As state boards of education and other state policymakers consider the future of schools, sorting fad technology from technology that accelerates learning is key. Virtual reality (VR) is one such technology with promise that seems unlikely to fizzle. Hailed as potentially transformative for education and still in the early stages of application, VR has seen new developments over the past two years that have tipped it into the column of technologies that schools could begin to adopt now.

An ever-expanding roster of both new and established companies—zSpace, Alchemy VR, Facebook, and Google, among others—are providing more options than ever to make this technology available and affordable for education. Policymakers will want to keep an eye on this technology and determine whether they want to encourage greater VR adoption in their state.

What Could Virtual Learning Look Like?

Virtual reality is a “computer-generated environment that lets you experience a different reality.” Users don VR headsets to immerse themselves in a virtual environment. Alternatively, a VR headset could provide an “overlay,” such as instructions that appear in your field of vision that tell you how to fix an actual car engine or showing virtual characters to “catch,” as in Pokémon GO. A user wearing a VR headset in a classroom context could tour the Grand Canyon, visit another country, or join Martin Luther King, Jr., in the 1963 March on Washington.

Zach Huberty, a VR expert, likened the experience to a real-life “Magic School Bus,” the 1990s television show in which students traveled on unusual field trips inside the human body and back to the time of the dinosaurs. In fact, the technology is already used in medical and veterinary schools to let students explore and dissect virtual bodies in ways that would not be possible with actual cadavers. According to Robert W. Hasel, D.D.S., associate dean of simulation, immersion, and digital learning at Western University of Health Sciences in California, these virtual experiences are “engaging, pulling the learner in, consuming their attention, allowing them to interact, and allowing them to take responsibility for their own education. This is similar to a person playing a video game; they are responsible for what they do in that environment, they take ownership to their education in that environment, and it is fun.”

K-12 Applications

There are only “pockets of utilization” in K-12 education now, says Scott Kinney, a senior vice president for Discovery Education. However, there is great potential: Kinney cites a current Discovery Education VR app called Racing Extinction that takes students to the rain forest. He suggests that a future app could take students back in time to see Lincoln give the Gettysburg Address and see the battlefield as it looked then.

VR also has potential for teaching math and science: Samantha Adams Becker, senior director of publications and communications for the New Media Consortium, said that students studying the periodic table could “hold a chemical in their hands, to look at the structure of the chemical and the proteins and view it in a more 3D way,” adding that “those types of tactile experiences are proven to bolster deeper learning.” Another program lets a teacher virtually take her students to Egypt’s pyramids in order to learn how to calculate area and volume.

Many users and experts cited the recently launched VR education program, Because it can engage students and is increasingly affordable, virtual reality technology may be on the cusp of widespread adoption in K-12 settings.

by Amelia Vance
The increasing number of free or low-cost virtual environments that are being developed make it more likely that VR will take off in education.

Experiments, which Google developed for schools. Program manager Jennifer Holland noted that schools need only a smartphone, a tablet, and a VR viewer to “teleport all over the world.” VR can also be used to visit nearby places that may be hard for kids to get to. Holland used the example of a Crow cultural celebration in Montana in early 2016 that students from a school three hours away could not attend, “but if we can capture it and bring it to the school, not only can that school learn about the Crow Indian tribe, but schools all over the world can. It changes the dialogue for how we talk about cultures and people and historical events.”

When students at Benjamin Banneker Charter School piloted Google Expeditions early this year, teachers enjoyed it so much that they signed up for extra sessions. Jared Perrine, director of innovation technology and digital learning at the Cambridge, MA, school, said they participated in VR field trips on Mars and at the bottom of the sea.

Because a student’s experience in virtual reality is different depending on what she focuses on in the virtual environment, VR also enables personalized learning and thus “opens up huge areas of possibilities to think about how we really differentiate for kids and what are the types of environments that make sense for them,” says Kinney.

Virtual reality can also be used to help students with their college and career decisions. Becker noted that Soledad O’Brien’s scholarship foundation helped young women in New Orleans to experience a veterinarian performing a procedure through virtual reality. Since many of them did not know there were jobs like vet tech assistant, it “opened up a new world to them,” she said. First Lady Michelle Obama’s “Reach Higher” program wants to use VR to let students virtually visit college campuses.

Though VR education research is in its infancy, many small studies have shown that virtual reality in education is beneficial to students. For example, two studies showed that students’ comprehension of geometrical concepts and anatomy improved after VR experiences.

Making VR Scalable for All Schools

Scott Kinney notes that using new low-cost VR viewers, such as Google Cardboard, makes VR technology scalable for most classrooms. With Google Cardboard, students slip a smartphone into a slot of the headset to participate in a virtual experience. Holland notes that schools could also use “magic window mode” in which students use tablets to explore a virtual space.

Kinney also suggested that VR could be used for training. A teacher could view a prefixed classroom via a VR headset and “stand in the middle of that classroom and look around and watch how the teacher interacts with kids,” creating “this incredible professional development opportunity for teachers.”

Holland acknowledged that many new technologies in education get “thrown over the fence, and teachers are expected to figure it out. And many do. But the reality is that teachers don’t have lots of time learning new tech and how to use it.” Google’s approach with Expeditions was to ensure that “teachers can just pick it up and start using it in the classroom without the prerequisites like professional development first.”

Virtual reality will not work for every student: Some at Jared Perrine’s school got motion sickness during the VR pilot or found it hard to focus in the virtual environment. Perrine noted that a 2D option in Google Expeditions provided a workaround for those students so they were still able to participate with their classmates.

What State Policymakers Can Do

As with any new technology, the VR “buzz” could fade. However, the affordability of adopting VR and the increasing number of free or low-cost virtual environments that are being developed make it more likely that VR will take off in education. This does not mean that a state should push for immediate VR adoption in every classroom; Kinney emphasized the importance of piloting VR to keep costs low and “prove the educational value” before scaling up. Becker also advised that such pilot programs integrate teacher perspective and feedback.

Holland suggests that policymakers who want to see VR adopted in their state can be supportive by “encouraging schools to take that leap forward” and providing the resources to aid teachers in professional development and funding technology in the classroom.

VR is not the only new technology with huge potential for education. Advancements like
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digital textbooks and new learning apps could also spur greater educational achievement.
No matter what technology a state adopts, “it’s not about advancing tech, it’s about advancing a teaching and learning strategy that is really going to promote deeper learning,” says Becker. Policymakers will want to monitor technological advancements and obtain input from educators to see whether the technology in question is a tool that works for them. ■


cont’d from pg 43...The Future of Learning: New Definitions and Approaches

controversial of all, revamping teacher evaluation systems.
4This evidence vacuum presents a considerable risk to states and districts. The educational intervention landscape is filled with vendors ready to provide “proven” and “aligned” interventions. Avoiding unscrupulous vendors will remain a constant for states. Equally unfortunate would be the temptation to ignore weak or missing research and create strategies, policies, and interventions without any regard for prior experience and evaluation.
5M.W. McLaughlin, “The Rand Change Agent Study Revisited: Macro Perspectives and Micro Realities,”


cont’d from pg 39...The Future of Personalized Learning for Children with Disabilities

Blended and Online Education and the National Center for Learning Disabilities’ Personalized Learning: Policy & Practice Recommendations for Meeting the Needs of Students with Disabilities. ■

2A personalized learning plan is not the same thing as an Individualized Education Program, which is required by the Individuals with Disabilities Education Act. IEPs are written statements for each child with a disability that must include information on the student’s academic progress, address how the child will be integrated into and supported in the general classroom, and describe any special instructional needs, services, or accommodations. Although personalized learning plans and IEPs share a focus on the needs of each child, the IEP is designed to ensure that a student who is eligible for special education services receives them and that accommodations and supports level the playing field with their peers and allow them to participate in the general education classroom.
4S. Patrick et al., Promising State Policies for Personalized Learning (Vienna, VA: INACOL, May 2016).
5This allows districts and regular public schools flexibility similar to that provided charter schools, though that flexibility will vary depending on the state. For example, Colorado’s Schools of Innovation policy allows traditional public schools some flexibility around budgeting and curriculum, but local collective bargaining still applies, and teachers have to vote annually to remain as a school of innovation.
6The grant-funded project is part of the Next Generation Learning Challenges initiative, founded by Educause in partnership with several other organizations, including INACOL. See http://nextgenlearning.org/assessment-learning-project.
8R. Rose, Access and Equity for All Learners in Blended and Online Education, (Vienna, VA: INACOL, October 2014).