Project-based learning tied to students' communities and interests readily makes the leap across modes of instruction.

Monica R. Martinez and Dennis McGrath

Seize the Moment: Double Down on Authentic Learning

During the pandemic, one California teacher used Facetime to connect a fourth-grade aspiring marine biologist and English learner to a shark researcher in Australia, an oceanographer in New York, and a marine biologist in Washington, D.C. Another teacher helped a middle school student interview an older relative and create a website about his Jewish heritage. Yet another helped students create poems and podcasts using digital media.[1]

When COVID-19 first disrupted the routines and traditions that constitute school, many teachers grappled for the first time with online instruction, often with little experience or support. The experience of the past months has demonstrated that those who could transition seamlessly to online or hybrid models were already delivering authentic, project-based learning tied to students' interests or experiences, real problems, and events—and leveraging technology to do it. They provide examples of the way forward post-COVID.

For example, Shelby County Public Schools in Kentucky trained all its

Box 1. Virtual Museum Visits

As educators across the nation have demonstrated, online learning need not be reduced to a passive process where students read static texts, watch videos, complete worksheets, and take multiple quizzes—essentially a form of drill and kill. Instead, teachers can provide their students with interactive learning experiences using authentic resources, many of which are available through museums. For example, Margaret Sullivan, a librarian at Rockwood Summit High School in Fenton, Missouri, integrated online museum exhibitions into her history units, which also include readings, video clips, assignments, discussion board questions, and assessments.[a] Students at Dallas's Thomas Jefferson High School virtually visited the Dallas Holocaust and Human Rights Museum and interacted with its senior museum educator.[b] Teachers and students in Maryland learned about the Underground Railroad through an online collection of interactive activities designed by Maryland Public Television. One study found that the students of teachers who integrated the Pathways to Freedom Electronic Field Trips into their instruction about slavery and the Underground Railroad outperformed those whose teachers delivered the same unit without these materials.[c]

[a] Margaret Sullivan, "Online Museum Exhibitions as Virtual Learning," Knowledge Quest blog (August 13, 2020), https://knowledgequest.aasl.org/online-museum-exhibitions-as-virtual-learning-resources/.

[b] Bill Zeeble, "Virtual Field Trips: How Interactive Learning Has Evolved in the Pandemic Age," KERA News, December 15, 2020.

[c] Michael Long and Helene Jennings, *Maryland Public Television's Pathways to Freedom Electronic Field Trip: A Randomized Controlled Trial Study of Effectiveness* (Calverton, MD: Macro International, 2005).

teachers in project-based learning seven years ago. The instructional approach had taken root in pockets of the district, but district leaders decided they would use the imperative for remote learning to promote the strategy more broadly. In interviews, the district's teachers noted higher student engagement in projects focused on the pandemic.[2]

In other schools using project-based learning, students designed and completed long-term projects connected to their communities. At the grade 6–9 School for Examining Essential Questions of Sustainability in Honolulu, Hawai`i, students designed and implemented yearlong interdisciplinary explorations of sustainability at home, and many connected their work to the emotional, physical, and economic threats of COVID-19. Projects included building rain catchers and irrigation systems to sustain home gardens, developing a Twitter bot to remind people to wash their hands to prevent infection, creating sidewalk art, and researching and engaging in healthy activities to alleviate stress.

At the UCLA Community School, students investigated the disparate impact of COVID-19 on communities of color as part of a 10-week interdisciplinary project. For each project, students were able to demonstrate what they know and can do through a performance-based assessment. Such assessments—which include research projects, science investigations, mathematical and computer models, and other products—are mapped to the syllabus and content-area standards and are selected for the skills, topics, and concepts they represent. The assessments may take place during a Socratic workshop with students' peers, a mock trial, or a debate, and thus students engage diverse perspectives while exercising higher level analytic skills.

Schools that are using such assessments prepare students better for college and careers.[3] With the right teaching supports, students can develop higher order thinking competencies as well as skills for planning, organizing, managing, and improving their own work and becoming more self-directed. And they can do it whether learning is in-person or online.

However, activities in online and hybrid learning need to be much more engaging (see box 1). Interactive technology that enables learners to

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explore, create, solve problems, and develop ideas in concert with teachers and peers is a more effective online strategy for learning than students learning solely through passive drill and practice activities such as worksheets in online textbooks.

Another sizable barrier arose as schools transitioned to distance learning: A significant number of students were unable to engage in learning opportunities due to lack of devices, Wi-Fi, broadband internet access, and teachers' lack of preparation to leverage technology for authentic learning. Necessity nonetheless led to invention in many districts (box 2).

Lessons Learned

There are significant lessons to be learned from the creative efforts of educators striving to engage their students in authentic learning. Even when schooling was disrupted, they have been connecting lessons to real-world applications, allowing students to explore the world around them, and to demonstrate what they know through projects and presentations that display their work. From EL Education elementary schools to high schools in the New Tech Network, Big Picture Schools, and the

Internationals Network for Public Schools, several networks of public schools have enacted learning strategies grounded in curricula that teach students how to learn through guided inquiry, collaboration, connections to culture and community, and the production of complex papers, projects, and products. As a result, these networks have demonstrated significant gains in student learning.[4]

People learn by building on prior knowledge and experiences, drawing on their cultural and community contexts, and connecting what they are learning to what they already understand.[5] To make meaning of new ideas, learners need to apply them to new contexts. People's questions and curiosities motivate them to learn, as do opportunities to investigate what things mean and why things happen. These principles, derived from the learning sciences, need to be applied to preK-12 teaching practice more widely so that all students can benefit.

There is no better time to rethink and reinvent educational practices. State and district leaders should resist the temptation, when school resumes in classrooms, to set aside their pandemic-induced technology and authentic work in favor of doubling down on the

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Box 2. Games and Simulation

As they transitioned to remote learning when the pandemic hit, schools in Broward County, Florida, first distributed laptops to students who needed them and then explored using Minecraft and Roblox, which many of their students already played.[a] Atlanta students also received computers or tablets, and the school district more than doubled its number of licenses for the education version of Minecraft to almost 12,000 over the preceding year.[b]

Such districts are doing more than bringing the fun. While it can be difficult to ascribe causality, an analysis of student technology use and performance on the National Assessment of Educational Progress posited that the use of simulations and applications in eighth grade and games in the fourth grade improve test scores, whereas drill and practice at the eighth grade hurt scores. In science, the use of games, word processing, simulations, and data analysis improve test scores. And in eighth grade reading, use of computers for writing activities improved test scores, but use of computers for grammar/punctuation or for reading activities (which usually involve drills or tutorials) had a negative effect.[c]

[a] Linda Darling-Hammond et al., "Restarting and Reinventing School: Learning in the Time of COVID and Beyond" (Palo Alto, CA: Learning Policy Institute, 2020).
[b] Olga Kharif, "Why Minecraft and Roblox Are on the Fall Syllabus," *Bloomberg Businessweek*, August 24, 2020.
[c] Harold Wenglinsky, *Using Technology Wisely: The Keys to Success in Schools* (New York: Teachers College Press, 2005), as cited in Mark Warschauer and Tina Matuchniak, "New Technology and Digital Worlds: Analyzing Evidence of Equity in Access, Use, and Outcomes," *Review of Research in Education* 34, no. 1 (2010): 205.

decontextualized learning of traditional transmission teaching. It may seem to some educators the best way to prepare for tests that measure learning in equally decontextualized ways. Drawing on lessons learned in the pandemic, however, state boards of education can address policies to help districts close the digital divide and support teachers in the delivery of authentic learning, thereby improving student outcomes.

Closing the Digital Divide

Closing the digital divide is a precondition for equitable learning. The compounding effects of the digital divide have meant that students without adequate computing devices and internet connectivity also have not had access to these high-quality learning experiences during the crisis. Most often, these students were in less-resourced schools or in communities with limited infrastructure, where giving students and educators access to broadband was almost impossible or very limited. State boards can and must mitigate the digital divide.

In a state-by-state overview of access to broadband, the Pew Charitable Trusts report a Federal Communications Commission estimate that 21 million Americans still lack broadband access. Other sources put this number as high as 162 million.[6] Because the broadband problem is beyond the scope of an individual district or state, state boards and departments of education must partner with other state and federal agencies, nonprofit organizations, and technology companies to maximize resources and expand the use of the federal E-Rate program.[7]

The Wyoming Classroom Connectivity Initiative, for instance, was created in 2016 as a partnership among Governor Matt Mead's office, the state education agency, the state's Department of Enterprise Technology Services, and the national nonprofit EducationSuperHighway. The initiative brought districts together to collaborate and support each other in solving infrastructure issues within schools and gave technology directors opportunities to learn more about E-Rate and addressing connectivity issues.[8] All of Wyoming's students can access the internet at speeds of at least 100 kilobits per second, and many in the sparsely populated rural state are connected at higher speeds.[9] Minnesota's K-12 Connect Forward

Initiative likewise was launched in 2016 through a joint partnership between state agencies and a nonprofit in order to ensure students and teachers had high-speed, affordable bandwidth, infrastructure, and access to distance learning.[10]

The California Bridging the Digital Divide Fund includes the state board, other state agencies, and a foundation. Funds from this campaign equip school districts with the resources they need to enable distance learning. From March to August 2020, the fund garnered over $18.3 million and in-kind donations that have enabled procurement of over 64,000 devices and over 100,000 hotspots. More than 300 districts, or approximately 29 percent of all districts in California, received devices, hotspots, or both, with priority given to rural communities.[11]

Supporting Authentic Learning

Equally important are efforts to enable teachers to fully use digital resources and develop their capacity for delivering authentic teaching and learning. As they do for technology use, states can offer guidance on authentic learning and assessment strategies.

Oregon's guidance for the 2020–21 school year says districts should seek to "support student-centered project-based educational experiences that ignite student agency, identity, and voice." The guidance calls for clearly stated learning goals and outcomes based on grade-level Oregon state standards, including the integration of quality, culturally sustaining instructional strategies and materials; the design of curricular experiences that use authentic, deeper learning experiences to engage students; opportunities for students to meet standards in nontraditional ways, such as through student-driven projects that honor student identity and context; implementation of opportunities for students to earn credit by proficiency; the use of universal design for learning principles to improve access to learning for all participants; and assessments that are embedded in instructional practices to identify progression toward grade-level content knowledge and skills. The guidance also addresses goals and competencies at the state and district levels that prioritize higher order skills that students need to solve problems and learn to learn, with processes to incorporate these skills

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Monica R. Martinez is director of strategic initiatives at the Learning Policy Institute, and Dennis McGrath is professor emeritus of sociology at the College of Philadelphia.

more fully into curriculum, assessments, and professional development.[12]

Virginia provided high school innovation planning grants to develop or implement programs that promote Virginia's 5 C's—critical thinking, creative thinking, collaboration, communication, and citizenship—while preparing students for careers and postsecondary education. The legislature defined the essential elements of high school program innovation as student-centered learning; progress based on proficiency; "real-world" connections aligned with local workforce needs and emphasizing transitions to college or career or both; and varying models for educator supports and staffing.[13]

New Hampshire is the model for how to use performance tasks to measure learning more frequently and authentically. Through the Performance Assessment of Competency Education pilot, teachers design locally developed performance assessment. The assessments are personalized and authentic to enable deeper learning and to be more integrated into students' day-to-day work.[14]

Through the federal Innovative Assessment Demonstration Authority program, North Carolina uses an end-of-year assessment that is linked to a student's performance on formative assessments. Called Check-Ins, the assessments provide in-depth actionable data for students who are tested in language arts in grades 4-8 and math for students in grades 3-8. These data provide a reliable estimate of the students' current performance on the selected subset of content standards.[15]

Colorado passed a set of graduation guidelines that allow districts to choose from a menu of options that includes a "district capstone," which is a culminating exhibition of a student's project or experience that demonstrates academic and intellectual learning, and a standards-based performance assessment, in which students display mastery of Essential Skills for Postsecondary and Workforce Readiness through the creation of a complex product or presentation.[16] Because traditional multiple-choice tests are insufficient for these goals, the law explicitly allows the use of portfolios, projects, or extended-performance tasks as part of the state system.

These practices and policies are rooted in the science of learning and a commitment to equity. As the nation emerges from the pandemic and establishes new routines for school, the lessons drawn from schools and districts around the country provide a way to rethink and reinvent school. ■

[1] Becki Cohn-Vargas, "What Educators Are Learning during the Pandemic," Edutopia, December 9, 2020.

[2] Tara García Mathewson, "Project-Based Learning Gets Its Moment during the Coronavirus," *Hechinger Report*, July 1, 2020.

[3] Linda Darling-Hammond et al., "Restarting and Reinventing School: Learning in the Time of COVID and Beyond" (Palo Alto, CA: Learning Policy Institute, 2020).

[4] Ibid.

[5] Ibid.

[6] Pew Charitable Trusts, "How States Are Expanding Broadband Access," Report, February 27, 2020.

[7] Many states earmarked federal CARES Act funds for device purchases. See Adam K. Edgerton and Peter W. Cookson Jr., "Closing the Digital Divide: The Critical Role of the Federal Government," *Learning in the Time of COVID-19* blog (Palo Alto, CA: Learning Policy Institute, November 10, 2020). In March, Congress passed a $7.2 billion Emergency Connectivity Fund. The FCC will be promulgating rules in May on distribution of the funds to eligible schools and libraries for purchase of relevant equipment and services for use by students, school staff, and library patrons at locations other than a school or library.

[8] Wyoming Department of Education, "Wyoming's Digital Learning Plan," web page, https://edu.wyoming.gov/educators/technology/digital-learning-plan.

[9] "2019 State of the States: the Classroom Connectivity Gap Is Closed" (Education Superhighway, 2020), https://stateofthestates.educationsuperhighway.org/?postalCd=WY#state.

[10] Minnesota Employment and Economic Development, "Broadband Grant Program," web page, https://mn.gov/deed/programs-services/broadband/grant-program/.

[11] GoFundMeCharity, "California Bridging the Digital Divide Fund," web page, https://charity.gofundme.com/o/en/campaign/cdef.

[12] Oregon Department of Education, "Ready Schools, Safe Learners: Guidance for School Year 2020-21," web page, www.oregon.gov/ode/students-and-family/healthsafety/Pages/Planning-for-the-2020-21-School-Year.aspx.

[13] Darling-Hammond et al., "Restarting and Reinventing School."

[14] Reaching Higher New Hampshire, "PACE," web page, https://reachinghighernh.org/pace/.

[15] Kristy Carter, " 'Check-Ins' Assess Proficiency, Not Growth," *Sampson Independent*, January 30, 2019.

[16] Colorado Department of Education, "Graduation Guidelines," web page, https://www.cde.state.co.us/postsecondary/graduationguidelines.