This month’s Commentary is by Evan Marwell, founder and CEO of EducationSuperHighway, a nonprofit with a mission of ensuring that "every K-12 public school in America has the 100 Mbps of Internet infrastructure that students and teachers need for digital learning and teaching."

Commentaries are occasionally published writings by members of state boards of education, other education leaders, researchers or practitioners, and NASBE staff. NASBE welcomes submissions for new Commentaries, as well as responses to current articles. Please send all correspondence to David Kysilko, Director of Knowledge Resources, at davidk@nasbe.org.

Upgrading the Internet Infrastructure of America’s Public Schools
by Evan Marwell

Blended Learning is the Future of Education. States across the nation are recognizing the power of blended learning to transform K-12 classrooms, and studies have shown that teachers overwhelmingly support the use of technology in schools. Blended learning can help teachers personalize instruction and ensure that every student has access to high quality, Common Core-aligned curriculum. Perhaps most importantly, blended learning is improving student outcomes.

Blended Learning Requires Robust Internet Infrastructure.
But here’s the rub: In order to capitalize on the promise of blended learning, the vast majority of schools will need to significantly upgrade their Internet infrastructure. America’s students and teachers need reliable access to high-speed broadband and ubiquitous Wi-Fi networks. According to the State Education Technology Directors Association (SETDA), schools need 100 megabits per second of Internet access per 1,000 students today, and 1 gigabit per second by 2017.

Unfortunately, over 75 percent of schools do not have the robust Internet infrastructure necessary to implement blended learning, and more than 40 percent lack sufficient bandwidth to easily implement the 2014-15 online assessments. To address these shortfalls, state education agencies need data on which schools are struggling, and districts need technical and procurement support to design and implement cost-effective, mission-critical networks.

Why Networks Fail. As technology moves from the principal’s office and the computer lab to students’ desks, K-12 networks are facing a 10-fold increase in the number of users vying for bandwidth. This is overwhelming existing networks and forcing districts to upgrade both their Internet connections and the wired and wireless networks inside their schools. As illustrated in the diagram on page two, K-12 networks are complex and contain a diverse set of potential bottlenecks that can prevent the successful implementation of blended learning. Common bottlenecks include: insufficient Internet connectivity or connections from the school to the district office, old network hardware or wiring, and too few wireless access points.

Planning for Blended Learning Success. The lack of network, technical, and procurement expertise at the district level means that state education agencies (SEAs) have a critical leadership role to play in upgrading a state’s K-12 networks. Specifically, states should help districts:

1. Organize a data-driven network assessment and planning process.
2. Obtain access to networking technical expertise.
3. Lower the cost of connectivity and equipment by facilitating demand aggregation (e.g., pooling the demand for telecommunication services among districts) and pricing transparency across districts.

The planning process should answer three critical questions:

1. Which schools need upgrades?
2. What specific upgrades are needed?
3. What is the most cost effective way to implement the upgrades?

Developing effective K-12 network upgrade plans at the state level can help to identify and promote best practices and accelerate the upgrades necessary to prepare schools for blended learning and online assessments.

The Role of the State Board of Education. State board of education members can promote K-12 network upgrades by advocating for the implementation of a statewide upgrade planning process. Board members can provide leadership by asking SEA staff to develop answers to the following questions:

- How much bandwidth is currently available in each of our schools?
- What is the gap between available bandwidth and what is needed for blended learning?
- What upgrades are necessary in each of our districts to close this gap?
- What is the most efficient way to help districts obtain the technical expertise they need to deploy and manage a mission critical network?
- What can we do to lower the cost of connectivity and equipment for districts through consortia purchasing and pricing transparency?

Resources to Support Upgrade Planning. States can find information about implementing efficient network upgrades through SETDA and Digital Learning Now. EducationSuperHighway’s web-based SchoolSpeedTest tool helps states identify which of their schools need upgrades using real-time data. When combined with data from their Network Snapshot assessment and Internet Pricing Portal, states can use this information to ensure that they implement the most effective upgrades at the lowest cost. The Learning Accelerator has launched a pilot program to implement district-wide blended learning at several sites across the country, and will be identifying and publicizing best practices as the project progresses. Best practices are also being developed by Digital Promise’s League of Innovative Schools.

Case Study: Maine Learning Technology Initiative

From 1999-2000, the Task Force on the Maine Learning Technology Endowment created a statewide plan that mapped out a bold upgrade implementation strategy to connect every student to high-speed Internet and cutting-edge devices.

As a result, Maine now boasts one of the most cost-effective and comprehensive school technology programs in the country. Maine’s success has largely hinged upon the following three practices:

- The state routinely collects data on school network performance to ensure sufficiency and identify weaknesses.
- The state provides a dedicated network support team to help plan, monitor and troubleshoot district networks.
- The state has collected extensive data on pricing across the state and facilitates purchases through consortia to leverage bulk buying power.

Maine’s statewide technology programs are proof that state education agencies can provide critical leadership in helping districts upgrade and maintain their Internet infrastructure.