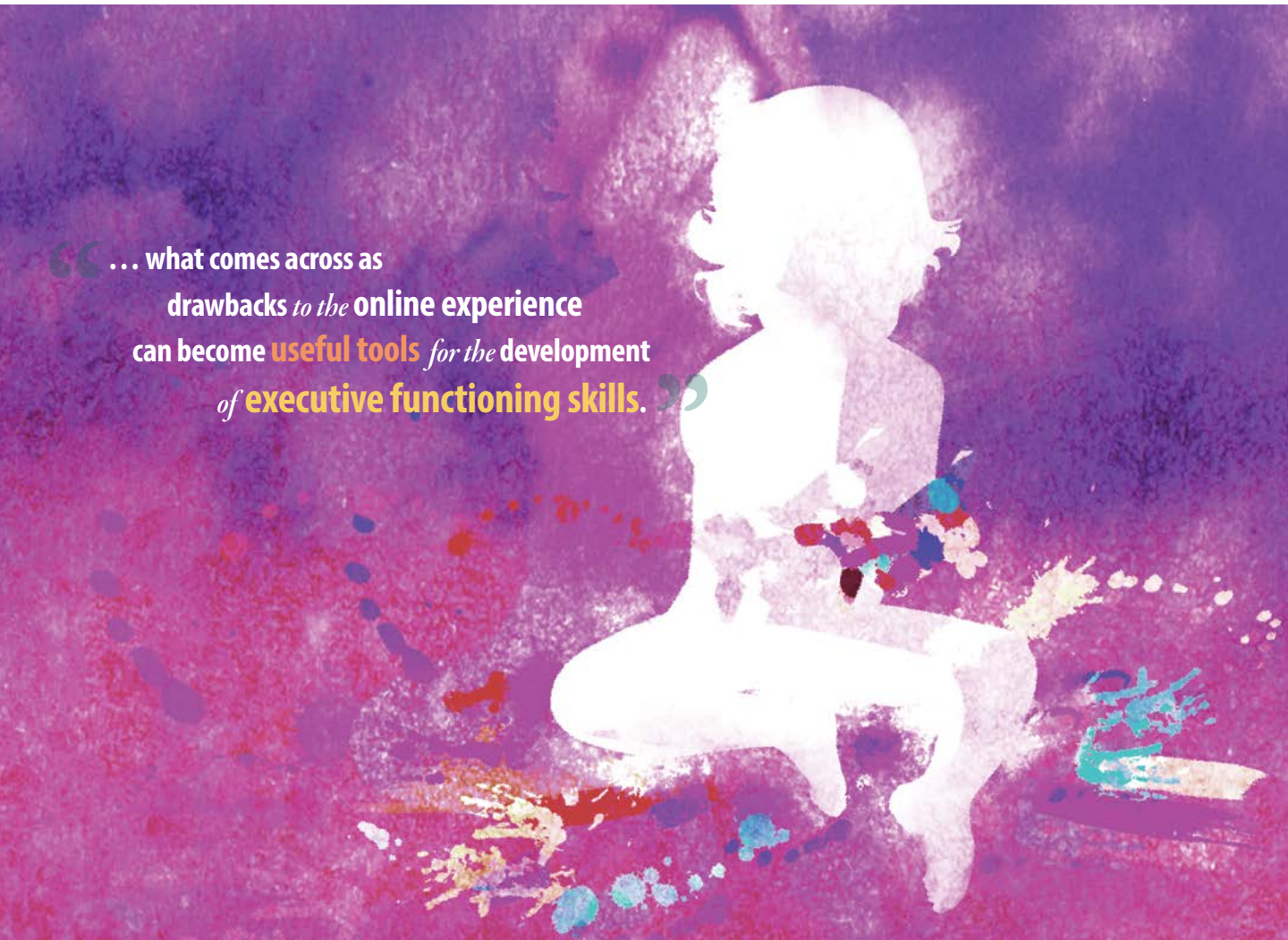
While the personalized, independent nature of online learning environments tends to leverage teachers as facilitators more than as instructors, several teaching strategies, such as direct or explicit instruction,[10] have been successful with neurodiverse populations. Virtual learning environments enable students to meet one-on-one with their teachers for explicit instruction,

for remediation, or simply to receive specific, individualized feedback in an intimate setting. These sources of feedback may also help students develop autonomy and self-determination, enabling them to take charge of their own learning.[11]

Fluidity of synchronous and asynchronous learning time is another aspect of online learning environments that promotes student autonomy. Flexibility in scheduling learning time encourages students to view lessons, access materials, and complete assignments and assessments in their own time and at their own pace.[12] Controlling the pace of their own learning allows the student deeper and more creative learning experiences. A flexible schedule allows learners who struggle with attention or sensory integration to take the movement breaks essential to maximizing their learning.

Executive Functioning Skills

While this flexibility engages students in their own learning and develops their sense of autonomy, it also places a high demand on cognitive skills like planning, organization, working memory, and self-regulation—executive functioning skills. Since the use of personal devices in school contexts places greater demands on students' executive functioning skills,[13] fully remote learning environments can exacerbate these concerns. Neurodiverse students may struggle with these skills more than their peers. However, with the right attention and care, what comes across as drawbacks to the online experience



can become useful tools for the development of executive functioning skills.

Research shows that many neurodiverse students have limitations on their working memory (WM)[14]—one of the primary executive functioning skills. Well-structured online lessons that provide explicit overviews, make connections between concepts, and clearly present instructions can help these students overcome WM limitations.[15]

An online environment that presents learning objectives and expectations in an accessible way can remove the cognitive burden of keeping these instructions in WM, allowing students to dedicate those cognitive resources to the academic task at hand. An online learning platform that is easy to navigate minimizes WM demands; and simple organizational aspects such as knowing where to submit work, where and when to find office hours, and where to retrieve your schedule alleviate the stress of these tasks and contribute to the development of students' self-efficacy.

Clear, predictable expectations allow students to adjust their behavior and focus based on the desired learning outcomes.[16] Written step-by-step instructions and expectations are a common accommodation offered to support students as they develop their executive functioning skills[17] and are a feature of a well-designed online learning environment. When this type of scaffolding exists, learners have more cognitive resources for higher-level thinking and engaging in course content. This helps maintain an environment where students are passionate about learning.

The flexible schedule inherent in online learning environments can also help hone executive functioning skills. At first, this flexibility appears to leave students without support as they try to organize their time on schoolwork, monitor their progress on assignments, and fight off distractions such as messaging, video streaming, or other internet diversions. With feedback from an instructor, practice mitigating these potential pitfalls can help increase students' capacity to focus their attention. Similarly, ample practice in making and following a daily schedule can help facilitate student growth in executive function.

Cognitive Load

Another consideration when teaching neurodiverse student populations in online environments is the cognitive load imposed on students. Cognitive load is the amount of mental exertion required to complete a given task.[18] Navigating the various technologies, applications, and notifications, as well as the multimedia presentation of information, can be taxing. Online learning environments must thus be intentional about reducing the cognitive load in the structure and design of lessons. If they do not, they risk overwhelming all students, especially neurodiverse ones.

Research shows that having two focal points negatively impacts learning in typically developing students,[19] and neurodiverse students have further difficulty dividing their attention when viewing images and related text online.[20] All students benefit from having a single focal point on the screen,[21] with simple graphics and written information integrated with images and other types of communication. An organized system for students to retrieve lesson materials (documents, slides, videos, and class recordings) also helps reduce cognitive load.

Neurodiverse students learn as well as their typically developing peers when task demands are limited and content divided into small instructional chunks.[22] Online environments provide the flexibility to limit synchronous time to smaller blocks

and assign shorter, less demanding tasks to be completed in asynchronous times. Shorter blocks provide more frequent breaks and help alleviate cognitive demands, facilitating the successes of neurodiverse student populations.

Conclusion and Takeaways

Online learning environments present both new obstacles and new opportunities for teaching neurodiverse student populations. Being intentional about online curricula and content presentation is critical to ensure these students are able to succeed. Helpful strategies to mitigate obstacles and utilize new opportunities are shown at right. Ed

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Online Strategies *for* Neurodiverse Student Success

Maintain a **flexible**, **modular** schedule to allow students to pace tasks, take mental breaks as needed, and focus on their schoolwork at a time that works best for their individual needs.

Keep **synchronous** and **asynchronous** learning time fluid. This promotes student autonomy and allows students to view lessons, access materials, and complete assignments on their own time and at their own pace.

Break synchronous instructional time into **shorter blocks** with appropriate breaks to mitigate cognitive overload, as well as to keep students' attention focused.

Keep instructions **clear** and **easy to understand**, broken down into steps, if necessary.

Divide content into **small instructional chunks** and limit task demands.

Organize text and graphics to maintain a **single focal point** on the screen.

Add elements of **competency building** to allow for personalization and differentiation, while making sure neurodiverse learners access the highest level of curriculum.

Endnotes

1. Julie Skelling, "Neurodiversity: An Overview," *The Education Hub* (blog), June 9, 2020, https://theeducationhub.org.nz/neurodiversity-an-overview/.

2. Julie Skelling, "Neurodiversity: A Strengths-Based Approach to Teaching Diverse Learners," *The Education Hub* (blog), October 19, 2020, https://theeducationhub.org.nz/neurodiversity-a-strengths-based-approach-to-teaching-diverse-learners/.

3. Sean J. Smith and James D. Basham, "Designing Online Learning Opportunities for Students with Disabilities," *Teaching Exceptional Children* 46, no. 5 (2014): 127–37.

4. David Lyttle, "Lessons from the Pandemic: Putting Our Findings to Practice," in Preparing for the Future: Using Curiosity and Creativity to Boost Confidence in Maths (white paper), Jennifer Chang Wathall and David Lyttle (Oxford University Press, 2021), 21, https://global.oup.com/education/content/primary/key-issues/maths-thought-leadership/mathswhitepaper/.

5. Stein Brunvand and Heidi Abadeh, "Making Online Learning Accessible: Using Technology to Declutter the Web," *Intervention in School and Clinic* 45, no. 5 (2010): 304–11; Smith and Basham.

6. Heng Luo et al., "Impact of Student Agency on Learning Performance and Learning Experience in a Flipped Classroom," *British Journal of Educational Technology* 50, no. 2 (2019): 819–31, https://doi.org/10.1111/bjet.12604.

7. Diana Greer, Amber L. Rowland, and Sean J. Smith, "Critical Considerations for Teaching Students with Disabilities in Online Environments," *Teaching Exceptional Children* 46, no. 5 (2014): 79–91, https://doi.org/10.1177/0040059914528105.

8. Greer, Rowland, and Smith.

9. Greer, Rowland, and Smith.

10. Greer, Rowland, and Smith.

11. Meagan Varga, "The Effects of Teacher-Student Relationships on the Academic Engagement of Students" (master's thesis, Goucher College, 2017).

12. Cathy Cavanaugh et al., "Online Learning for Students with Disabilities: A Framework for Success," *Journal of Special Education Technology* 28, no. 1 (2013): 1–8, https://doi.org/10.1177/016264341302800101.

13. Robin Kay, Daniel Benzimra, and Jia Li, "Exploring Factors That Influence Technology-Based Distractions in Bring Your Own Device Classrooms," *Journal of Educational Computing Research* 55, no. 7 (2017): 974–95, https://doi.org/10.1177/0735633117690004.

14. Janet F. McLean and Graham J. Hitch, "Working Memory Impairments in Children with Specific Arithmetic Learning Difficulties," *Journal of Experimental Child Psychology* 74, no. 3 (1999): 240–60, https://doi.org/10.1006/jecp.1999.2516.

15. Diana L. Greer, Stephen A. Crutchfield, and Kari L. Woods, "Cognitive Theory of Multimedia Learning, Instructional Design Principles, and Students with Learning Disabilities in Computer-Based and Online Learning Environments," *Journal of Education* 193, no. 2 (2013): 41–50, https://doi.org/10.1177/002205741319300205.

16. Greer, Crutchfield, and Woods.

17. Rebecca C. Booth, "List of Appropriate School-Based Accommodations and Interventions," East End Psychological Services, accessed May 18, 2022, https://www.eepservices.org/pdf/LIST_OF_APPROPRIATE_SCHOOL.pdf.

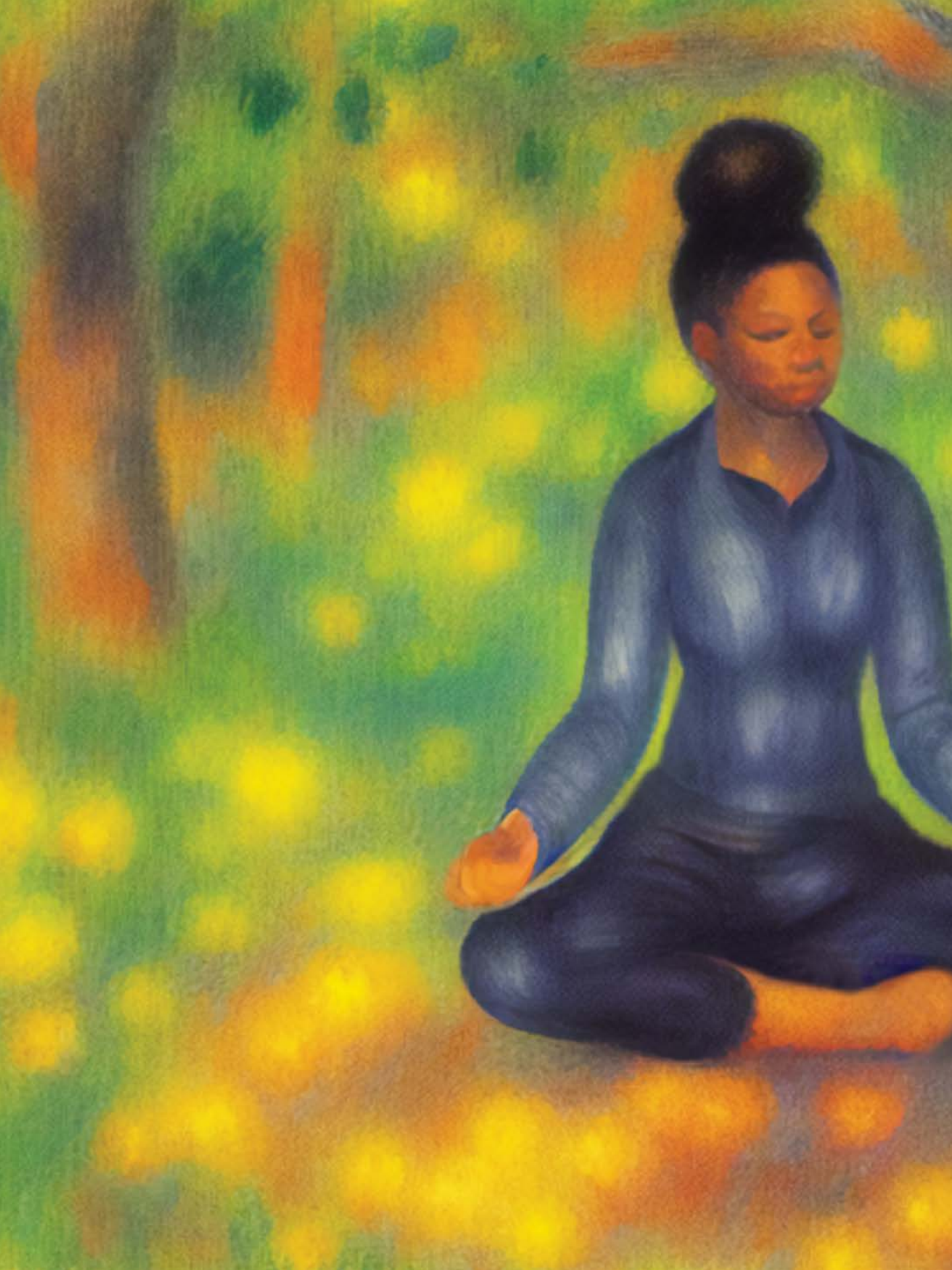
18. Anna Wong et al., "Cognitive Load Theory, the Transient Information Effect and e-Learning," *Learning and Instruction* 22, no. 6 (2012): 449–57, https://doi.org/10.1016/j.learninstruc.2012.05.004.

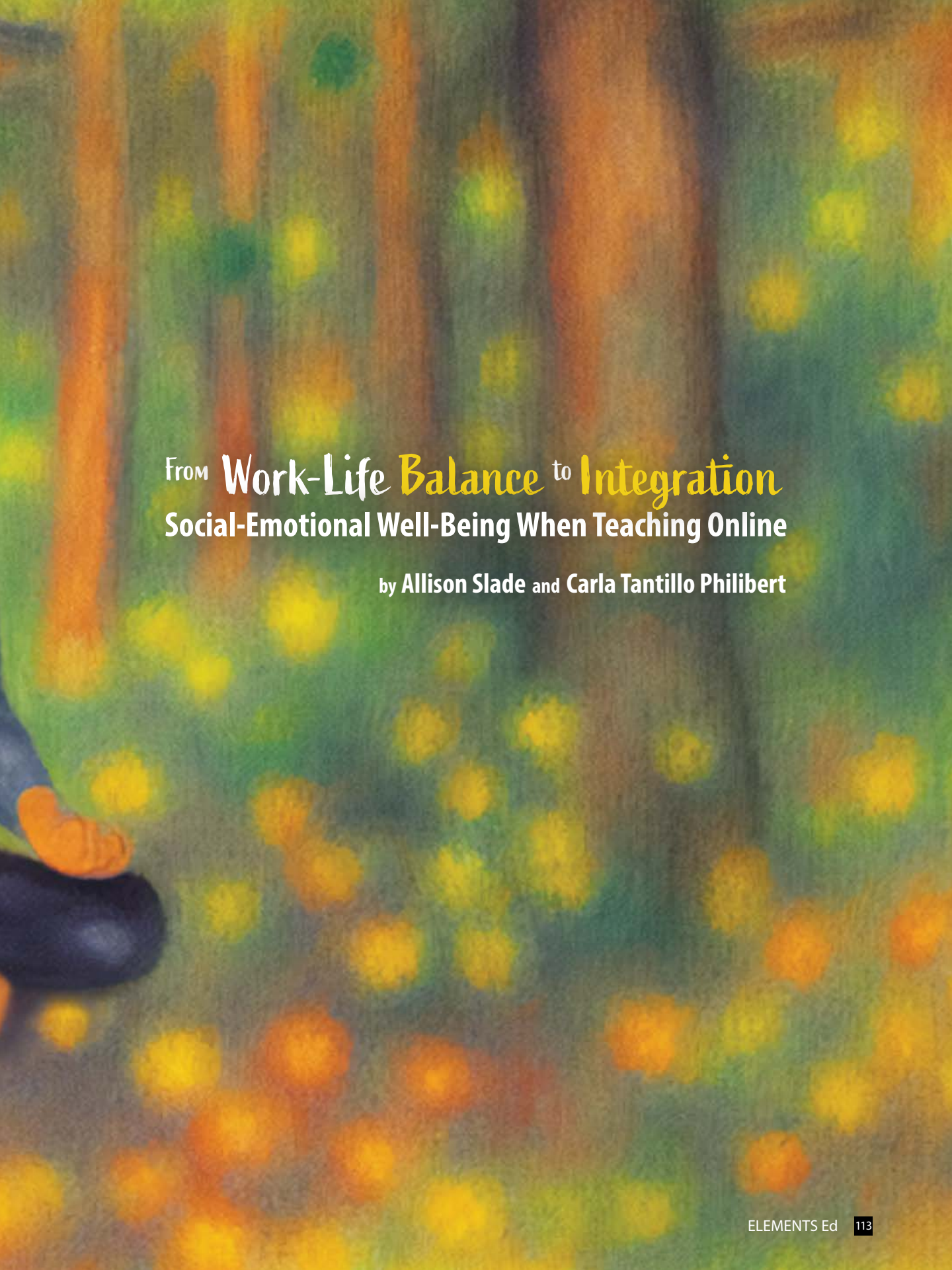
19. Paul Ayres and John Sweller, "The Split-Attention Principle in Multimedia Learning," in *The Cambridge Handbook of Multimedia Learning* (New York, NY: Cambridge University Press, 2005), 135–46, https://doi.org/10.1017/CBO9780511816819.009.

20. H. Lee Swanson and Xinhua Zheng, "Memory Difficulties in Children and Adults with Learning Disabilities," in *Handbook of Learning Disabilities*, 2nd ed (New York, NY: The Guilford Press, 2014), 214–38.

21. Greer, Crutchfield, and Woods.

22. Fernand Gobet et al., "Chunking Mechanisms in Human Learning," *Trends in Cognitive Sciences* 5, no. 6 (2001): 236–43, https://doi.org/10.1016/S1364-6613(00)01662-4.





From Work-Life Balance to Integration

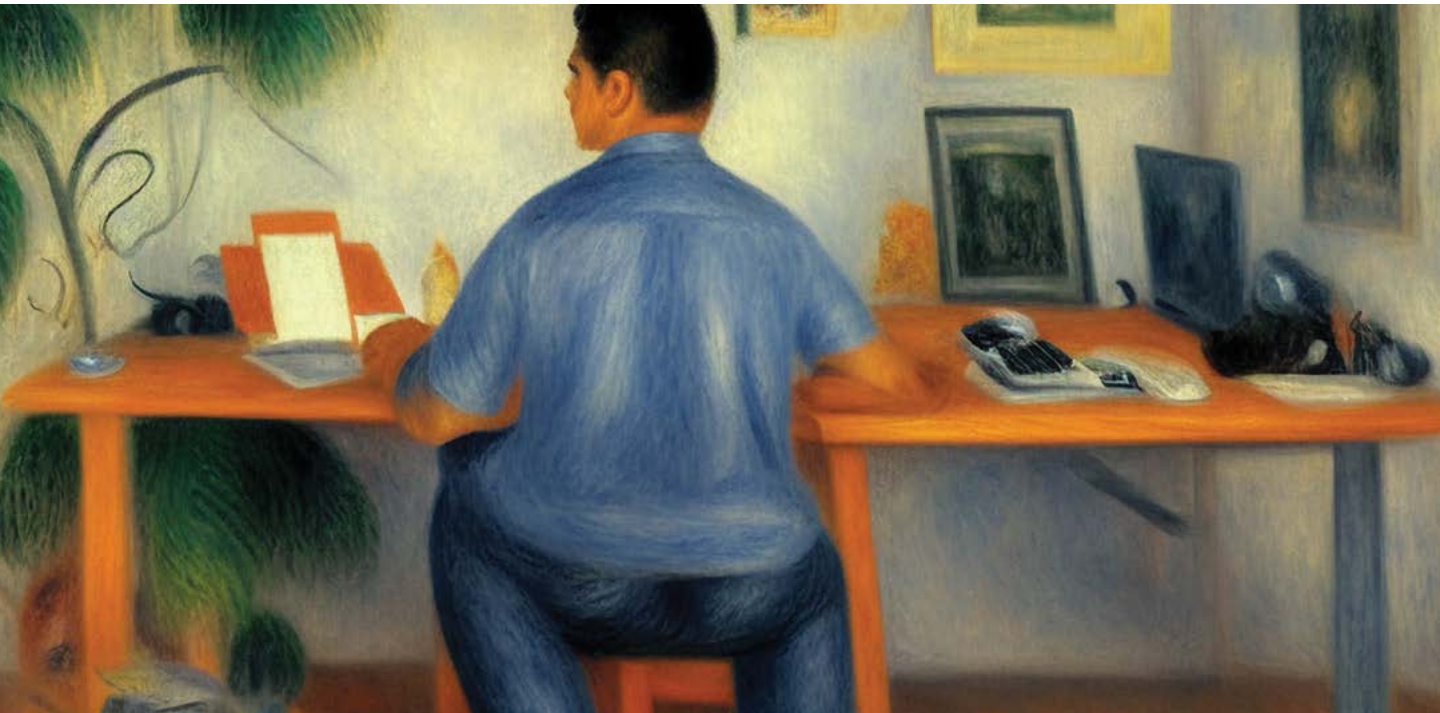
Social-Emotional Well-Being When Teaching Online

by Allison Slade and Carla Tantillo Philibert

While it is widely recognized that the emergency remote teaching that defined the early stages of the COVID-19 pandemic is mostly over, teaching and learning will continue to encompass multiple modalities in ways we have yet to imagine in the field of education. Researchers in educational technology have long distinguished between intentional remote learning design solutions and emergency response teaching and learning. As teachers and leaders, we see remote learning as relevant long beyond the COVID-19 crisis — where the opportunities for its use are abundant for students with significant and ongoing medical needs, for migrant students, and for students who need flexibility in their education due to pursuits outside of school. The strategies and opportunities that lie in this article and in our full text, *Everyday SEL in the Virtual Classroom — Integrating Social Emotional Learning and Mindfulness Into Your Remote and Hybrid Settings*, can be useful in the long-term, especially when it comes to devising ways to improve overall adult and student well-being and social-emotional health.

The research is clear: social-emotional learning (SEL) is key to successful student performance.[1] It is also clear that students, teachers, and school leaders alike are constantly trying to figure out what school, and its social-emotional support, should look like for students when they are in school remotely or in a blended learning environment. In our book we provide specific strategies to help teachers, school and district leaders and parents—both during a crisis and beyond—for implementing SEL in an environment where disconnection is prevalent. In this article, we will specifically focus on reflection and recognition of how the current pandemic/post-pandemic environment is impacting educational practitioners. Our goal is to shed light on ways in which teachers can become emotionally competent in virtual learning environments so they can use these strategies for increased collective efficacy across teams and the school as a whole.

> "No one cares how much you know, until they know how much you care."
>
> Theodore Roosevelt[2]

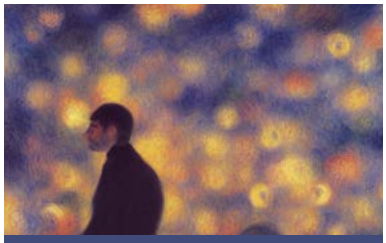


Routines

Create daily routines and working norms: morning, breaks, workplace, hours, and end of the school day, among others.

Connections

Ensure weekly connections with other adults, professionally and outside the school environment.



State of Mind

Create and promote a state of relaxed alertness in yourself to promote cognitive engagement in teaching and learning.

Becoming an Emotionally Competent Teacher in a Virtual Environment

Emotionally competent teachers are actively introspective and reflective in their orientation to students, families, the classroom, and the school community, as well as in their own homes and lives. They are resilient in response to negative stress and less likely to overwhelm themselves with pessimism and strong, negative emotions. Becoming an emotionally competent teacher in a virtual teaching environment involves several steps. Some of these occur naturally during in-person learning, but educators must deliberately plan for and practice them in virtual settings (top).

Routines and Working Norms: Intrapersonal Emotional Competence

In a school setting, routines and norms develop naturally from external expectations. These routines help us organize ourselves for the day ahead, and the flexibility allows us to be responsive to our own needs, which often differ based on a variety of factors, such as the tempo of the day, the weather, or even the prior night's sleep. Every educator has a similar cadence of routine—a regular time to wake, a morning routine that follows a pattern with some level of customization possible based on need. A typical day may have several interruptions—a car accident or a broken train delaying commute, not having morning coffee, or a child waking up with a fever. When we recognize how each of these stressors might impact us, we can usually think rationally and manage our emotions to accomplish the task of getting to school on time, and being ready to teach our students.

Emergency remote teaching, which came on suddenly and without warning, necessitated an immediate paradigm shift in educators' daily routines. Due to the suddenness of this shift, we were unable to prepare and organize ourselves for success at first. Shifting our focus from emergency mode to remote learning as part of the education landscape of the future, it is critical that we take time to develop new routines and working norms for ourselves in our new work setting. We advocate taking time to answer the following questions and clearly define the new routines and norms required for successful self-awareness and self-management:

- Do I have a regular routine for waking up and a getting-ready routine that prepares me for the day ahead?

- Do I have a consistent work space that signals to others in my home that I am at work?
- What is my routine for breaks? With whom do I engage, and why?
- What is my routine for ending the day? How do the others with whom I live know when I am off the clock?
- Do I need transition time between *work* and *home*? How can I achieve that when the physical environment overlaps?

In a remote learning context, it may be challenging to demarcate professional and personal responsibilities and expectations. Therefore, instead of advocating for *work-life balance*, achieving successful *work-life integration* is critical to the development of our own intrapersonal SEL competencies as educators. Ensuring we reestablish routines for the virtual environment is critical for success—not just for the space of remote learning but to more easily respond and adapt to the new educational reality awaiting us in the future (which may even more fully hybridize remote and in-person classroom settings).

> "...achieving successful work-life integration is critical to the development of our own intrapersonal SEL competencies as educators."

Good teaching involves compassion. Whether we are working with a student to tame their crippling fear of failure or struggling to keep our cool when a challenging student pushes our buttons, our level of compassion toward our students can

often be predicted by our level of compassion toward ourselves. An educator's ability to be compassionate—toward themselves and their students—is something that is felt immediately upon entering their classroom. This can actually be more transparent in a virtual setting, where students can see and feel the emotions of other students (who have their cameras on) in a much deeper way, since most of the virtual classroom environment is taken up by the faces of the learners. A virtual classroom space that welcomes all (even those who test our patience) creates a consistent, emotionally resilient, and compassionate environment for learning—or, as Charlotte Danielson describes, an "environment of respect and rapport" in which students feel they have the space to explore self-awareness without shame.[3]

School is both a personal and interpersonal pursuit. To be successful, students must learn to balance the needs of the self with the needs of the collective. The secret is to explicitly teach the competencies without becoming the domineering narrator inside our students' heads. As former teachers, we knew many educators whose style was so prescriptive that there was no room for student self-awareness to be cultivated. Students never learned to be self-aware or to self-regulate; they simply learned to comply. This becomes even more extreme in a virtual setting, where connection is limited. To be successful, students need even more self-awareness and self-management than in in-person contexts. It is therefore clear that the virtual environment has enhanced our need to ensure both students and staff work on wellness in all forms.

Connecting with Others: Interpersonal Skill Building

As humans, we are wired for connection; despite teaching in a remote setting, we still thrive on personal and professional connections with others. As teachers and professionals, this comes in the

form of professional collaboration and socialization, as well as developing relationships with people outside our homes and connecting with others to ensure accountability for self-care.

The emergency remote teaching period disrupted our regular way of acting and interacting with our colleagues and developing relationships with others. These disruptions impacted on the ways we communicate and collaborate, as well as the ways we interact socially at school (staff meetings, hallway interactions, lunch in the teachers' lounge). The pandemic has not only isolated us as individuals but has also taken away many of the avenues by which we practiced relationship skills and social awareness in an in-person setting. In addition to focusing on our self-awareness and self-management in this new setting, it is critical for us as educators to find new ways to develop communication skills and maintain social interactions so we can continue to grow our perspective-taking, empathy, and recognition of issues of inequality. This is what connection means in a virtual setting. Think about these questions:

- What regular routines can you put in place to discuss student concerns and to collaborate with other staff to accomplish goals related to student learning?
- How do you effectively express your gratitude, needs, or concerns in a virtual environment?
- Do you regularly engage in non-school related conversation during the work week, both with school personnel and outside friends or neighbors?
- How comfortable are you being vulnerable and experiencing a range of emotions (laughing, crying, fear, excitement) with others both in and outside your inner circle or immediate family?
- How have you engaged with different experiences of others during the pandemic? Have you engaged in self-inquiry or reflected upon your level of empathy and emotional availability?

Creating a plan for connection, both personal and professional, is a major component of being an emotionally competent educator. The key is recognizing and addressing the unique and inherent challenges that arise from the physical isolation during any type of remote learning and making a plan to continually develop and practice communication and social skills, regardless of location. As we move into a post-pandemic setting, it is critical to reflect on these issues for students and staff who may engage in more hybrid or remote learning throughout the year, whether regular or intermittent.

Collaboration with colleagues is another important element in a school, but it became more challenging with the prevalence of the remote learning environment, as teachers were required to teach both synchronously and asynchronously and to have various other responsibilities for connecting with students and families. Ensuring that as teachers and leaders, we are all working collaboratively is critical, albeit exceptionally challenging in remote learning, particularly in mixed environments with some participants virtual and others in person. Creating collaborative connections with both in-person and remote learners will be an ongoing area of growth in most school settings in the future. As the famous African proverb states, "If you want to go fast, go alone. If you want to go far, go together."

Conclusion

Prioritizing SEL and the development of social-emotional competence in both children and adults is critical to overall success, both in school—regardless of the mode of learning—and in life. In remote learning, it is essential we remember SEL is a process, an approach practiced and developed over time. As we look to forge deep and meaningful connections with our students through digital mediums, we must give students the space to get to know themselves and give ourselves the time and space to get to know them. Paying attention to our own well-being and SEL is an essential part of this process. For many of us, human connection is what called us to education. If we take care of our own social-emotional competence, interpersonal skill building, and personal well-being, we can be emotionally available to others and connect with our colleagues and students more authentically. Ed

Allison Slade is an educational innovator and the founder in 2004 of Namaste Charter School in Chicago, IL, an SEL focused K–8 school. Since founding Namaste, Allison has been a principal coach, school leader, consultant, and professor in educational leadership at Roosevelt University.

Carla Tantillo Philibert founded Mindful Practices to share Social Emotional Learning (SEL), mindfulness, and well-being with students, educators, and families. A yoga instructor, Carla has taught both the secondary and elementary levels. She was a curriculum director and a co-creator of Class Catalyst, Five to Thrive, and Michigan Public TV's POP check series.

Endnotes

1. Vanessa Vega, "Social and Emotional Learning Research Review," *Edutopia* (November 7, 2012), https://www.edutopia.org/sel-research-learning-outcomes.
2. Joseph Bucklin Bishop, *Theodore Roosevelt and His Time: Shown in His Own Letters* (New York: Scribner's Sons, 1920).
3. Charlotte Danielson and Chicago Public Schools (CPS). *CPS Framework for Teaching Companion Guide*, Version 1.0 (Chicago: Chicago Public Schools, 2012).

Silver Bullets and Sleeping Giants

Making Tech Work for Learning in Remote Settings

by Drew Edwards

Sarah[1] wears the eagerness of youth on her sleeves. Sitting in a plastic chair, the kind that is a feature of countless backyards and garages around the world, her legs are too short to touch the ground; instead, they hang from the edge, moving constantly. Sitting there, she held breakthrough insights into educational equity. Sarah and I only had a brief conversation; in fact, it lasted just a few questions. Sarah, like all other seven-year-olds, had other things on her mind. She answered the first two questions carefully and quietly. The third question was about assessments: Did she like taking them? Did they take too long? She answered with her own question, "When will we start again?" with eyes that carried both concern and excitement.

Sarah lives with five other siblings in a "child-led household"—their oldest sibling oversees the home while her parents remain at the border of South Sudan. Sarah and her siblings live in the Imvepi Refugee Settlement. You would struggle to find Imvepi on a map. Until 2017 it did not even exist. Imvepi is situated in the northwest corner of Uganda in a region called West Nile, which sprawls west from the River Nile to the borders of The Democratic Republic of the Congo and South Sudan. The region hosts one of the highest concentrations of refugees in the world, nearly one million people in an area the size of Massachusetts.[2] Most are children like Sarah; children under the age of eighteen comprise 64% of the population in Imvepi.

The Imvepi Refugee Settlement is a community characterized by impermanence. Residents like Sarah's parents shift back and forth to the nearby border, constantly contemplating repatriation or whether returning home is a possibility. Most homes and classrooms are a combination of mudbricks and tarpaulin. Classrooms made of temporary materials are still waiting for permanent structures and teachers. Despite herculean efforts by government and nongovernmental organizations (NGOs), the settlement still lacks adequate infrastructure to educate children five years after its opening.

These resource limitations have created a difficult environment for children to learn. In 2017 Imvepi began with a student-to-teacher ratio near 200:1. Five years later, it still has an overwhelming student-to-teacher ratio of 133:1.[3] This becomes a challenging environment for any teacher to help students like Sarah receive individual support. Even worse, there are few opportunities to learn outside of the classroom. Imvepi is largely separated from other local services for children and families. Additionally, most families do not have an income,

so paying for extra tutoring or services is not feasible. Without enough teachers, classrooms, or materials, and with few alternatives, learning an essential skill like reading is a monumental feat.

Despite these constraints, we have made significant strides about how effective learning can occur in low-resource environments like Imvepi. We have done so without costly traditional inputs and engaging often forgotten stakeholders in the educational world including the "sleeping giant"—the family. Amid a global learning crisis, these insights help understand how the world can move toward education for all.

Technologies and applications abound to educate children in remote and hybrid settings, but how we use these tools and with whom we use them may be more important than what is on them.

Project Backpack

Pangea Educational Development (Pangea) has been operating a Mobile Library service in Imvepi since 2017. Families sign up for a Netflix-style subscription to books. Each month, children choose eight books to read at home. The next month the Mobile Library returns and children exchange their books for eight more. The approach has provided more affordable access to books around Uganda, where families and schools pay a subscription fee for books. In Imvepi, books are offered entirely free of charge, and they have provided some of the richest access to level- and context-appropriate books for miles. Across all locations, Pangea's Mobile Library service has delivered more than four hundred thousand books in its first four years of operation.

Families in the Mobile Libraries initiative are highly motivated, and the program reaches most children outside of traditional classroom settings. This program sparked a collaboration between Pangea and Avenues The World School (Avenues) beginning in 2019 to explore the limitless potential of learning beyond books alone. Given the large number of students per teacher, limited resources, and children entirely out of school in Imvepi, the program, called Project Backpack, aimed to identify whether an untraditional approach to education could lead to meaningful learning for highly motivated families. The answer began with delivering tablet devices (iPads) that were capable of holding both multiple books and other tools for learning.

Based on a lifewide learning framework, Project Backpack recognizes the importance of integrating learning in all spheres of a child's life.[4] Lifewide learning highlights additional opportunities to learn and interrogates traditional assumptions of how and where education should be done.[5] Project Backpack engaged parents as critical facilitators of learning, from engaging them in the curriculum selection to ensuring they serve as teachers and learners in projects along with their children.

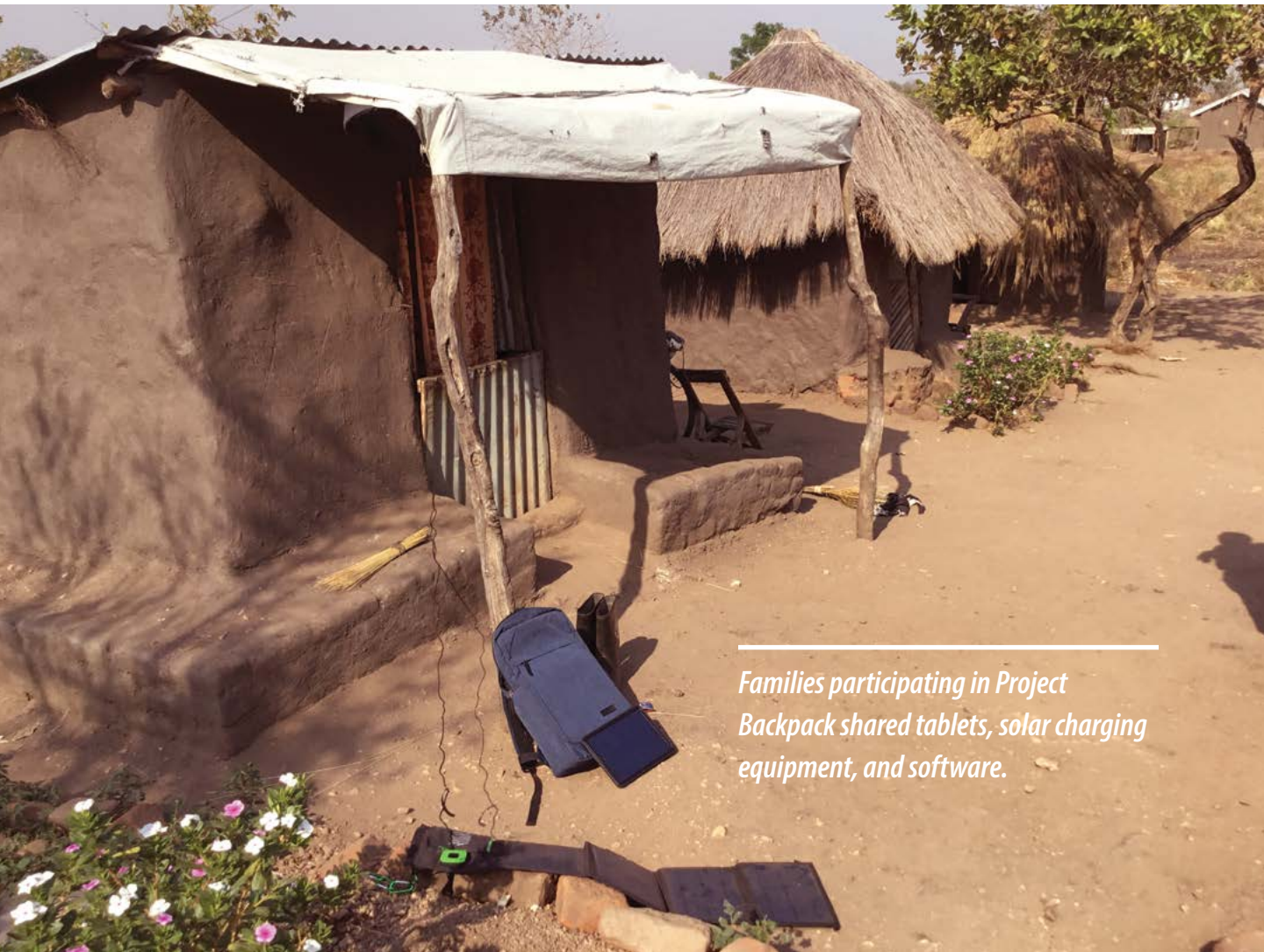
In Uganda, students only spend 27 percent of their annual waking hours in school.[6] While structured, intentional learning happens at school, children continue learning outside of school walls, at home and in their communities. Sometimes this happens in the form of play—critical to the development of social and complementary academic skills.[7] At other times children learn skills in practical roles, helping with tasks at home or in family businesses. In Imvepi, many

families are motivated to help their children learn foundational skills.

Through Project Backpack, families received a tablet and solar charging equipment. The tablets were shared on a rotational model, based on evidence of the impact of social accountability witnessed in Village Savings Loan Associations (VSLAs).[8] VSLAs are a type of local financial institution that standardizes community-based financial loans when formal financial institutions are not available.

VSLAs work by relying on their members' savings and contributions in order to offer loans in the community. These loans are typically granted monthly, and the allocation of debt ownership throughout the membership facilitates an accountability and continuous feedback on the part of the borrower to ensure repayment occurs. Sharing tablets, like sharing loans, provides mutual incentives to take care of resources. In Project Backpack, tablets were rotated in groups among three different families every two weeks. All groups were neighbors situated around a nearby water tank, usually living within eyesight of each other. Since there was no way to repair the tablets, a large emphasis was placed on tablet maintenance.

The tablet software choices were intentional and changed with each step of the program. Most participants had not used a tablet before. As a result, software and applications were



Families participating in Project Backpack shared tablets, solar charging equipment, and software.

added gradually, to scaffold familiarity with the devices themselves as well as with the individual applications. Tablet applications were added as tools to complete projects, and the tablets are disconnected from the internet because of both the unsustainable cost of data and the distractions the internet can pose. Some assert that unrestricted and unsupervised learning leads to breakthrough outcomes. However, research finds only few learners are autodidacts, those who can learn entirely on their own.[9] Project Backpack was built on the principle that learners benefit from some teaching support but sought to explore exactly how much.

The program was designed as a series of projects for students to complete. Participant feedback during each project guided both the next project and new tablet applications available for them. Pangea's Mobile Librarians, who themselves are refugees, served as "Learning Guides" and provided clarity and limited teaching support to help students complete projects.

The initial phase of Project Backpack began as a supplement to in-class instruction with project-based learning activities. Beginning projects were simple, such as interviewing and recording parents or elders about their memories. Over time, the projects evolved in complexity and app usage, eventually culminating in a multistage design thinking course. Engagement was high, even as an at-home, after-school learning initiative, with families averaging more than one hour and twenty minutes on the iPad per day.

COVID-19 Adjustment

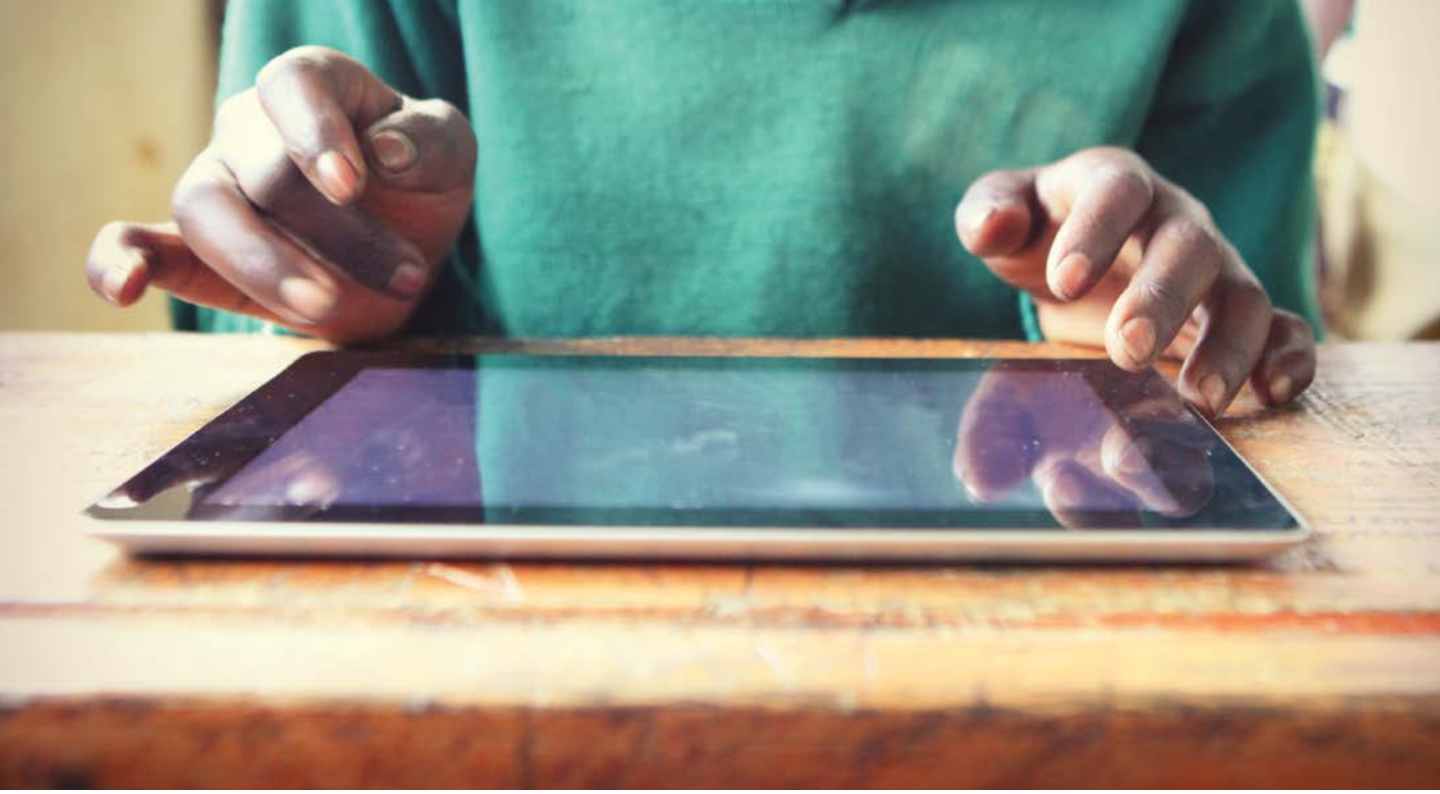
As the COVID-19 pandemic arrived in early 2020 and evolved, these early projects entirely replaced structured in-person schooling. At first, the projects simply reflected the evolving reality. One project reported about COVID-19 and the safe operating practices for the area and then exchanged information with Avenues and other schools around the world. Then food rations were reduced in Imvepi. In response, the next project developed innovations to help with farming. The entire time, students were reading leveled content for each project. For months, these projects were the only documented learning activities taking place in the refugee settlement. During this time, engagement with the devices more than doubled, soaring to two hours and forty-five minutes per day on average, with some families averaging over four hours per day.

After six months of no formal schooling, families began worrying about their children's core academic growth. They emphasized a need for an increased focus on literacy skill development. Embedded within Pangea's Mobile Library program, literacy was already a prominent focus, but this new phase elevated the development of important core reading skills like letter knowledge, phonics, decoding, and ultimately reading comprehension, as the highest priority.[10]

Further, families also wanted to know if their children were learning. Given the typical skepticism in Imvepi (and other refugee camps in this area) about data being collected and "taken from them," not to be shared back, we wanted to empower these families to engage with their assessments, their data, and their progress.

A Unique Research Opportunity

Together the families, learning guides, and our team examined the impact of this shift to learning as an out-of-school solution. We asked whether sharing data back with parents, who themselves struggled with reading, would help their children learn. What



could we do differently where other projects have failed—time and time again—to realize the potential of technology, especially considering the extreme circumstances and limited resources? Ultimately, we wanted to know whether sharing literacy assessment results with families in an accessible format accelerated reading development for pre-reading and emerging ESL (English as a Second Language) readers.

We hypothesized that an improved understanding of formative assessments by all stakeholders (students and caretakers) and more intentional reading practice would lead to better outcomes and eventually to a meaningful level of literacy.[11] To test this hypothesis, we used frequent formative assessments that helped identify specific skill development. We also gave targeted feedback on what areas of literacy development students should spend their time practicing.

The assessment of choice was the Early Grade Reading Assessment (EGRA), adapted to the local context. Originally developed by Response to Intervention (RTI) International under the U.S. Agency for International Development (USAID), EGRA is the most widely used literacy assessment across sub-Saharan Africa. The assessment has five scaffolded sections: letter knowledge, phonemic awareness, decoding, fluency, and comprehension. Every member of every participating family was given an EGRA assessment leveled for seven-year-olds, for a two-week period before and after receiving the iPads. The assessments were given three different times over a six-month period, totaling six assessments per participant.

We also collected information on participant motivations, preferences, perceptions of support, and self-concept as readers, using a survey created in partnership with students from the Learning Analytics master's program at Columbia University's Teachers College.

To gauge the impact of continuous assessment feedback, we randomly divided the forty-three families who participated in the program into two groups. One group of families, which we called the

feedback group, received continuous assessment feedback, with directions on which app and lessons to practice. This happened in sequence. If participants did not master the first section of letter knowledge, for instance, they would be directed to focus their iPad learning time on app lessons that taught letter knowledge. Only when participants "mastered" a section, scoring 90 percent accuracy or better, would they move to the next section. The other group, which we called the control group, still took assessments and used the iPads with the same applications but received no continuous assessment feedback with directions of which application to use.

To assess our students, the team developed a low-cost tool that simplified formative assessment data to help stakeholders target literacy skill development. These included the following key components:

- Key skill development benchmarks from a widely used assessment tool
- A database tool that will categorize and automate reports for learning guides to give to caretakers and learners, with understandable feedback on areas of focus for learners to practice and how to support them
- Visuals and strength-based simplified language to communicate to caretakers and learners through formative assessments
- Evidence-based practices for improving the benchmarks through applications and books

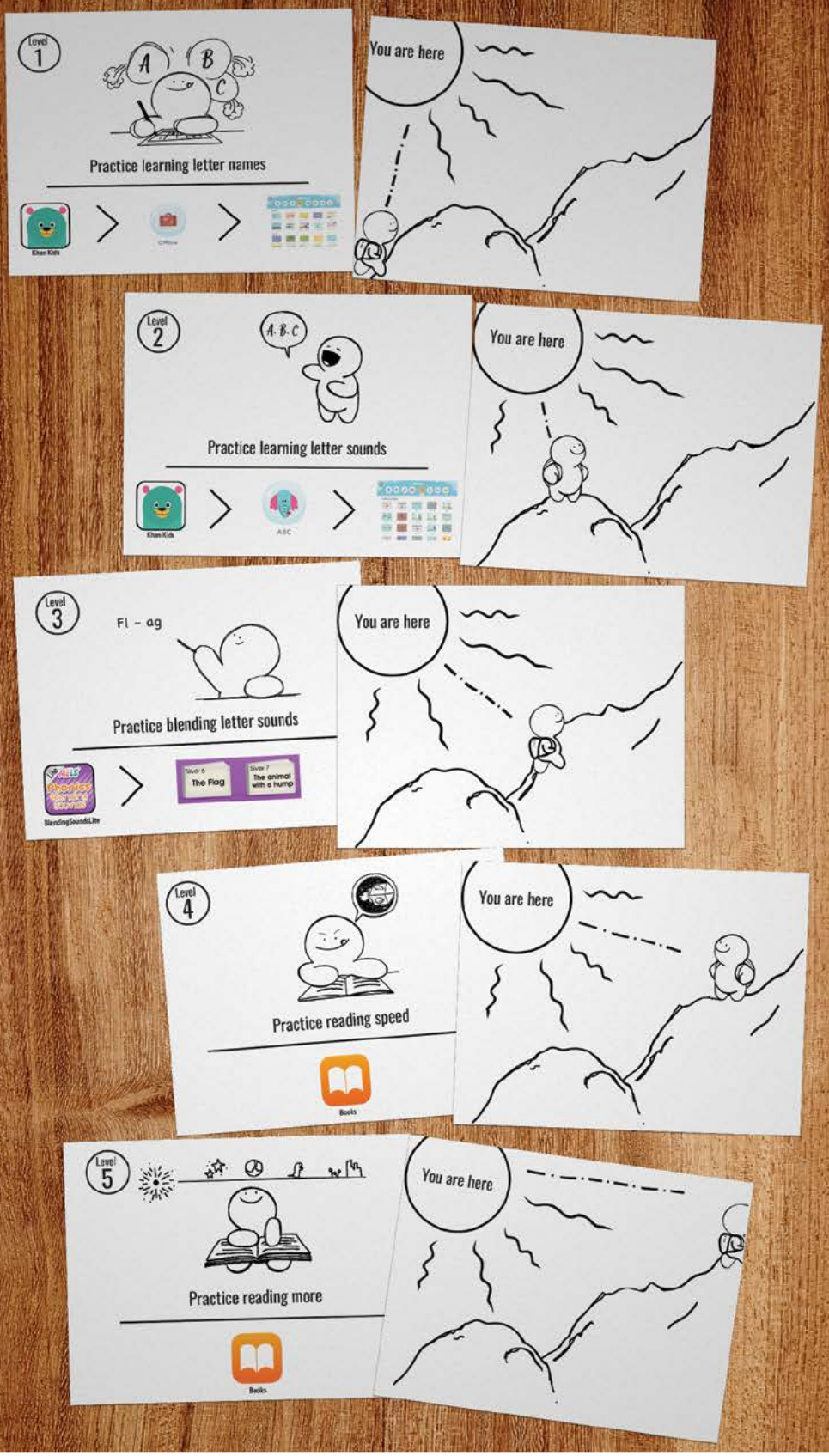
Students in the feedback group were given visual directions to navigate to lessons (see next page). These directions were printed on waterproof paper, with pictures of specific apps and lessons they should practice. This allowed even illiterate parents to supervise their children to ensure they were spending time on the suggested tasks.

Results

The initial assessments revealed a difficult starting point. Although there was some familiarity with whole words, every participant was functionally illiterate. Only fifteen of the 223 participants could accurately identify every letter in the alphabet. There was virtually no phonemic awareness or decoding skills displayed. Fluency, or whole word recognition, was limited but clearly showed familiarity with some words. The average across all participants was twelve words and the median zero words. This resulted in nearly all of the entire feedback group focusing on letter knowledge in the first lessons.

At the end of the program, all participants grew in their ability to read. Participants in the feedback group, who received the continuous feedback loop, flourished, including—somewhat surprisingly—the parents. Continuous assessment with limited guidance had a significant impact on developing literacy skills, regardless of the student's prior literacy level or parent literacy level.[12] 88 percent of students in the feedback group mastered letter knowledge, the first of three key literacy skills, and 55 percent became functionally literate within nine months. Compared to the control group, the feedback group learned more letters and more words and could more frequently comprehend what they were reading. This approach also positively impacted how students saw their abilities to learn to

Continuous assessment with limited guidance had a significant impact on developing literacy skills, regardless of the student's prior literacy level or parent literacy level.



These cards provide visual directions to navigate to lessons for the treatment group to practice. On the back of each card is an illustration of a learner along their literacy journey.

read; between initial and final testing, perception of reading ability increased by 19 percent in students.

There was, however, one critical factor for which to control: student learning within their families. There was a statistically significant impact of learning by families and between the neighboring families[13] among whom the tablets rotated. This insight was noted by Learning Guides as well: "We find that there are some families that are doing better than others. [The parents] are supportive to the children." While we do not yet empirically understand what successful families do and what unsuccessful families fail to do, the team noted anecdotal evidence that could guide future studies. For example, successful families were engaged with their children's lessons, set a schedule for learning time, and saw that it was taken seriously.

How did Sarah do? When Sarah began the program she could accurately identify four of a list of one hundred letters and none of one hundred sounds, could not read a word fluently, and answered no comprehension questions correctly. Within nine months Sarah mastered letters, identifying ninety-nine of one hundred, the first of three key literacy skills. She reads at a functional literacy rate of sixty words per minute and answers 80 percent of questions accurately about what she is reading. The same is true for her five siblings.

Takeaways

Technology is often seen as the silver bullet to learning and educational equity, but it cannot reach its potential without education's sleeping giants: family. While technologies and applications abound to educate children, how we use these tools and who we use them with may be more important than what is on them. Remote and hybrid learning not only has the potential to include stakeholders, it is reliant upon them to fulfill its potential.

To achieve this, the following was observed from this study:

- Collaborative development of the program has been essential to participation.
- A continuous feedback loop, giving children and their parents feedback and sharing the data to support the children, was essential to building committed practice from students and support from parents alike.
- Learning occurred within a social framework. In groups of learners, whether at the family or neighborhood level, new learning took place through interaction—by discussion, observation, or imitation.
- Remote and hybrid learning evolved the role of the educator no longer as an instructor but as a facilitator of learning and included stakeholders like parents in learning, regardless of their prior knowledge, and empowering them to support learners.
- Rotational model of sharing tablets created social accountability between participating families that only led to one of seventeen iPads being broken beyond repair over a two-year period. This is particularly important where there is no opportunity to replace devices.

Ed

Drew Edwards is the co-founder and CEO of Pangea Educational Development. He is a social entrepreneur, children's book author, and coach who has spent his career working in education with children in post-conflict and crisis settings.

Endnotes

1. Sarah is a pseudonym. Since she is a minor and a refugee who faces a well-founded fear of persecution, her name has been changed to protect her identity.

2. Uganda Ministry of Education and Sports, *Education Response Plan for Refugees and Host Communities in Uganda* (2019), https://globalcompactrefugees.org/sites/default/files/2019-12/Uganda-%20Education%20response%20plan%20for%20refugees%20and%20host%20communities%2C%202017-2020_0.pdf.

3. UNHCR, *Uganda – Refugee Statistics March 2022 – Refugees and asylum seekers* (2022), https://data.unhcr.org/en/documents/details/92189.

4. Richard Desjardins, "Determinants of Literacy Proficiency: A Lifelong-lifewide Learning Perspective," *International Journal of Educational Research* 39, no. 3 (2003): 205–245, https://dx.doi.org/10.1016/j.ijer.2004.04.004.

5. Elliot W. Friedlander et al., "Lifewide or School-Only Learning: Approaches to Addressing the Developing World's Learning Crisis," *American Educational Research Journal* 56, no. 2 (April 2019): 333–367, https://doi.org/10.3102/0002831218792841.

6. Ugandan Ministry of Education (2019): *Academic Calendar 2019.* Found at: https://www.education.go.ug/wp-content/uploads/2019/07/SCHOOL-CALENDAR-2019.pdf.

7. Sugata Mitra, *The School in the Cloud* (Thousand Oaks, CA: Sage Publications, 2013).

8. Christopher Ksoll et al., "Impact of Village Savings and Loan Associations: Evidence from a Cluster Randomized Trial," *Journal of Development Economics* 120 (May 2016): 70–85, https://doi.org/10.1016/j.jdeveco.2015.12.003.

9. David Whitebread et al., *The Role of Play in Children's Development: A Review of the Evidence* (research summary), The LEGO Foundation, DK (2017).

10. Paul Black and Dylan Wiliam, "Assessment and Classroom Learning," *Assessment in Education: Principles, Policy & Practice* 5, no. 1 (1998): 7–74, https://doi.org/10.1080/0969595980050102.

11. Robert L. Bangert-Drowns, James A. Kulik, and Chen-Lin C. Kulik, "Effects of Frequent Classroom Testing," *Journal of Education Research* 85, no. 2 (November–December 1991): 89–99.

12. Significant difference between the students who received feedback and the students who did not ($p < 0.01$).

13. Significant difference between the families who received feedback and the families who did not ($p < 0.04$).

10 PRINCIPLES *of* Online Learning

1. Challenge students to think, play, work, and practice at the edge of their abilities while ensuring a healthy balance of work-life and social-emotional development.

2. Limit the time students spend online to two to three hours per day.

3. Use synchronous time to build relationships, facilitate peer feedback, discuss big ideas. Use asynchronous time for inquiry, reading, problem solving, meaningful project work. Set separate calls for support or administration to minimize impact on group meetings.

4. Schedule consistent, end-of-week deadlines for submission of student work. This sets clear expectations with learners, helps them manage their time effectively, and leverages the natural rhythm of the work week.

5. Ensure student work receives a grade with targeted feedback, identifying one or two key areas for improvement, within one or two days of submission.

6. Encourage and permit students to resubmit work to improve learning to the maximum degree possible, given the time available.

7. Make student engagement a priority. It can be easy for students to hide or get lost online, especially when asynchronous. Ensure frequent check-ins, timely responses, and active participation in chats and meetings.

8. Abide by the KISS principle (Keep It Simple for Students) and minimize the use of outside apps, web sites, and resources that require additional steps and logins for students.

9. Empower teachers to make changes and modify instructional approaches when things aren't working.

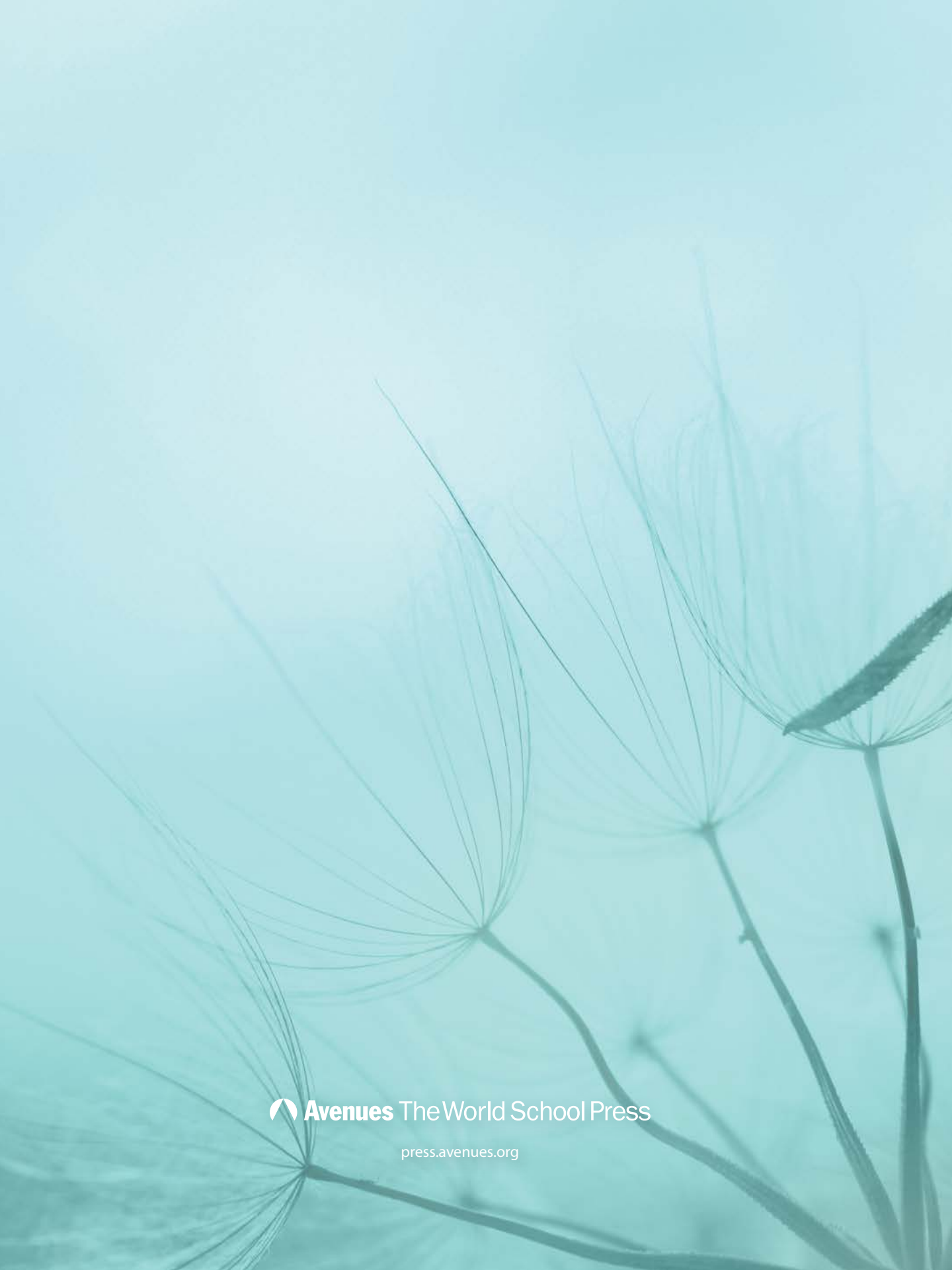
10. Prioritize well-being above all else. Make accommodations for teachers, students, and families in need. If people aren't happy and healthy, none of the rest matters.

ELEMENTS *from the* FUTURE

by Jill Butler

“**Deep learning**
will **transform** every single industry....
When anyone goes to see a doctor,
I want AI to help that doctor provide
higher quality and **lower cost** medical service.
I want every five-year-old
to have a **personalized tutor**.”

Andrew Ng *Computer Scientist and Entrepreneur*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