Editor's Note

The Dilemmas of Technology

"Technology is just a tool. In terms of getting the kids working together and motivating them, the teacher is most important." — Bill Gates

When you walk into a classroom today, you immediately notice a drastic shift from what we would have seen just a decade ago. Kindergartners are maneuvering tablets; fourth graders are using simulation software; black, green, and whiteboards have been replaced with interactive smart boards. What we see as new and innovative is simply ingrained in the way students go about finding answers. They are beyond digital natives, they are embedded in technology, and it is not separable from any part of their lives.

It's obvious that student learning is impacted by the use of technology. We need to be sure they are exposed to technologically advanced tools frequently in science and further build skills around those tools that are already familiar. We also need to seek out new technologies that provide opportunities for students to explore beyond what's familiar. But the challenge is to find the technology that provides the best opportunities for students to access knowledge, build science and engineering skills, and function within a framework of scientific investigation. Using technology for the sake of exposing students to a new gizmo should not be the major goal in instruction. That's not to say we should ignore the value of technology to motivate and interest students—new technology may inspire new ways to approach a learning opportunity. Thus, we have a selection dilemma.

Using new technologies is an instructional challenge. Exchanging a computer simulation for a laboratory-based investigation is not a simple swap. It not only takes a different kind of preparation, it also requires a change in approach and assessment. No longer is the teacher the keeper of technology, using it to enhance lessons. In classrooms that focus on the 21st-century learner, we see a shift to providing students with technologies that had previously been used exclusively by teachers. The International Society for Technology Education (ISTE) *National Educational Technology Standards for Students* are delineated into seven categories representing student learning roles: Empowered Learner, Digital Citizen, Knowledge Constructor, Innovative Designer, Computational Thinker, Creative Communicator, and Global Collaborator. The explanation of the empowered learner states, "Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals." This empowers students to take control of their learning and communicating.

This new educational landscape is unexplored territory for many teachers and school systems. New technology can simply be happening to them rather than being carefully considered and selected. Organizations like ISTE, the National Center for Educational Statistics, and publications like *Education World* are providing resources and support for deliberate decision making, opportunities, strategies, and guidelines for assessing and selecting tools. Sometimes the best technology is a piece of paper and pencil.

Linda Froschauer
Editor, *S&C*

Resources

Education World: *www.educationworld.com/a_tech/archives/technology.shtml*
ISTE *Standards for Students*: *www.iste.org/standards/standards/for-students-2016*
Technology in Schools: Suggestions, Tools, and Guidelines for Assessing Technology in Elementary and Secondary Education: *http://nces.ed.gov/pubs2003/tech_schools/index.asp#5*

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