Wireless EdTech CONFERENCE 2012

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Wireless Reach™ from Qualcomm

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Wireless EdTech CONFERENCE 2012

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OPENING REMARKS EXECUTIVE SUMMARY

SETTING THE STAGE FOR WIRELESS EDTECH 2012

Co-hosts: **Chris Dede**, Timothy E. Wirth Professor in Learning Technologies, Graduate School of Education, Harvard University
Julie Evans, CEO, Project Tomorrow

Overview

Mobile learning has quickly advanced from infancy to adolescence and is poised to take the next step. But what is required is a transformation, not an incremental evolution. The field needs greater integration of technologies, more capacity building among educators, and more research on technologies such as Augmented Reality to understand their impact on learning and the application of knowledge.

Yet even as urgency is needed to advance mobile learning, today's mobile technologies are already being used in many educational settings to change how learning occurs. Students are using mobile devices in classrooms (sometimes whether school policies allow it or not), and connected learning in school and out is changing the classroom experience and how teaching occurs.

Driving the transformation that is needed requires a top-down vision, a bottom-up groundswell, and middle-out initiatives—all working in concert.

Context

Wireless EdTech co-hosts Professor Chris Dede of the Harvard Graduate School of Education and Julie Evans, CEO of Project Tomorrow, kicked off Wireless EdTech 2012 by sharing ideas, perspectives, and real-world experiences regarding the use of mobile technology in education. Professor Dede's fields of scholarship include emerging technologies, policy, and leadership. His funded research currently includes five grants to design and study immersive simulations, transformed social interactions, and online professional development. In 2007, he was honored by Harvard University as an outstanding teacher, and in 2011 he was named a Fellow of the American Educational Research Association. Through Project Tomorrow, Ms. Evans has worked closely with Qualcomm, numerous districts, and other stakeholders in developing a perspective grounded in the reality of what is happening in schools around the country. Additionally, a key initiative of Project Tomorrow is the Speak Up National Research Project, which annually polls K–12 students, parents, and educators on their views on emerging technologies including the role of mobile devices within learning.

Key Takeaways

Wireless EdTech is a unique conference that goes deep into mobile learning and includes all stakeholders.

In kicking off Wireless EdTech, Professor Dede referred to this gathering as "a different conference than you are used to." Wireless EdTech is different because it focuses on mobile devices and wireless broadband in education, and goes deep in these areas. In addition, Wireless EdTech is different in that it brings together individuals from all of the various stakeholder communities involved with these topics.

Ms. Evans explained that the 2012 conference focused on three primary areas:

1. **What is Happening Now.** This involved assessing the current landscape and environment for mobile learning.
2. **The Big Challenges.** Discussions focused on critical topics, such as investment strategies for mobile learning and ensuring digital equity.
3. **Looking Ahead.** Topics covered included emerging technologies and implementation strategies that are on the horizon, as well as what needs to happen to realize their future potential.

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Mobile learning has gone from infancy to adolescence.

Just a few years ago mobile learning was just beginning. Leaders in this area were trying to expose educators to the idea of mobile learning, and early adopters were starting to explore its potential by doing relatively simple things with wireless broadband.

In a short time frame, mobile learning has moved out of infancy and has quickly entered adolescence. As anyone who has had adolescent children knows, this is both an exciting and a challenging phase.

People used to be astonished by mobile devices. They were excited by the technology and impressed with what apps could do. But that initial excitement quickly gave way to demands for more consistent quality, applications that did even more things, and a desire to take this technology to an even higher level.

Education must go beyond evolution to transformation and disruptive innovation.

Professor Dede compared the traditional education system to the stage coach. For years, minor innovations to the stage coach took place that made the stage coach a bit bigger and perhaps a bit more comfortable. These innovations were evolutionary in nature. Then, the train was invented, which fundamentally transformed transportation and rendered the stage coach obsolete.

Today's education system can be seen as a "motor stage," which was in between the stage coach and the train. In education, many exciting innovations have already taken place, including one-to-one devices in classrooms and the use of social media in powerful ways. Professor Dede termed these innovations "a good place to start, but a poor place to stop." That is because there are technological breakthroughs on the horizon, including low-cost, powerful mobile devices and universal, affordable wireless broadband. These innovations will be the engine that make a new form of education possible.

But the educational system of the future won't be achieved through evolution. Professor Dede confessed that he is tired of evolutionary strategies not making much progress. In attempting to evolve, the first 10% of change is easy, the second 10% is harder, and by the third 10% there is active opposition.

Professor Dede believes that we over-invest in evolution, even though it is important, and under-invest in other forms of change, like transformation and disruption. He sees transformational models at work in which 40–50% of the change is taking place at once. This can be uncomfortable and poses some risks, but also results in large numbers of stakeholders fighting for innovation instead of opposing it. Also, disruptive innovation is currently occurring in higher education, where underserved populations are identified and new models are developed and refined to serve them. An example is massive online open courses (MOOCs).

> "We need to be less sanguine about evolution and more willing to roll the dice with models that deal with transformation or disruption."
>
> Chris Dede, Timothy E. Wirth Professor in Learning Technologies, Graduate School of Education, Harvard University

Chris Dede. Click to watch video.

There is a growing sense of urgency to go beyond "build it and magic will happen."

A misconception has been that if schools bought devices and vendors built apps, wonderful things would happen. This isn't true. The educational system in the United States has enormous challenges, and just purchasing new technology won't solve these problems. However, technology provides a platform that can be used by teachers and students to change how learning occurs.

> "Education is not about devices helping students learn; it's about our learning together using devices as a kind of catalyst that makes learning possible."
>
> Chris Dede, Timothy E. Wirth Professor in Learning Technologies, Graduate School of Education, Harvard University

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An alternative model of education involves learning while students are immersed in the real world, with real-world tools.

The traditional view of higher education has been that learning should take place in an isolated location where students are taken out of the real world so they can reflect on knowledge acquisition. But Julie Evans offered an alternative theory: students can learn best when immersed in the real world, using real-world tools, and can experience learning in an actionable sense. This is a very different perspective from how education has traditionally taken place.

Julie Evans. Click to watch video.

Mobile Technology in Practice: Marissa's Story

Marissa is an 11th-grade honors student at a Los Angeles high school. Her English Literature class was reading and discussing Hamlet during a two-hour blocked period. Marissa was struggling to understand the old English terminology and some of Shakespeare's thematic symbolism, but she sensed that others in the class were not struggling. She didn't want to fall behind the class but was embarrassed to ask the teacher a question.

Julie Evans. Click to watch video.

So, despite school rules restricting the use of student-owned mobile phones in class, during the period Marissa coyly used her smartphone to go on the web and look up information about Hamlet. By doing so, she "got it."

Through her resourcefulness, and defiance of school rules, Marissa was able to access resources she needed, at the time she needed them, in a highly personalized way, to move forward in the class.

> "We can't put the genie back in the bottle. This is how kids are using technology. They are personalizing their learning every single day, regardless of what policies schools and districts may have . . . this is truly personalized learning at work, and not conceptual. It's happening every day."
>
> Julie Evans, CEO, Project Tomorrow

Marissa's story shows that students are fascinated with learning. But they want to learn in a way that makes sense for them, in their context. They want to be untethered and not bound by traditional conventions and methods. They also don't want to be isolated and to learn alone; they want to collaborate. They want to be able to experience the real world and bring it into their world.

To transform education, integration and capacity building are needed, as well as greater understanding about the value of immediacy and transfer.

Professor Dede doesn't believe that education will be transformed through a top-down approach (on its own) or a bottom-up approach. Transformation requires a top-down vision, a bottom-up approach, and a middle-out approach—all working in concert. In an era of new media, there needs to be:

- **Integration.** To date, the results of many mobile initiatives have been less than the sum of the parts. This is because each part is working on its own and the pieces haven't been put together in a coherent way. Integration requires a connected cyberinfrastructure that brings about the image of "connected teaching," which is part of the U.S. Department of Education's National EdTech Plan. In this image, teaching is connected to life, teachers are

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connected to peers, and students are connected to others who play educational roles, including families, community mentors, informal educators, and more.

- **Capacity building.** It is not enough to just train educators to use mobile devices. Tools have to empower teachers to innovate "the whole practice." In this way, the tool fades into the background, and the focus is on new ways of teaching and learning.

Also, there needs to be greater understanding of the benefits and value of immediacy and transfer. Augmented Reality provides greater immediacy, as a student learns by being immersed in a real-world context. Not yet known is how much this immediacy adds to learning, how important it is, and what sacrifices should be made to provide immediacy in education. The same questions exist around transfer. It is known that students may master something in the classroom, but may struggle to transfer this knowledge and apply it in the real world. It is believed that Augmented Reality can improve transfer, but more questions need to be answered.

Mobile Technology in Practice: Connected Learning

Julie Evans emphasized that having connected classrooms, connected teachers, and students connected into the whole is not just a concept; it is happening every day. In Qualcomm Wireless Reach projects, connected learning is actively taking place. Learnings from these experiences include:

- **Learning-centered classrooms.** In these classrooms, students and teachers are co-learners. They are developing content together, changing the student/teacher relationship, and transforming the traditional learning process.
- **Changing teacher practice.** Mobile devices are acting as a catalyst for changing teacher practice. The device itself isn't the key aspect, but really what is happening is the build-up of educator capacity and the idea of changing instructional practice, which has longer-reaching and much greater impact not only on this class but on next year's class and the class going forward.
- **Student impact.** While adults see mobile technology as a tool for student engagement, students themselves use different terms. They talk about learning more efficiently and effectively. They say that they collaborate more, learn more, question more. They talk in terms of impact.

> "The students themselves . . .talk more in terms of the business language of 'impact."
>
> Julie Evans, CEO, Project Tomorrow

- **Equity.** Mobile devices with 3G and 4G capabilities are changing the equity conversation as an increasing number of students say their primary access to the Internet is now through a 3G or 4G device.

Chris Dede. Click to watch video.

In transforming learning, social media is the low-hanging fruit.

Among all of the opportunities to leverage mobile technology to transform learning, social media is the low-hanging fruit. Access to and use of social media is widespread. Using it is fashionable and there is tremendous buy-in. For kids, this is their medium. Using case-based teaching infused with social media, coupled with standard academic resources, is a powerful method of teaching and learning.

Leaders in education must focus on scaling teaching innovations.

Professor Dede encouraged education leaders to "think about scale." Historically, innovations in education have not scaled very well because education is highly dependent on context and adapting to the context. Among the dimensions of scale on which educators must focus are:

- **Sustainability.** This is adapting an innovation when not all of the conditions for success are present.

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- **Spread.** This is the diffusion of an innovation. Surprisingly, innovations don't spread just because they are effective. They spread when a trusted party is already participating; when an innovation is consistent with what a person is already trying to do; and when a person can try something and back out if it is not working.
- **Shift.** This is helping people take ownership for an innovation so it becomes theirs.

At Wireless EdTech 2012, practitioners from around the country and across the world showed how mobile learning is transforming education and described the tremendous progress that has been made in a very short period. Yet numerous obstacles and challenges were identified which must be overcome in order for mobile learning to reach its full potential. It is the charge of those who attended Wireless EdTech to lead this revolution by educating others, sharing best practices, overcoming the obstacles that exist, moving rapidly ahead—and convening again in 2013 to report on the progress that has been made and to identify the next steps in this journey.

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Wireless EdTech CONFERENCE 2012

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KEYNOTE SESSION EXECUTIVE SUMMARY

BEYOND BEING THERE: THE MOBILE FUTURE OF LEARNING

Keynote Speaker: Laura Smith, Vice President of Content and Development, Amplify

Overview

While the rate of adoption for cell phones, smartphones, e-readers, and tablets has been astonishing, even among teenagers and children, the majority of schools require that students power these devices off in the classroom. Thus the growth in access to mobile technology has not yet resulted in schools fully leveraging the power of this technology to transform education.

But important trends are taking root. More schools are adopting BYOD (bring your own device) policies and one-to-one programs. At the same time, mobile technologies are making possible transformative concepts such as connected and customized learning. Though early, it is already clear that mobile technology has the potential to revolutionize and fundamentally transform students' learning experiences.

Context

Laura Smith, vice president of content and development at Amplify, described how mobile technologies will revolutionize learning and the role that Amplify aims to play. Amplify is News Corp.'s new education arm dedicated to reimagining K–12 education. The company is working on three areas of innovation:

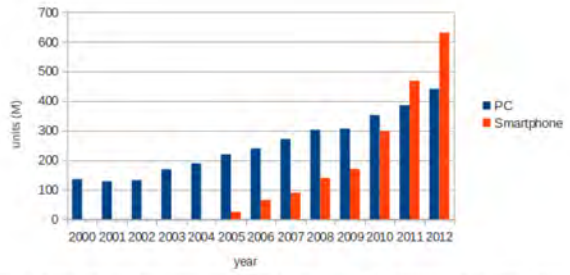
- **Analytics and assessments.** Products and services that facilitate real-time student assessment, helping teachers quickly adapt instruction to meet the needs of individual students.
- **Transformative learning.** Fully digital content—as immersive as movies and as engaging as video games—that is driven by adaptive technologies becomes a customized resource for each student.
- **Expanded access.** A tablet-based platform that bundles curricular and extracurricular content with sophisticated analytic capabilities will help teachers provide a personalized experience for each student.

At Amplify, Ms. Smith is responsible for managing the delivery of tablet-based learning products and services to teachers, students, and parents. She previously worked at Sesame Workshop, where she leveraged the organization's digital content for preschools. Before that she served as assistant commissioner at the New York State Department of Education, and at the New York City Department of Education as special assistant to Chancellor Joel Klein.

Key Takeaways

The access to and use of mobile technologies are exploding.

Today, 85% of American adults already have cell phones, and 45% have smartphones. What's more, smartphone adoption is accelerating quickly. From May 2011 to February 2012, smartphone adoption increased by 11 percentage points. In 2011, for the first time, smartphone sales outpaced PC sales.



(Source: Gartner data, http://www.streamcomputing.eu/n/blog/2011-05-06/the-history-of-the-pc-from-2000-2012/)

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Tablet use also is exploding. Consumers bought over 100 million tablets in 2012, just two years after they were introduced. By 2015, analysts expect sales to total 300 million. It's only a matter of time until tablet sales also exceed PC sales. No other technology has penetrated society so quickly.

> "The rate of adoption [for tablets] is six times as fast as cell phones and four times as fast as smartphones. It's just staggering growth."
>
> Laura Smith, Vice President of Content and Development, Amplify

Access to mobile devices for teenagers and children is also increasing incredibly quickly.

According to research from the Pew Research Center, 77% of kids between 12 and 17 years old report having a cell phone. Among younger children, 39% of 5th graders and 19% of 3rd graders already have cell phones.

Also according to Pew, 23% of teens report having smartphones. Other sources put the percentage even higher. Nielsen & Co. research shows that up to 58% of teenagers have smartphones.

In terms of tablets, recent Project Tomorrow 'Speak Up' surveys have found that about 20% of K–12 children are using tablets to go online.

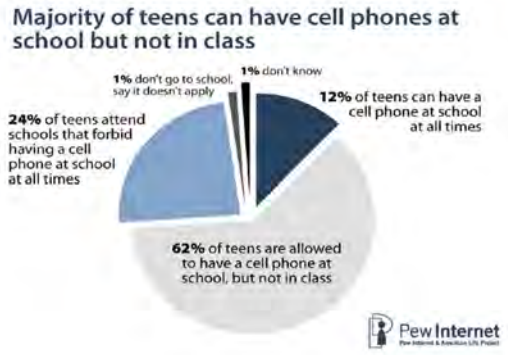
Laura Smith. Click to watch video.

In terms of Internet connectivity, Project Tomorrow's research shows that around 75% of children have high speed Internet access at home and more than half have access through mobile broadband.

There is little difference in access to smartphones based on gender or race, but there remains a digital divide in terms of income and urban/rural. Those earning more than $75,000 are almost twice as likely to have a smartphone as those earning less than $30,000, and almost half of urban and suburban adults have a smartphone compared to fewer than 30% of rural adults. However, there is little difference in access among urban, suburban, and rural children.

Despite the rapid growth in the ownership and use of mobile devices among teens, most schools require students to turn off their devices while at school.

Many children—although not all—have fully integrated mobile technologies into their lives, and mobile technologies have captured children's imaginations. But that integration and the use of mobile technologies generally stop at the school door. That's because most students who own mobile devices are being asked to power off their devices when they walk into school. In fact, only 12% of teens can have a cell phone at school at all times, according to Pew. And 62% are allowed to have one at school, but not in class. As a result, schools are not yet fully leveraging these technologies in learning.



Of those schools embracing mobile devices, two trends are emerging:

- **BYOD or BYOT (Bring Your Own Device or Technology).** This means that students can bring and use their own personal mobile devices during the school day as part of formal instruction. As BYOD/BYOT emerges, equity is often a challenge, as not all students own mobile devices and those who do may have different generations of technology with different features and capabilities. Potential solutions when students don't have their own devices include student sharing or students being provided a school-issued laptop.

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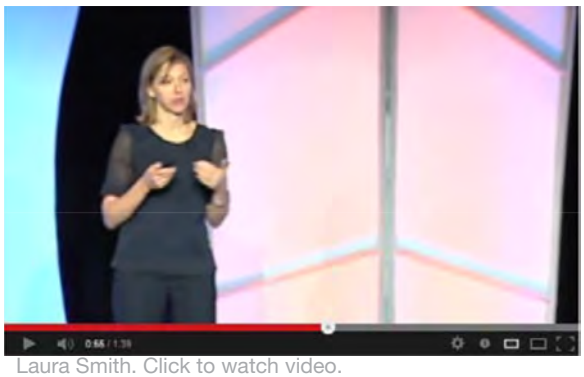
- **One-to-one** involves a district or school providing one device for each student. More than 100 districts started a one-to-one program last year and worldwide there were about 2,000 K–12 implementations.

However, even with these trends, a concern is whether schools are taking advantage of the learning that can be afforded through mobile technology. Too often devices end up being returned by students at the end of the day. This means they aren't being fully leveraged for personalized learning.


Laura Smith. Click to watch video.

Schools need to progress from evolutionary changes in learning to revolutionary changes.

Schools need to move away from making evolutionary changes, where change occurs slowly and incrementally. In this context, mobile technologies are viewed as just supplemental delivery tools.

Instead, what are needed are revolutionary changes, where mobile learning becomes a fundamentally different kind of learning. Pedagogy and classroom practices must change significantly. There must be different ways for kids to create, acquire, and share knowledge. And teachers must be able to manage and facilitate that knowledge creation in their classrooms.

To achieve those outcomes, the focus must be on revolutionizing learning in four distinct ways:

- **"Curated" learning.** Interactive content must be "curated" so it is fully accessible by a mobile device any time and anywhere, and is easily shareable. The device essentially replaces everything students now are lugging around in their backpacks.

  Example: A company called Inkling makes beautiful, interactive, digital textbooks enhanced with video. For students, it changes the entire textbook/learning experience.

- **Connected learning.** More than 100 years ago, John Dewey promoted the idea that learning happens in different localities—schools, extracurricular activities, cultural events, and so on—and should be connected. All learning needs to be fully integrated so that people can make sense of it in the context of their real lives.

  Example: Pathbrite is a platform that enables users to create a portfolio of career, educational, or other achievements. Users can track those achievements against personal goals and create a "Knowledge Graph." This becomes a rich picture of who they are as individuals, which users can use to promote themselves to admissions officers or job recruiters.

- **Captured learning.** Learning often happens when people are "on the go." Mobile connectivity helps students capture little snippets of information and insight as they go through life. Two innovations happening in the area of captured learning:
  - *Project Noah* wants to inspire students to become citizen scientists. Using the platform, individuals—both amateurs and professionals—can document wildlife in real time and participate in ongoing data analysis.
  - *The Museum of London* is using Augmented Reality technology to make the city's history come alive. At locations around the city, people can point a mobile camera at street scenes or historic sites and see an augmented version of what that scene looked like decades ago or in Roman times.

- **Customized learning.** A customized experience is created when the content that is curated for students is exactly the right content they need, when they need it. It captures their learning in school and out of school, and connects the gap between formal and informal learning so that it is really customized to their own experiences.

Laura Smith. Click to watch video.

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KEYNOTE SESSION EXECUTIVE SUMMARY

ELEVATING EDUCATION: WHY MOBILE WILL TRANSFORM LEARNING

Keynote Speaker: Peggy Johnson, Executive Vice President and President of Global Market Development, Qualcomm

Overview

Mobile devices are already affecting people's lives in powerful and transformative ways. That impact will only intensify as mobile connectivity around the world continues to rise.

Leveraging those mobile connections in the classroom is essential. While obstacles to effective implementation remain, using mobile devices to advance learning contributes to economic growth and has the potential to transform an outdated educational system. Using wireless technology, educators will be able to increase personalization and collaboration, as well as improve assessments.

Going forward, it will be important for all players to work together to create a true mobile ecosystem for the 21st -century classroom.

Context

Qualcomm's Peggy Johnson discussed the positive impact and global reach of mobile connectivity, and the ability of next-generation wireless technology to revolutionize education. Ms. Johnson previously served as Qualcomm's executive vice president of the Americas and India, where she played an instrumental role in the global development and adoption of 3G wireless broadband technology and services in those regions. In her role as executive vice president, Qualcomm Technologies, Inc. and president, Global Market Development, Ms. Johnson is responsible for commercializing new business opportunities and developing strategic relationships for the company. Ms. Johnson leads Qualcomm's focus on education and has a particular interest in the use of mobile technologies in education.

Key Takeaways

Mobile connectivity is transforming people's lives.

Over the last year, the number of mobile wireless connections in the world grew by more than half a billion, from 5.7 billion to 6.3 billion. In fact, the pace of growth is accelerating so quickly that within a relatively short time, almost everyone will have access.

And it is happening not only in developed markets, but also in emerging markets, where people are using mobile technology in some surprising ways. In Nigeria, they are using cell phone applications to fight against counterfeit drugs. In Honduras, they are using phones to access clean water. And in South Africa, rural clinicians are retrieving up-to-date medical information via cell phones. So it is not just about the growth in the number of devices; it's about how mobile devices are being used and how they are affecting people's lives.

Recently, Qualcomm collaborated with Time on the magazine's mobility issue. A survey of people in eight countries, in both established and emerging markets, revealed how cell phones are permeating people's lives:

- 84% of respondents said they "couldn't go a single day without their mobile device in their hand."
- 65% said they would take their mobile device with them in the morning instead of their lunch.

Another interesting discovery dispelled the myth that parents are opposed to their children using technology for learning and are holding back the adoption and use of mobile technologies in classrooms. Actually, 70% of parents think that the benefits of their kids learning about technology outweigh the potential distractions from studies.

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> "Parents believe that 13 is an appropriate age to introduce a mobile device to a child."
>
> Peggy Johnson, Executive Vice President and President of Global Market Development, Qualcomm

Worldwide, access to 3G mobile broadband is overtaking fixed broadband.

Today, there are almost about 2 billion 3G connections. By 2016, 85% of total broadband connections will be mobile.

One reason that is happening is that it is simply more difficult and expensive to run fiber or cable into a home to establish fixed broadband. So in underserved areas around the world, the fastest and most efficient way to connect people to broadband is through 3G. Also, in 2011 an interesting shift occurred: Consumers bought more smartphones (472 million) than PCs (353 million). In other words, people who want connectivity are starting to veer toward smartphones because mobility is important to them.

> "For many, the first and only computing experience will be mobile."
>
> Peggy Johnson, Executive Vice President and President of Global Market Development, Qualcomm

Peggy Johnson. Click to watch video.

Leveraging mobile connections in the classroom contributes to economic growth.

Improving the quality of education across the world certainly is good for children, but it is also good for economic growth. According to a recent McKinsey & Co. analysis, a small improvement in educational quality for children born in 2010 across 40 different countries could have a positive economic impact of about $115 trillion.

What's more, innovation in classrooms is important to prepare children for tomorrow's jobs. The McKinsey report also showed that 65% of children who are in grade school today will hold jobs that have not even been created yet.

And finally, the analysis pointed to the considerable business opportunities that exist in global mobile education. Right now, the market totals about $3.4 billion. But by 2020, it will be 20 times greater, at an estimated $70 billion.

Wireless technology has the potential to revolutionize the educational system.

The U.S. educational system, created during the industrial revolution, still operates like an assembly line. Teachers stand at the front of the classroom, and students all move through the system at the same pace, in a highly structured way, even though they have different capabilities and experiences and come from different backgrounds.

> "Rarely do we customize the learning experience enough to truly make a difference."
>
> Peggy Johnson, Executive Vice President and President of Global Market Development, Qualcomm

Wireless technologies present an opportunity to change that paradigm and change how education takes place in the classroom. Benefits of integrating wireless technology into the classroom include the ability to:

- **Personalize:** The right content can be delivered at the right time for each individual student.
- **Coach:** Teachers can better coach students, help them analyze and synthesize all of the data they see, and use wireless technology to immerse them in new ways of learning, such as Augmented Reality. Also, through integrated wireless technology, kids can coach each other via peer-to-peer networks.
- **Assess:** Providing nearly instantaneous feedback for teachers to help them adjust teaching methods in real time and assist struggling students as well as identify outliers.

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Qualcomm is engaged in educational initiatives that address some of the key barriers regarding the use of wireless in classrooms.

Qualcomm's Wireless Reach initiative involves introducing wireless technologies into underserved communities to improve different aspects of people's lives. In 2012, this initiative involved 73 pilot projects in 31 countries, with many of the projects focused on the uses of wireless in education.

These pilots are focused on four areas, which have been identified as barriers to mobile adoption:

- **Infrastructure.** Many schools lack the basic infrastructure needed to support a 1:1 environment.
- **Content.** The focus must be on creating truly immersive, interactive educational experiences that take advantage of mobile.
- **Teacher development.** Teachers must become familiar enough with the tools to change their methodologies.
- **Safety and security.** Children's personal information must be protected and schools must remain CIPA compliant.

To overcome those obstacles, major constituencies—operators, educators, publishers, manufacturers, and government—will have to work together to develop the mobile ecosystem. In particular:

- **Operators** need to develop data plans tailored to the needs of schools.
- **Educators** must remain open to new ideas and methodologies.
- **Publishers** must take advantage of the full range of mobile capabilities to provide great content.
- **Manufacturers** need to develop tools that enable teachers.
- **Students** need to interact with each other in peer-to-peer ways—so learning takes place whenever and wherever people are. Government needs to fund proven programs. For example, the FCC's Learning On-The-Go project, which provided many tangible, measurable results, is winding down. Hopefully, the agency can be convinced to bring that back.

Examples of Qualcomm's Wireless Reach initiative in U.S. schools include:

- **Onslow County Project K-Nect.** At-risk kids in North Carolina were given 24/7 access to smartphones equipped with math content and tools. One recipient was previously unsuccessful in math. Because of the program, she ultimately completed Algebra I, Geometry, Algebra II, and Pre-Calculus, as well as Advanced Placement Calculus and Statistics. She is now a freshman at the University of North Carolina and attributes her success in mathematics to Project K-Nect.
- **San Diego Unified School District.** The district's Learning on the Go pilot enabled its schools to offer students access to broadband connections off campus. One middle school achieved amazing results: Students who previously did not have access to broadband at home raised their test scores by 43%.

In multiple sessions at Wireless EdTech 2012, other examples of Qualcomm's Wireless Reach Initiative were described, including international examples. These included:

- **Radiophone (India).** This Wireless Reach project in conjunction with Sesame Workshop distributes content about healthy living and good hygiene habits to children and their families in migrant Indian communities through 3G mobile devices. Another Wireless Reach project with Sesame is in development for China.
- **TLINC (Teachers Learning in Networked Communities).** The National Commission on Teaching and America's Future (NCTAF) TLINC initiative uses mobile technology in professional development. NCTAF president Tom Carroll explained that TLINC enables student teachers to use mobile technology to call upon networks of support. This creates a networked community for new teachers during their early years of practice.
- **EcoMOBILE.** This is an Augmented Reality project at Harvard University that combines immersive virtual environments and real ecosystems that are infused with virtual resources.

Next-generation technologies can take classrooms to a new level.

Educators have the opportunity to consistently adopt innovations that promise to provide a richer educational experience. Consider these examples:

- **Interactive, flexible networks.** Cell phones already connect with many kinds of networks such as wi-fi, Bluetooth, and GPS. So it should be easy to enable students to "talk" to teachers and each other. And when students transfer to another classroom, they should be able to form an entirely different learning group, or learning community, seamlessly.

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- **Augmented Reality.** The Harvard Graduate School of Education created EcoMOBILE, a great outdoor experience using Augmented Reality. Students can use their phones to capture an image, and data can be overlaid on top of that image. In the Wireless Reach pilot program, after four months of using the application, teachers found that learning was more student-driven, and student collaboration was intensified. Students mastered more academic content and skills and reported greater interest and self-efficacy in science.
- **Digital sensors.** Qualcomm recently released a platform called Gimbal that helps software developers capture and filter data according to time and location. For example, students on a field trip to Washington, D.C., could point their mobile devices at the steps of the Lincoln Memorial. The device would then play a video of Martin Luther King, Jr. giving his "I Have a Dream" speech on the monument's steps. A digital map would guide the students to the next historic building, and the phone would display content appropriate for that location.

We must bring today's smart, connected world to education.

Smart, mobile technologies have already changed the lives of adults around the world; they have inundated our lives in a good way. For many adults, their smartphone is the last thing they look at before they go to sleep and the first thing they look at in the morning.

Now is the time to leverage this technology to transform education. Technology enables peer-to-peer learning, Augmented Reality, and context awareness that provides students with new views and insights. In addition, there is an exciting opportunity to develop apps that engage students in interactive new ways.

What is critical is that all stakeholders continue to actively participate in the conversation about building the global education ecosystem and spread the early successes from mobile technologies across the globe. Doing so will create better experiences for students and will ensure a better future for everyone.

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Wireless EdTech CONFERENCE 2012

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PLENARY SESSION EXECUTIVE SUMMARY

CYBERLEARNING INFRASTRUCTURES—BUILDING HUMAN AND TECHNOLOGICAL CAPACITY

Moderator: Chris Dede, Timothy E. Wirth Professor in Learning Technologies, Harvard University
Panelists: John Seely Brown, Independent Co-Chairman, Deloitte Center for the Edge
Janet L. Kolodner, Regents' Professor in the College of Computing, Georgia Institute of Technology

Overview

The new world of cyberlearning puts different demands on educational infrastructure than in the past, because it is a fundamentally different way of educating. This pull model of education (versus the traditional push model) requires wide-ranging infrastructure to support students as they acquire knowledge, driven by their personal curiosity. Cyberlearning infrastructure is broader than just the technology that enables access to resources. It includes everything that helps learning actually happen, including skilled people, peer cultures, and learning venues.

To be most effective, infrastructure needs to be designed to achieve clear purposes. The end goal of learning is to promote understanding. The ultimate goal of educators is to cultivate inquisitive minds, able to forge connections and create coherence. Infrastructure designed to help educators in those pursuits will ensure that our educational system turns out people well equipped for whatever unforeseeable challenges the rapidly changing 21st century brings.

Context

The two speakers in this plenary session have both been deeply involved in thinking about the country's cyberlearning infrastructure. John Seely Brown was 1 of 15 people on the Technical Working Group for the National EdTech Plan and was heavily involved in crafting the infrastructure section of the plan. Janet Kolodner is a leading thinker in the learning sciences community and is currently at the National Science Foundation heading a new program on cyberlearning. They shared their perspectives on how educators need to be thinking to create the most effective infrastructure for realizing the potential of cyberlearning.

Key Takeaways

A fundamentally different model of education, cyberlearning focuses less on *content* and more on *context*.

The world today is one of increasingly rapid change. The half-life of a given skill is constantly shrinking, and now averages about five years. People can no longer be trained for a single job that will last for decades. They need to be continually learning throughout their entire lives. The way they are educated needs to change accordingly.

No longer can educators rely on scalable efficiency for achieving the best learning outcomes; i.e., teaching large numbers in big lecture halls using a "push model." This traditional push model has given way to the "pull model," where learners capture the endless flows of information, knowledge, and activities that are constantly moving by. Individual learners will draw to them what is needed as it is needed.

Educators' roles and objectives in this pull model are fundamentally different than in the traditional push model. Instead of being the repository of knowledge and then pushing it out to passive recipients, teachers need to cultivate inquisitive minds and develop skills of connected learning. The goal of teachers is to create resilient, resourceful, lifelong learners who will succeed in life no matter how the world changes.

> "How can we create the resilient, resourceful, almost entrepreneurial learner—a kid who can basically find resources wherever he or she looks and do something with [them]?"
>
> John Seely Brown, Independent Co-Chairman, Deloitte Center for the Edge

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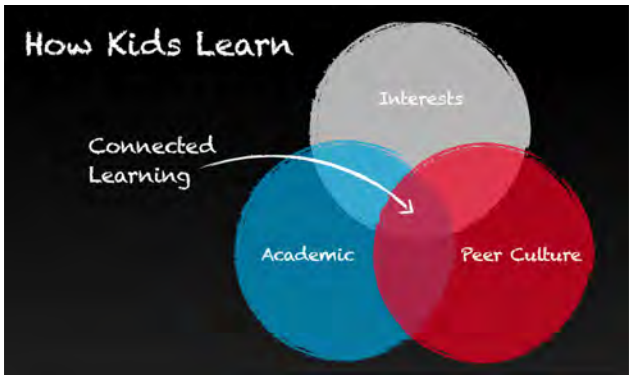
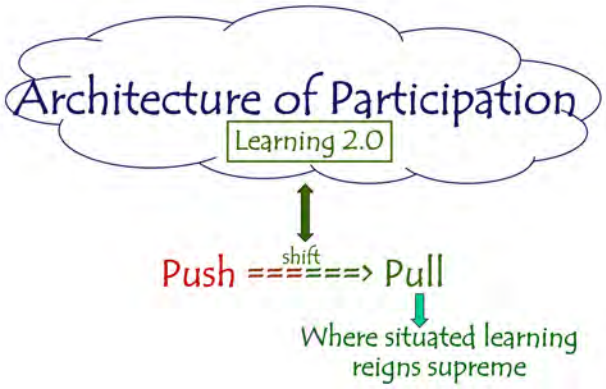
Part of developing lifelong learners is helping students navigate learning resources in the physical and cyber environments in which they move. These learning resources compose students' personal "learning networks," unified by enabling infrastructure. Students who are engaged in connected learning draw knowledge from their networks, driven not only by academics but also by interests and peer culture.



Teachers facilitate this interactive process of "learning on demand," helping students make sense of all the knowledge pulled down. In the pull model, education is more about context, whereas in the push model the focus is on content. In the pull model, situated learning reigns supreme. Situated learning, Dr. Kolodner explained, is a theory of education that says what people learn and the way it is learned is very dependent on the situation.



In developing cyberlearning infrastructure, educational purpose should dictate design.

All tools are designed for specific purposes. It is easier to do certain kinds of work with a hammer, and other types of work require a screwdriver. Purpose dictates design. So before figuring out how to build the infrastructure, educators need to understand the kind of learning they want to achieve.

Infrastructure designed for the traditional push model has been place-based, focused, for example, on how to accommodate enough people in lecture halls.

Designing for a pull model will mean figuring out how to:

- Structure learning environments (i.e., context) to capitalize on situated learning.
- Promote deep experiential learning, learning by doing.
- Develop inquisitive minds that can draw connections and achieve coherency.

> "What is the learning that we're building the infrastructure for? That's the heart of the matter. What's the goal?"
>
> Chris Dede, Timothy E. Wirth Professor in Learning Technologies, Harvard University

The cyberlearning pull model requires wide-ranging infrastructure to support it.

Cyberlearning doesn't happen just because the requisite technology is there. Infrastructure that supports the complex processes of learning is broader than technology. It encompasses everything that makes learning happen, as well as everything that makes teaching and assessment happen. More specifically, cyberlearning infrastructure includes:

- **The technology.** Technology encompasses the hardware such as mobile devices, the software including apps, and the cloud where learning resources reside. Mobile devices don't just enable cyberlearning, however, but are "curiosity amplifiers" that promote it.

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> "The mobile device is basically a curiosity amplifier. It [provides for] interest-driven learning, learning on demand."
>
> John Seely Brown, Independent Co-Chairman, Deloitte Center for the Edge

- **The learning resources,** open source and proprietary, that reside on devices and in the cloud, including apps, blogs, software, e-books, etc.
- **Assessments.** Assessment in mobile learning is about more than digitizing traditional tests but includes new forms of testing, measuring 21st-century skills and competencies.
- **The policies** that make the infrastructure work, make it sustainable, and make it capable of continuous improvement.
- **Skilled educators,** without which any infrastructure doesn't do much good. People are the most crucial component of learning infrastructure.
- **Professional development** for teachers, showing them how to create and optimize cyberlearning opportunities.
- **Peer culture.** Peer culture interacts with interest-driven and academic learning, creating a third kind of learning ecology. The peer culture affects how enthused and engaged about mobile learning students become, and whether they live up to teachers' activity expectations (e.g., working in a team on online research and sharing findings with other teams). There is a "coolness factor" that needs to be present for optimal cyberlearning.
- **Contextual environment.** Learning contexts should be designed for optimal experiences. That means paying attention to all aspects of the environment: the kinds of interactions people have there, the materials and tools they will use, the activities they will do, and the outcomes that will be targeted.

> "Cyberlearning is an informal kind of learning but a very powerful kind that our infrastructures have to be able to support."
>
> John Seely Brown, Independent Co-Chairman, Deloitte Center for the Edge

Several critical pieces must be in place for infrastructure to best serve its ultimate goal of promoting understanding.

The pull model vision of education is not only about knowing things but also about doing things. Learning through doing is heavily dependent on enabling infrastructure.

For the infrastructure to achieve the potential of this vision, Dr. Kolodner has identified several critical elements that must be in place:

- **Imagination about the possibilities.** Cyberlearning is about more than accessing and sharing; it is ultimately about facilitating understanding. What's needed is more software that invites curiosity and contributes to deep understanding. A good example is the Noah app, which allows people to describe spottings of animals and plant life, contributing to a global database. Skilled people need to have imagination about the possibilities in order to create the cyberlearning infrastructure that above all promotes understanding.

> "Imagination about the possibilities is really essential to making this vision [of education] happen. Beyond accessing music, beyond accessing information, beyond supporting communication . . . is understanding."
>
> Janet Kolodner, Regents' Professor in the College of Computing, Georgia Institute of Technology

- **Humility about the challenges.** The challenges in technology development and skill development are great. The mere existence of learning apps and the mere presence of student excitement are no guarantees that learning is occurring. The roles technology and people have to play for learning to happen systematically need to be better understood.

  Humility is also in order because educators have to give up some control in the classroom as they learn together with the students.

> "You've got to be completely comfortable with your kids asking you questions and your being clueless."
>
> John Seely Brown, Independent Co-Chairman, Deloitte Center for the Edge

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- **Intensive professional development for numerous stakeholders,** including teachers, administrators, policymakers, parents, even perhaps religious leaders. Everyone who is interested in helping people learn or in creating learning environments could benefit from professional development focused on leveraging cyberlearning.

> "Professional development needn't be about technology as much as about how people learn—what it takes to really understand something, really gain expertise. We want students who can think . . . not just follow recipes."
>
> Janet Kolodner, Regents' Professor in the College of Computing, Georgia Institute of Technology

- **A focus on materials and their usage.** This means using a wide range of different tools in different ways, for different purposes. It means exploring how specific devices—such as iPads—can be most effectively used across various venues.
- **Curriculum units that leverage technology to promote the deep understanding that comes from doing.** Curriculum units would include project-based and problem-based activities, such as case studies, that develop 21st-century skills. Important competencies for the future will be inquiry skills, the ability to explain knowledge, and the ability to integrate diverse learnings, connecting them coherently.

> "We want people coming out of our education system with some coherency to the things they know and are able to do."
>
> Janet Kolodner, Regents' Professor in the College of Computing, Georgia Institute of Technology

The most important component in all of the above is skilled people who understand the vision of cyberlearning.

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PLENARY SESSION EXECUTIVE SUMMARY

FROM THE FRONT LINES: TEACHERS' VIEWS ON MOBILE LEARNING IN THE CLASSROOM

Moderator: **Julie Evans**, CEO, Project Tomorrow
Panelists: **Dana Delle Donne**, Academic Technology Director, St. Elizabeth High School
Bill Donovan, Fourth Grade Teacher, Jamestown Elementary, Arlington Public Schools
Joan Le, Science Teacher, Washington-Lee High School, Arlington Public Schools

Overview

As the front-line teachers in this conversation made clear, mobile technologies are transforming the learning experience and having a significant impact on learning. These technologies are engaging students, extending the classroom, giving students greater control over how, what, and when they learn, and changing how teachers teach. Teachers are "letting go" and giving students more latitude to decide what they want to learn, with the teacher there to assist and guide them. Parents—thought by many to oppose the use of mobile technology in classrooms—are actually demanding greater use of technology and are driving its adoption.

But leveraging mobile technology to transform education is a work in progress. Many teachers still need to be "moved along" so they are comfortable incorporating technology in their class, which starts with the support of administrators who encourage experimentation. Other challenges that must be addressed include financial issues and technology/capacity issues.

Despite the challenges, the panelists are optimistic about the opportunities for mobile learning. They envision more individualized learning, greater use of Augmented Reality (both inside and outside of classrooms), and teachers connecting with students in a more collaborative process of discovery that helps create lifelong learners.

Context

Moderator Julie Evans provided background information about the context for mobile learning in the classroom. Next, a panel of three teachers—two high school teachers and a fourth grade teacher—each with personal experience implementing mobile technology in their classrooms, shared their experiences regarding the impact of, challenges in, and opportunities for implementing mobile learning.

Key Takeaways

Perceptions of mobile learning and an understanding of best practices are evolving rapidly.

Based on evidence about the impact of mobile learning from evaluation studies and the National Speak Up Research findings, Ms. Evans shared four insights from the front lines about teachers using mobile learning:

1. **Implementation success depends upon the teacher.** The teacher matters greatly.
2. **A teacher's personal value proposition drives adoption.** It is becoming increasingly apparent that teachers' familiarity with mobile technology heavily influences its rate of adoption in the classroom. The more that teachers use mobile technology personally, the more receptive they are to deploying a range of different mobile devices in their classroom.
3. **This remains a learning process for all.** Implementing mobile learning is still a work in progress. There is a great deal of experimentation and trial and error happening.
4. **Some teachers are embracing a "let go" philosophy** in terms of trying new things and trusting students to take the lead in learning, and many are seeing fabulous results.

Finally, a mobile learning tipping point may be at hand. For the last several years, Project Tomorrow's Annual Speak Up survey has asked teachers and administrators about the benefits of using mobile devices in the learning process. The difference between what respondents said in 2007 and what they said in 2011 is striking, particularly in terms of the perception that mobile learning provides a way to personalize instruction.

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	Teachers 2007	Teachers 2011	Administrators 2007	Administrators 2011
Improves teacher-parent-student communications	35%	55%	31%	36%
Increases student engagement in learning	51%	79%	66%	80%
Provides way to personalize instruction	30%	61%	30%	58%
Develops collaboration and teamwork skills	21%	40%	26%	34%
Develops problem-solving skills	26%	50%	34%	41%
Extends learning beyond school day	45%	58%	47%	58%

Speak Up 2011 National Data Results

"Teachers themselves, as well as the administrators, are realizing that these devices could be an important component of that personalized instruction process."

Julie Evans, CEO, Project Tomorrow

Mobile technology is having a revolutionary impact on classrooms.

The panel reported increasing use of mobile technology in their classrooms.

- Dana Delle Donne said her private high school currently has a BYOD policy and is in the process of rolling out iPads for each student. The reasons for moving from BYOD to iPads are: 1) standardization in knowing that all students will have the same device and experience; and 2) the ability to use a textbook delivery system, which will save money on textbooks and provide students with a more engaging, interactive learning experience.
- Joan Le said her high school has a BYOD (bring your own device) policy and the science class that she teaches has been provided access to a set of iPads for the first quarter of the school year.
- Bill Donovan said his elementary school provides mobile devices for use by students in all grades, although not necessarily at a one-to-one ratio.

Some of the impacts from mobile technology seen by these educators include:

- **Increased student engagement in learning.** Students are connecting with lessons in new and interesting ways. At Jamestown Elementary, for example, pre-K students are using iPads to learn about the alphabet. Fifth-grade students are making eBooks about scientific principles that include text, pictures, and even video. In fact, students consistently ask to incorporate mobile devices into lessons.

"When you look at [eBooks] on the iPad, you can click on the picture of Abraham Lincoln, and 'he' talks to you. Students are fascinated. It's right there in front of them."

Dana Delle Donne, Academic Technology Director, St. Elizabeth High School

- **Extension of the learning experience.** Accessing information through mobile devices makes it faster and easier for students to be exposed to what is happening in the external world, and to communicate and ask questions outside of class. For example, Ms. Le has developed a website, www.thescienceroom.org, where she aggregates Twitter hashtags relevant to her daily lessons. Students can track what people all over the world are saying about topics they are studying.

"Everything is changing . . . these mobile devices make it so that the outside world is constantly flowing through our room. . . . Now my one and a half hour class is just one of the meetings we have; it just happens to be a physical meeting, but class goes throughout the day."

Joan Le, Science Teacher, Washington-Lee High School, Arlington Public Schools

- **Increased student communication.** Students who are reluctant to speak up in class will often engage in lively discussions via social media. Good examples of that are happening in Onslow County Schools through their Project K-Nect and One-to-One initiatives with smartphones, netbooks, and tablets. These projects have been funded by Qualcomm Wireless Reach.

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> "On a visit to Onslow County schools in North Carolina, I talked with a young man who told me about the personal impact of using a mobile device in class. He has serious speech limitations which make him fearful of speaking up in class. Being able to collaborate through social media on the Project K-Nect smartphone opened up a whole world for him."
>
> Julie Evans, CEO, Project Tomorrow

- **Greater student control over their learning experience.** With mobile technology students are more empowered to initiate and lead their own learning experience. Ms. Delle Donne said that students can drive the classroom and lead the class in an entirely new (and exciting) direction. This empowers students by stimulating their natural curiosity and enables them to personalize their educational experiences. It is a process that helps create college readiness and lifelong learners.
- **Improved access to content.** Ms. Delle Donne said that mobile technology has revolutionized how she teaches. Ms. Le agreed. She said mobile and web-based technology allows her to easily and quickly find and incorporate new content into the classroom. Teachers can relay a link to this content to students and parents, and can easily share and store this content.

The panelists were in agreement that the greatest impact of mobile technology occurs when it is seamlessly and naturally integrated into the classroom experience, as opposed to being an add-on.

Many challenges exist to successful implementation of mobile technology in the classroom.

While these teachers see mobile learning as a net positive, they face obstacles when using the technology. Some include:

- **Financial limitations.** When schools rely on a BYOD policy, teachers may struggle with inequitable distribution. Some students do not own suitable devices, requiring that schools fund and provide students with devices. Also, there are costs for infrastructure and support.
- **Unreliable connections.** Technology is great, until it doesn't work. Teachers are realizing they must have back-up plans in place for downed connections.
- **Technical considerations.** BYOD policies mean that teachers must understand how to navigate varying platforms. Students frequently forget passwords or have trouble downloading an application and need assistance. In addition, students may come to school without a device because "a parent took it away" over discipline issues. Teachers must be prepared for those unexpected situations.
- **Safety concerns.** Parents express considerable anxiety over whether social media is appropriate in the classroom. To address those concerns, an Arlington Public School policy requires all messaging to be public so that teachers and administrators can monitor communications. Teachers generally support an approach of "responsible use" as opposed to restricting use. Learning to use the Internet and social media responsibly is a valuable lesson itself. When something inappropriate happens, instead of blaming the technology, there is increasing support for focusing on the student's behavior, making it a teachable moment.

> "I'm hearing a shift in the conversation which is going away from "acceptable use" to "responsible use," with the idea that we have a teaching moment here around digital citizenship."
>
> Julie Evans, CEO, Project Tomorrow

- **Capacity issues.** In the beginning, sharing limited hardware at Jamestown Elementary was a major logistical and coordination challenge. But as more devices have become available, capacity of the school's wireless network is now the biggest challenge.
- **Control issues.** Ms. Le explained that for some teachers, relinquishing some control in the classroom by allowing students to use mobile devices can be a significant challenge. An equally significant challenge is strictly enforcing appropriate use policies. When teachers give control to students they must be strict in ensuring devices are used appropriately.
- **Curriculum issues.** Some curriculum areas, including various AP courses, have a standardized, rigid curriculum, which doesn't necessarily lend itself to integration of mobile technology.

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Over the next few years there is a tremendous opportunity for mobile devices to make individualized learning possible.

The entire panel agreed that perhaps the greatest opportunity provided by mobile technology is the ability to individualize the learning experience in entirely new ways, and for learning to take place both within and outside of the classroom.

When asked to anticipate what the big idea in edtech will be a year from now, the panelists offered the following responses:

- **Augmented Reality.** Ms. Le sees Augmented Reality as fundamentally changing the context of learning, which includes how students learn outside of the classroom, in places such as museums. She can't imagine all of the creative ways that Augmented Reality will be used in the future.

> "[Augmented Reality] outside of the classroom will change the context of learning. . . . Going to a museum and using Augmented Reality in some way that I can't even imagine . . . that's really exciting."
>
> Joan Le, Science Teacher, Washington-Lee High School, Arlington Public Schools

- **Dual learning.** Ms. Delle Donne sees technology as transforming how learning takes place in classrooms. Instead of teachers standing at the front of a classroom and talking, they will sit among small groups of students, learning with them (and classrooms won't even have a recognizable "front"). Teachers will engage and learn with students on topics that are both student- and teacher-driven, engaging in some type of Augmented Reality lab or exploring new applications. A good metric for successful mobile integration will be if students (and classroom visitors) have no idea where the front of the classroom is.

> "We're going to be doing it [learning] together, and that changes the face of what a classroom looks like."
>
> Dana Delle Donne, Academic Technology Director, St. Elizabeth High School

- **A paperless classroom.** Mr. Donovan envisions a paperless classroom where student work is done almost completely on mobile devices, largely eliminating the need for paper.

Parental demand is driving greater use of technology. Making teachers comfortable with it is a necessity.

The panelists are seeing increased parental demand for greater use of technology in the classroom. Ms. Evans said this is consistent with Speak Up data over the past few years, which shows an increased demand from parents who are interested in their children using mobile devices. Parents exert a great deal of influence over how and when mobile technology is deployed in schools, and are increasingly encouraging their children to take classes that incorporate technology or avoid those that do not.

> "Teachers [who aren't using technology] will say, 'Parents are starting to ask when I'm going to start using the technology. Can you show me how?'"
>
> Bill Donovan, Fourth Grade Teacher, Jamestown Elementary, Arlington Public Schools

Teachers that are not completely comfortable (yet) with technology need help in being "moved along." In the view of Ms. Delle Donne, this starts at the top. The most important way that administrators can facilitate change is to help teachers overcome their fear of using this new technology by creating an "environment of trust" where teachers know they will be supported when they try new things.

Other ideas for helping move teachers along include administrators empowering a single person to serve as a technical resource or coordinator. They can also allow teachers to have substitutes so they can monitor other classrooms to see how mobile technology is being used, as occurs at Jamestown Elementary.

Other Important Points

- **For more information** about the Speak Up research findings, visit www.tomorrow.org/speakup.

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PLENARY SESSION EXECUTIVE SUMMARY

POLICIES THAT ENABLE MOBILE LEARNING: FEDERAL, STATE, AND DISTRICT PERSPECTIVES

Moderator: **Brian Lewis**, CEO, International Society for Technology in Education
Panelists: **Jon Bernstein**, President, Bernstein Strategy Group
Richard Culatta, Deputy Director, Office of Educational Technology, U.S. Department of Education
Maribeth Luftglass, Assistant Superintendent and CIO, Fairfax County Public Schools
John Miller, Assistant Director, Office of Instructional Technology, West Virginia Department of Education

Overview

As mobile learning takes off, policies are needed at all levels that promote, not inhibit, mobile learning. The challenge is to develop guidelines that facilitate the use of mobile devices, while simultaneously enabling schools to comply with legal and financial obligations. Local officials want policies that give them flexibility and control over decision making. State and federal policymakers are comfortable with local control and flexibility; they see their role as setting common goals, disseminating best practices, providing funding (in some instances), ensuring compliance, and intervening if and when compliance is not achieved at the local level and local goals are not met.

The panelists shared a common vision for mobile learning: new, low-cost devices and more advanced tools will make true personalized learning possible. But achieving this vision is going to take leadership, creative decisions, and a reimagining of educational models. Schools that simply infuse more technology into the current educational system will be on the losing side of a new digital divide.

Context

This plenary panel was composed of individuals with extensive experience related to the use of technology in education. Richard Culatta, from the Office of Educational Technology at the U.S. Department of Education, brought a federal perspective, along with expertise in creating personalized learning experiences and promoting increased connectivity to improve access to education. A big-picture perspective came from Jon Bernstein, who has expertise on education appropriations, No Child Left Behind, and the E-Rate program.

John Miller, from the West Virginia Department of Education—with responsibility for overseeing all of West Virginia's broadband initiatives, network infrastructure, and other initiatives relating to supporting instructional technology—provided a state perspective. And, Maribeth Luftglass from the Fairfax County Public Schools, the 11th-largest district in the country with 177,000 students and 133,000 computers, provided the perspective of a large district with local control.

The session was moderated by Brian Lewis, who oversees ISTE, which advocates for policies to support mobile learning at all levels. Mr. Lewis led the panel in a discussion of the role of different policymakers in setting mobile learning policies, some of the challenges faced in creating new policies, and the future vision for mobile learning.

Key Takeaways

The federal government, state governments, and local bodies all have important roles to play in setting policies related to mobile learning.

In discussing where policies should be set, panelists offered the following comments:

- **Locally.** The panelists agreed with Maribeth Luftglass's assertion that mobile learning policies should be established locally, where they can be flexibly tailored to the local context. In fact, Ms. Luftglass emphasized that her district lets schools and even teachers make their own decisions about whether and how mobile technologies will be used in the classroom. While providing discretion to schools and teachers, the district strongly advocates the incorporation of mobile learning in teaching and has embraced a Bring Your Own Device [BYOD] policy.

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> "If I could wave my wand, I would certainly like to have all the policies at the local level . . . because the more classroom-level decisions and school-based decisions and district-level decisions, the more flexible you can be."
>
> Maribeth Luftglass, Assistant Superintendent and CIO, Fairfax County Public Schools

- **States.** Per John Miller, in West Virginia, districts are allowed to adopt policies and make decisions locally. But the state is working to expand broadband access, has revised its policies in areas such as acceptable use, and has provided policy guidance to districts in the use of mobile devices for purposes like social media. The state of West Virginia also sees itself as playing a key role in sharing best practices and intervening if a district isn't making adequate progress in meeting the established goals.

> "We allow districts to adopt their own policies and make decisions locally. What we try to do as a state is model best practices and put things in the policy that encourage them to do the right things."
>
> John Miller, Assistant Director, Office of Instructional Technology, West Virginia Department of Education

- **Federally.** Richard Culatta and Jon Bernstein both see the federal government as serving a critical convening function, in bringing together multiple stakeholders to form a common agenda. An example shared by Mr. Culatta is work by the U.S. Department of Education in bringing together vendors and charging them with building certain types of educational tools. Mr. Bernstein emphasized the value of the E-Rate program, funded by the federal government (and discussed further below).

Brian Lewis. Click to watch video.

Even after policies are established, challenges exist in getting them implemented.

A few examples were shared illustrating the difficulty in implementing certain policies:

- **Assessments.** Mr. Bernstein described how states are supposed to be able to deliver online assessments in 2014. But he mentioned a recent survey which indicated that they are not yet ready, and that many states are worried about whether they will be ready by 2014.
- **BYOD policies.** Ms. Luftglass explained how despite having a BYOD policy in the Fairfax County schools, many teachers still refuse to allow students to use their own personal devices in school. Mr. Miller sees the same thing in West Virginia, where some districts still view student-owned devices as a distraction that should be banned as opposed to an opportunity to "expand the classroom" for anytime, anywhere learning.

  Other challenges in implementing the BYOD policy in Fairfax County include making sure that students register their devices and that students use the school's filtered network. Registration is important because it reduces theft and loss of devices, which is a major concern of parents. Using the filtered network is important because it is an essential part of compliance with federal law. In both instances the challenge that Ms. Luftglass is experiencing is getting students to abide with these directives.

Other important and relevant policies, which can be challenging to implement, include acceptable use policies, behavior policies, and policies related to social media.

Multiple stakeholders and factors play a key role in shaping mobile learning policies.

Beyond federal, state-level, and local policymakers, the panelists described other groups and factors that affect, or could affect, mobile learning policies:

- **Parents.** Mr. Culatta believes that parents can be even more involved in shaping policies that support mobile learning, but that parents need to be educated about these technologies and need to be provided with real-time assessment data.
- **Industry.** Mr. Bernstein made clear that industry and vendors are at the table, are engaged, are extremely focused on the use of technology in education, and are involved in discussions about policies in this area.

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- **Transparency.** Mr. Culatta described how the FCC has just announced that E-Rate purchasing information will be made public. This new level of transparency will provide schools with better information when negotiating technology and broadband contracts.
- **Longitudinal research.** Mr. Miller argued that to influence policy the industry needs good, credible longitudinal research that shows the value and benefits of mobile learning.
- **Public relations.** In Mr. Miller's view, the edtech industry could use a PR campaign. There have been multiple stories in publications such as The New York Times that have questioned the value, costliness, and effectiveness of technology in education. The industry has great stories to tell, and needs a concerted PR campaign to tell these stories.

The digital divide of the past is closing, but a new type of digital divide is emerging between those who cling to past practices and those who embrace the future.

Experiences in Fairfax County and West Virginia reveal that even the poorest students today typically have access to mobile devices. For example, Fairfax County schools have 30,000 students on free and reduced lunch, yet officials there estimate that as many as 95% of those students have some kind of mobile device. In West Virginia's poorest district, Dale County (which is also the poorest district in the country), a lack of certified geometry teachers forced the county to offer a virtual course. When participating students began watching an online orientation video for the course, administrators were surprised to see that most of them pulled out smartphones.

One way to interpret the fact that most teens own digital devices is that the digital divide is closing. However, Mr. Bernstein said that just having devices doesn't tell the entire story. He said that districts in many states still don't have enough computers to conduct online assessments, or they don't have the right computers, enough bandwidth, or adequate technical support. In addition, there remains a divide between students whose families can afford computers and broadband access at home and those who cannot. Thus, the playing field is still not completely level.

At the same time, Mr. Culatta sees a different type of digital divide emerging. The good news is that the digital divide of the past, which was largely economic, is greatly diminished. This new digital divide is between those school districts that simply layer new technology on top of traditional, outdated teaching practices and those that are reimagining learning, changing their culture, and then using technology to support this new way of learning.

> "I worry about simply layering technology on top of old teaching practices. . . . The best technology conversations I'm in are ones that don't start talking about technology. They start with a learning outcome, culture change, and then at some point how technology can support it."
>
> Richard Culatta, Deputy Director, Office of Educational Technology, U.S. Department of Education

Richard Culatta. Click to watch video.

In contemplating the future, the panelists are excited about the potential for personalized learning.

The cost of mobile technology already has come down significantly, and all of the panelists expect that over the next five years the costs of mobile devices will continue to fall—making mobile technology even more accessible and ubiquitous.

As technology becomes both more sophisticated and affordable, schools will be able to focus on personalized learning, resulting in individualized education plans for all students. Mr. Culatta described how in the absence of technology, individualizing education is impossible for a high school teacher who teaches six periods with 30 students per period. But technology will make personalized learning possible.

> "Technology enables us to do [individualized education plans] at scale."
>
> Richard Culatta, Deputy Director, Office of Educational Technology, U.S. Department of Education

Ms. Luftglass sees that over the next five years, technology will also make it possible for students to access the best and brightest teachers, regardless of where the student and the teacher are

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located. Whether students live in affluent or non-affluent areas won't determine whether they have access to top-notch education.

Mr. Miller sees the development of entire platforms and new content that can be accessed by students at any time, from any location, through their mobile devices. Mr. Culatta sees a future where schools will be able to connect personalized learning with personalized outcomes. Instead of holding schedules constant and allowing learning to vary, real-time assessments will enable schools to flip that approach. Students will be required to show mastery of standards at each level—even if that means allowing the schedule to vary. (Mr. Miller suggested that ultimately, the concept of "grades" could potentially be eliminated and students could advance at their own pace as they achieve mastery in a particular subject.)

John Miller. Click to watch video.

However, even though progress is being made in attaining this vision of personalized learning, Mr. Miller cautioned that we aren't there yet. No company was able to deliver on an RFI issued by the state of West Virginia for a personalized learning platform. He indicated that companies are getting closer and are creating great new tools, but much work still needs to be done.

In addition, the panelists pointed out that further investments are required to continue to build out the necessary technology infrastructure and further efforts are needed to address core equity issues. Mr. Bernstein observed that not all districts have the resources or leadership as in Fairfax County.

Funding for the E-Rate program has failed to keep pace with the rising costs of technology.

The E-Rate program provides assistance to schools and libraries for purchasing telecommunications equipment and Internet access. As Mr. Bernstein explained, "E-Rate is fantastic," and has provided valuable "plumbing" for technology in schools. But the program's annual funding was established in 1998 and has not been modified in 14 years, despite the enormous growth in technology, telecommunications, and wireless. E-Rate is now seriously underfunded.

> "The E-Rate program has run out of cash and is hurting. . . . There are serious structural issues in the financing of the E-Rate program that need to get addressed or we're going to start seeing a real downturn in its ability to finance what needs to get financed."
>
> Jon Bernstein, President, Bernstein Strategy Group

Spending on traditional infrastructure and broadband access is taking the majority of available funds, leaving next to nothing for the conversion to wireless technology. Mr. Bernstein argued that with BYOD programs and other school initiatives that rely on wireless, the E-Rate program has to grow to be able to accommodate all of the demand for wireless.

He believes that local policymakers—who haven't made E-Rate a priority in recent years—will begin doing so when they see that there is less E-Rate funding to go around and begin feeling a pinch. He sees a need for bottom-up support, where schools and districts tell their stories, along with the need for top-down leadership. Mr. Bernstein issued a call to action to everyone at Wireless EdTech 2012 to contact the FCC and members of Congress.

Other Important Points

- **Achieving consensus.** In December 2011 the Consortium for School Networking (CoSN) brought about 20 associations together and built consensus on various mobile learning policies. This consensus is capturing in *Making Progress*. Key elements of consensus were: 1) banning is not the answer; 2) students must be educated on responsible use; 3) professional development for staff should be emphasized; and 4) it is necessary to rethink appropriate use policies.
- **Speed test.** A free test is available to test the Internet connectivity speed at any school. This test can be accessed at www.educationsuperhighway.org.

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Wireless EdTech CONFERENCE 2012

Wireless Reach™ from Qualcomm

BREAKOUT SESSIONS EXECUTIVE SUMMARY

WHAT'S HAPPENING NOW IN MOBILE LEARNING

Overview

A tremendous amount is happening right now in mobile learning. The number of mobile devices used in schools is rapidly increasing, the cost of devices is decreasing, and more schools are taking the leap, often by deciding on BYOD (bring your own device) policies. As more and more districts embrace mobile learning, educators are gaining a deeper understanding that they need a robust infrastructure to support mobile learning; they must invest not just in technology, but also in professional development; they must make safety and security high priorities, involving all stakeholders in collaboratively developing appropriate use policies; and they must form and leverage partnerships with multiple stakeholders, particularly those who can help deliver compelling educational experiences outside of the classroom.

While the challenges are significant, the general belief of the panelists in these breakout sessions is that mobile learning can play a key role in transforming education. It can lead to more personalized, more immersive learning experiences that take place both in the classroom and in the larger community. And, the opportunities for mobile learning don't reside just in the United States; they are truly international.

Context

Across four breakout sessions, panelists from diverse backgrounds and experiences shared their perspectives on what is happening today in mobile learning. They described the status of mobile learning in the United States and examined the state of the infrastructure to support mobile learning, along with safety and security issues. They also discussed the role that partnerships play and offered perspectives on the international landscape for mobile learning.

Key Themes from Breakouts

Mobile Infrastructure

The breakout session titled *Mobile Infrastructure: State of the Art Strategies* was moderated by Michael Flood, vice president for education markets at Kajeet. Mr. Flood explained that Kajeet is a wireless carrier focused on kids and education. This includes a focus on the consumer market, with emphasis on devices, technology, and connectivity, as well as working on multiple types of mobile implementations with educational institutions.

> "We don't believe there is a single [mobile learning infrastructure] solution. . . . There's a lot of pieces that have to happen."
>
> Michael Flood, Vice President, Education Markets, Kajeet

Panelists

The panelists provided different perspectives on the infrastructure needed to support mobile learning. As the director of technology, Rena Seals serves 1,100 students in the Piedmont City School District in Piedmont, North Carolina. Steve Clemons, who is the chief technology officer for the San Diego County Office of Education, supports 42 districts in the county with about 400,000 students. And Janet Davis, associate director of wireless education strategy and sales support at Verizon Wireless offered the viewpoint of a major vendor with a nationwide perspective, where every state is different.

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Session Context

With mobile learning at an adolescent stage—no longer emerging, but still far from mature—it is important to understand the types of infrastructure-related decisions that educational institutions must make to support further advancements in mobile learning. Among the key questions the panelists discussed were:

- What are the key infrastructure models that are prevalent now?
- What are the pros and cons of the different models such as BYOD vs. school-provided devices?
- What information and support are needed to help decision makers choose among these options?

Districts and vendors are working rapidly to create the complex infrastructure needed to support mobile learning.

Exploding Demand

Each of the panelists described how the demand for mobile learning is exploding. Steve Clemons said that, "Districts are moving very fast in terms of mobile devices." This is the case in San Diego County, which is in the process of rolling out over 40,000 iPads.

While the scale is smaller, the pace of technology adoption is just as fast in Piedmont. The district began a pilot with 30 MacBooks at the beginning of the 2009/10 school year, which grew to 120 at mid-year. The district has since gone to 850 Mac Books, with a vision of using technology in education to "transform our community."

Janet Davis sees this momentum across the country, but noted that every state and every district is different.

Infrastructure Components

The panelists noted how complex the infrastructure is and how many components it involves. They also were in agreement that infrastructure includes far more than hardware. It also involves connectivity, content, and human capabilities.

> "The hardest part for us is . . . not to just go out and buy a device, but to think of the overall architecture."
>
> Steve Clemons, Chief Technology Officer, San Diego County Office of Education

Among the components of infrastructure discussed were:

- **Network.** An infrastructure starts with the network and network architecture that provides connectivity to the Internet. Networks must have adequate capacity and bandwidth to support a school's needs as more students use mobile technology for a greater amount of time. Networks must also be able to support students even outside of the schools.

> "The thing that we are lacking is high-speed Internet bandwidth. Without that, mobile learning is not going to continue."
>
> Rena Seals, Director of Technology, Piedmont City School District

- **Devices.** Obviously, mobile learning requires having enough mobile devices. Districts both large and small are providing mobile technology and adopting BYOD policies.
- **Software.** For mobile learning to have value, the infrastructure must provide access to applications with rich content and must support various software applications. A challenge, especially in a BYOD context, is dealing with multiple device operating systems and multiple types and versions of browsers. In addition, a key component is integration with a learning management system.
- **Student information system.** In addition to the infrastructure supporting mobile learning inside and out of classrooms, ideally, an infrastructure will support and enable a student information system. This requires being able to aggregate and access data about each student's progress.
- **Email platform.** An effective platform doesn't just enable access to the Internet; it allows for communication. Therefore, schools may want their infrastructure to include an email platform.
- **Cloud-based storage.** Increasingly, storing information is important, and the panelists suggested cloud-based storage. In San Diego County, Mr. Clemons is providing a private cloud infrastructure to host educational applications for all schools and students in the county.
- **Tech support.** A functioning infrastructure doesn't just get built; it requires ongoing technical support as problems will inevitably arise that require support. (One solution is for multiple districts to work together to share the costs of support.)

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- **Teacher readiness.** Multiple panelists commented that the mobile learning infrastructure is not just about technology. It must include professional development that transforms how teaching and education occur.

While each individual component of the infrastructure is important, even more important is the integration of all of these components so that they work together.

> "It's great to talk about the device. It is great to talk about connectivity. But the reality is, it is when you bring everything together that you start to have a holistic solution."
>
> Janet Davis, Associate Director, Wireless Education Strategy & Sales Support, Verizon Wireless

Leadership

An important insight is that a good infrastructure requires leadership support and having a technology and mobile learning leader. Large districts might have a chief technology officer; but even small districts, like Piedmont City School District, must have a director of technology.

Build or Buy

An important decision that educational leaders often confront is whether to build or buy aspects of their infrastructure. Many districts have adequate expertise, want to retain control, and therefore prefer to build it themselves. But Mr. Flood summarized the discussion by saying that, if the infrastructure is multipurpose and if scale is important, then districts may lean toward purchasing.

Ongoing Support

Creating an infrastructure that supports mobile learning is not a one-time undertaking, but is an ongoing process. It requires a vision, leadership, planning, and the ongoing support and involvement of multiple stakeholders.

Having a robust technical and human infrastructure is a necessity to leverage mobile technology in transforming learning experiences.

Safety and Security

Shawn Gross, managing director of Digital Millennial Consulting, moderated the breakout session *Safety and Security in 2012: New Approaches for Responsible Use Policies*. Mr. Gross implemented the Project K-Nect Wireless Reach project in North Carolina.

Panelists

The panelists for this session offered differing perspectives on safety, security, and appropriate use policies. Mark Shue is the principal at Red Lion Area School District in eastern Pennsylvania, which has nine schools. Becky Fisher is the director of educational technology, professional development, and media services at Albemarle County Public Schools in central Virginia. Albemarle County has 26 schools and 13,000 students. Also on the panel was Mike Lorion, who is the vice president and GM of education at Common Sense Media. This organization is a California-based not-for-profit that creates free curriculum tools focused on all levels of K–12. These tools deal with Internet safety, digital citizenship, and information and research literacy.

Session Context

As student, teachers, and parents are increasingly mobile device users, those experiences are reshaping the way that districts approach safety and security. Among the main issues the panelists were asked to respond to were:

- What are the current issues around student safety and security with mobile devices, and how are schools and districts addressing these issues?
- What new solutions or approaches exist today that should be better leveraged?
- Beyond providing safety and security, how can we help students become responsible users?

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Schools embracing mobile learning want positive school cultures where learning is advanced in a safe, responsible way.

Approach to Safety and Security

Mike Lorion emphasized that instead of just starting by creating a specific policy, a district should first have a vision for mobile learning and should understand the norms for the usage of mobile technology. He stressed that a community's norms are more important that written policies. With a vision and norms, policies should be developed in a collaborative manner, involving all stakeholders. Mark Shue and Becky Fisher strongly agreed with this collaborative approach.

> "Start with a vision, understand the norms, make sure you educate kids at every level, and then work your policy into what you've taught them."
>
> Mike Lorion, Vice President & GM Education, Common Sense Media

Mr. Shue also recommended that any policies that are developed be completely aligned with existing district policies, such as board policies, student handbooks, and teacher handbooks. As Mr. Shue said, "I know it's minutia and it's bureaucratic, but they have to align."

In Mr. Shue's view, also important in the approach of developing acceptable use policies is understanding where students are and engaging them by "meeting them where they are."

Policies Related to Safety and Security

The panelists were in agreement that schools pursuing mobile learning must be guided by rules and policies. Mr. Gross summarized that safety and security are broad topics, encompassing the safety of devices, data, the entire network, and most importantly, of students. Important considerations include:

- **Laws and regulations.** Mr. Lorion reminded session attendees that to receive E-Rate funds a district must be compliant with CIPA (the Child Internet Protection Act). CIPA includes several requirements around Internet safety, education around anti-bullying, and more. So to comply with CIPA, schools must have necessary safety and security programs in place.
- **Acceptable use.** Ms. Fisher explained that schools in Virginia must have acceptable use policies, though she prefers the term "responsible use." She believes that the purpose of such policies is not to restrict students but to guide them in making better choices.
- **Filtering.** If not mandated by law, the educators on the panel would prefer not to have filtering, and they hope it can be avoided in the future. Their preference is not to restrict use and access, but to emphasize positive norms, behaviors, and good decisions.

> "My philosophy would be . . . that there won't be filtering . . . we have an acceptable use policy and you monitor their traffic. Why are you going to monitor on top of that? . . . Essentially it boils down to good classroom management."
>
> Mark Shue, Principal, Red Lion Area School District

Mike Lorion understands the argument not to filter, but he cited data indicating that currently only 26% of teachers think their districts provide adequate digital citizenship education and Internet safety education. In the absence of such education, Mr. Lorion believes that filtering is still important. Also, a risk addressed by filtering is not just what students might access; it prevents outsiders from coming into a network and students from being tracked by outsiders.

Training

Despite the importance of security, the panelists were in agreement that most districts do not provide teachers adequate training around safety and security and are not prepared enough in this area. Becoming more prepared and creating a safe environment requires a continual dialogue among all stakeholders, including teachers, administrators, parents, and students.

> "It takes a village to keep a kid safe."
>
> Becky Fisher, Director of Educational Technology, Professional Development, and Media Services, Albemarle County Public Schools

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Additional Resources

Additional resources for those interested in security include:

- **Common Sense Media**, which has tips for parents and a kit to hold a parent media education night. Go to: www.commonsensemedia.org.
- **F3** is a California law firm that represents about 400 districts in the state and has a good website on policy information: http://www.fagenfriedman.com.

Partnerships

In moderating the session *Mobile Learning In and Out of School: Leveraging Diverse Partnerships*, Kristin Atkins, senior director of Wireless Reach at Qualcomm—who runs Qualcomm's Wireless Reach initiative—described the company's activities using wireless technology for social good. Qualcomm is involved in 73 projects in 31 countries, with many of these projects focused on education. Partnerships are critical to Wireless Reach's success.

> "Without partnerships our programs would not be successful because they are built from the ground up to be scalable and sustainable for other communities to take on."
>
> Kristin Atkins, Senior Director, Wireless Reach, Qualcomm

Panelists

This panel provided the perspectives of a practitioner (the superintendent of a rural district), a major museum, and a technology entrepreneur, and discussed the important role that partnerships play in advancing mobile learning.

Kathy Spencer is the superintendent of the Onslow County Schools, a rural school system in North Carolina with 25,000 students that has led her district in adopting innovative technology, tools, and processes. Sesh Kumar is the founder and CEO of Emantras. He has led the development of several edtech products and his ambition is to initiate a global education reform to enable technology to deliver quality education, which facilitates better learning.

Jeff Meade is the mobile learning program lead at the Smithsonian EdLab. In this capacity he coordinates educational programs aimed at increasing learning relevancy and the use of digital media in a meaningful way.

Session Context

The always-on, anywhere dimension of mobile devices provides unparalleled new opportunities for 24/7, on-the-go learning. To capitalize on these opportunities, new partnerships are emerging that extend learning beyond the classroom. In discussing how to most effectively leverage these partnerships, the panelists tackled the following questions:

- How are schools, museums, libraries, and other informal learning providers leveraging new partnerships to extend learning opportunities?
- What are the hallmarks of effective mobile learning partnerships?
- What types of supports are needed to extend the reach of schools and informal learning providers?

In developing all aspects of mobile learning—particularly learning outside of the classroom—partnerships among multiple stakeholders are essential.

Partnership in a Rural Context

In the view of Kathy Spencer, there remains a big gap in the resources available for mobile learning for rural districts. However, that gap can be overcome through partnerships, as has been the case for the Onslow County Schools. A key partnership for this district has been through Project K-Nect with Qualcomm's Wireless Reach initiative. Through this partnership and others, Dr. Spencer identified the following key elements to a successful partnership:

- **Commitment.** Before a mobile learning initiative is launched, there must be strong, long-term commitment from all of the partners. Dr. Spencer commended Qualcomm's sustained commitment with Project K-Nect. Through this commitment—which has been ongoing—this project has delivered outstanding academic results. Dr. Spencer said, "Developing and leveraging partnerships starts with finding those people who are truly committed to public education."

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- **Leadership.** Embracing mobile learning means doing things differently. It requires innovation and changing long-held practices. These are major cultural changes and aren't easy. Therefore, bringing together partners to transform education requires leaders who are willing to articulate a vision, take risks, and drive change.
- **Experimentation.** Partners need to have flexibility, be willing to start small and grow, and engage in research that measures results along with way.

> "Having the research and having that opportunity for someone to take a risk was huge. Overall, the reason that I believe this works is because there was true commitment from all of those who were involved."
>
> Kathy Spencer, Superintendent, Onslow County Schools

For the Onslow County Schools, funding for technology has certainly been an important part of the partnership, but the partnership has gone beyond that. It has involved funding data plans; ensuring teacher readiness through professional development, research, and external evaluation; and taking risks. Through it all, the commitment and desire to make an impact is what has made Project K-Nect successful for Onslow County.

Partnering to Make Content Accessible

Sesh Kumar said that schools are sprinting to purchase hardware for mobile learning, applications, and to implement BYOD policies. This will only continue as the price of hardware declines. But in his view, tablets, mobile devices, and apps are still seen as "tools" for small, discrete assignments. Missing are complete systems that educators can use to deliver the personal learning that is envisioned, as well as content that makes personalized learning possible. Also, Mr. Kumar asked, "Is the content ready for all this?" His conclusion: no.

To date, schools have either purchased content from a publisher or created their own content. And most of this content is not use usable by mobile devices. Mr. Kumar sees partnerships as the way to make content useable for mobile learning. In one example, a three-way partnership was formed among a district, a publisher, and Mr. Kumar's company. The publisher supplied content which Emantras then "chunked up" into basic pdf files that could be accessed via mobile phones by students in the district. As a next step, Emantras is now building project-based learning for the district, using the same platform. Such platforms and partnerships are how individualized learning, using existing content, can become a reality.

> "This [making a district's content accessible on mobile devices] is almost an impossible task for one group—a publisher or a school—to do this by themselves. That's why partnerships are important."
>
> Sesh Kumar, Founder and CEO, Emantras

Smithsonian EdLab

Traditionally, museum field trips were what happened the day after a big test. There would be a test on Thursday and on Friday teachers took students to the museum, as a sort of goof-off day. Jeff Meade and the Smithsonian EdLab are out to change that. Mr. Mead's goal is for the museum experience to be more connected to the classroom. Mobile technology can play a key role in that students can use technology to explore, investigate, and solve real-world problems.

> "We're trying to make school less about school and more about making education about community investigating and real-world problem solving."
>
> Jeff Meade, Mobile Learning Program Lead, Smithsonian EdLab

International Landscape

Qualcomm's Susan Silveira, senior manager of Wireless Reach, moderated the breakout session *The International Landscape: Success Stories in Mobile Learning Around the World*.

Panelists

The panelists in this session—who have a wealth of international experience—shared success stories and lessons learned from international implementations of mobile technology. Anita Stewart is senior vice president for strategic partnerships and development at Sesame Workshop. She spearheads partnerships that harness the power of media, including mobile and digital platforms, to deliver critical educational messaging to children and families around the

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world. She described several Sesame International Mobile initiatives. Anthony Bloome is senior education technology specialist at USAID. He provides advice and coordinates the exchange of good practice experience in the appropriate use of information and communications technology, particularly in developing countries. Michael Trucano is senior ICT and education policy specialist at the World Bank. He has provided advice and technical support to education projects in over three dozen countries.

Session Context

Mobile learning is truly a global phenomenon, and experiences from diverse projects around the world provide valuable input for new innovations and creativity throughout the education enterprise. Big questions this panel focused on included:

- What are some examples of success stories from around the world?
- What are the critical factors that have propelled these successes?
- What are lessons learned from these projects that could be valuable for new implementations?

What's happening now in mobile learning is truly international in scope, with success stories from around the world.

Low-Cost Technology

Low-cost wireless technology is already common in many countries—such as India, China, and Brazil—and the prices continue to come down. Michael Trucano told of recently being in a very poor area of Brazil, where 18 out of 19 students had mobile phones. He said that "things are really, really hyper low cost." Anthony Bloome agreed, indicating that low-end smartphones can be purchased in Kenya for $30.

> "From our [Qualcomm's} perspective, anything that is connected and is portable can be mobile."
>
> Susan Silveira, Senior Manager, Wireless Reach, Qualcomm

Sesame Workshop Pilots and Commonalities

For more than 40 years Sesame Workshop has developed educational content for children across the globe, focusing on early childhood education, mainly among the underserved. Currently the organization has exciting initiatives that leverage mobile technology to address literacy and health issues in developing countries. As the cost of technology comes down, the ability to reach children around the world with high-impact educational content goes up.

Sesame International's current mobile initiatives include:

- **Radiophone (India).** This project, which is being done in conjunction with Qualcomm as part of Wireless Reach, uses a feature phone with video capability. It has impact through the curriculum, which focuses on health; through the interaction it facilitates; and through the device, which makes learning easy.
- **Mobile Classroom (India).** This program uses mobile technology to improve teacher/classroom quality in 150 government preschools.
- **Learn to Read: Read to Learn (India).** This is a joint project being conducted with USAID that involves providing tablets and pico projectors to 200 schools in India, along with teacher training software.
- **Let's Get Ready!** (China). This is another project, in development, as part of Qualcomm's Wireless Reach initiative that will focus on using wireless technologies in China to help families and young children prepare for an emergency.

> "The most important thing that Qualcomm and USAID and many of our other partners have done is allow us to . . . start the learning so we can bring [these programs] to scale."
>
> Anita Stewart, Senior Vice President, Strategic Partnerships & Development, Sesame Workshop

Among the commonalities from these mobile pilots and from other Sesame International initiatives are:

- **All forms of technology.** Sesame uses the power of all forms of media and communication, on all types of technologies and devices, to express educational curriculum.
- **Customized and localized to the country.** Sesame's model has been to develop content that is very specific to a country, with advisors in that country, including teachers and ministries of education and health.
- **Looking at the whole child.** This includes looking at children from a cognitive, health, social, and emotional situation, and developing content appropriate for them.

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- **Conducting outreach.** Sesame engages in outreach programs to bring the content it creates to the population.

USAID's Focus

USAID has traditionally explored a variety of technologies across a variety of sectors. Two recent initiatives involve "Grand Challenges" that have focused on identifying innovations for promoting early reading (with more information at www.allchildrenreading.org) and convening an education alliance among players interested in using mobile technology for education on a global basis. The Mobiles for Education Alliance seeks to avoid duplication in this area. More information is available at www.meducationalliance.org.

In addition to these two grand challenges, USAID is focused on:

- **Open source.** Knowing that a role of government is to convene and facilitate discussions in solving difficult problems, USAID wants to spark the creation and sharing of ideas, particularly from non-traditional players.
- **Evaluation.** USAID wants rigorous independent evaluation of opportunities to leverage mobile technologies.

> "A really important underpinning is evaluation: rigorous independent evaluation of opportunities to leverage the power of mobile technologies."
>
> Anthony Bloome, Senior Education Technology Specialist, USAID

Lessons Learned

Based on their exposure to multiple mobile learning pilots around the world, participants shared their observations on some lessons learned, which includes things to avoid to improve future implementations.

- **Using existing technology.** Mr. Trucano finds it ironic and unfortunate that in many situations significant investments will be made to purchase technology for schools, yet the use of mobile phones—which are broadly owned by students—are then banned. Both Mr. Trucano and Ms. Stewart emphasized the need to provide content on devices that already exist. Leveraging existing technology is critical to be able to quickly scale successful programs.

> "How do we take advantage of this diversity of devices . . . that students are already using?"
>
> Michael Trucano

- **Family use of phones.** Ms. Stewart has observed that in some countries the fathers wanted to use the phones that were provided to their children at schools; this shows the need to understand the cultural context in which technology is provided.
- **Education outside of school.** Not only does a mobile device enhance learning within schools, but Ms. Stewart sees mobile devices as enabling learning anytime, anyplace.
- **Personal connection.** Mr. Trucano has observed that students often form personal connections to their mobile devices, which enhances the learning experience.
- **Governmental silos.** Around the world Mr. Bloome sees silos in how governments think about the use of technology in schools. One group may think about the use of technology for teacher professional development, while another group thinks how students will use technology in the classroom, and still another group focuses on another application of technology in education. He sees the need for ministries of education to think more holistically.

Other Important Points

- **Flash drive capacity.** A 1GB flash drive will hold over 5,000 books of 200 pages each. Mr. Trucano said that it won't be long before we have terabyte flash drives that will hold over 4 million such books.

Summary

The sessions dealing with What's Happening Now in Mobile Learning showed that in fact, a great deal is happening. Interest in and demand for mobile learning is exploding in the United States and around the world. To meet this demand, policies are being established related to BYOD, acceptable use, and multiple other topics; infrastructure is being built to make mobile possible; and partnerships are being formed between schools, vendors, government entities, nonprofits, museums, and other stakeholders to transform education in classrooms and beyond. But we still have many challenges to overcome before mobile learning is adopted globally.

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Wireless EdTech CONFERENCE 2012

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BREAKOUT SESSIONS EXECUTIVE SUMMARY

TACKLING THE CHALLENGES TO EXPANDING MOBILE LEARNING

Overview

Mobile learning in schools has entered the adolescent phase. Schools are seeing the benefits of successful implementations, momentum has been built, and best practices have emerged.

Still, several challenges exist that must be addressed in order for mobile learning to reach its full potential. Key challenges include the need for professional development, using technology for assessment, dealing with funding issues, and addressing persistent issues of inequity. In each of these areas, solutions are being developed to overcome these challenges so that the expansion of mobile learning can continue.

Context

This track was composed of four panel discussions focused on some of the most significant challenges related to mobile learning—in professional development, assessment, funding, and equity—and work towards overcoming these challenges.

Key Themes from Breakouts

Professional Development

The breakout session *Building Educator Capacity: Professional Development for Teachers Using Mobile Devices* was moderated by Kathy Rains, supervisor of technology at the Decatur City Schools in Decatur, Alabama.

> "Professional development needs to be exactly what we want our teachers to be doing for students. It needs to engage them and excite them."
>
> Kathy Rains, Supervisor of Technology, Decatur City Schools, Alabama

Panelists

Each of the panelists in this session is deeply involved in teacher professional development and is focused on ways to incorporate mobile devices in their professional development activities. Barbara Treacy is the director of EdTech Leaders Online for EDC (Education Development Center). EDC prepares teachers through project-based training programs that are delivered online. With the proliferation of mobile devices, EDC develops teacher training for these technologies.

A former chemistry teacher, Jared Mader is now the director of technology at the Red Lion Area School District in Pennsylvania. This suburban district serves 6,000 students with a professional staff of 400 and covers 144 square miles. Mr. Mader is the only person charged with providing technology-based professional development across the district, despite its large physical size.

Tom Carroll is the president of the National Commission on Teaching & America's Future (NCTAF), a non-partisan, nonprofit organization that conducts research and advocates for quality teaching and for schools that are organized for success. NCTAF's philosophy is that quality teaching is achieved not by micromanaging individual teachers through carrot and stick incentives, but by building collective capacity.

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Session Context

Administrators said that helping teachers master new skills is one of the most critical challenges they face in expanding mobile learning. Given the challenges of limited resources, new solutions must be leveraged for professional development. Among the key questions the panelists discussed were:

- What kinds of professional development do teachers need to leverage mobile devices in the classroom, and what are the most effective delivery and support mechanisms for that PD?
- How are we preparing our next generation of teachers to use mobile technologies in instruction?
- How can we tap into the always-on, anywhere aspects of mobile devices to transform teacher professional development?

There are several significant challenges to professional development for mobile learning, but creative PD programs are overcoming these challenges.

Challenges to Be Overcome

In discussing the critical role that professional development plays, the panelists identified several major challenges that must be addressed. These included:

- **Prerequisites.** Mr. Mader emphasized that just providing professional development on mobile technology is not adequate. A district must first have adequate technology; must have policies, protocols, and informed parents; and must have appropriate IT staffing to support mobile technologies. Effective professional development requires a foundation of those elements.
- **Lack of personal familiarity with mobile technologies.** All of the panelists commented that, to use mobile technology in the classroom, teachers must be personally comfortable with these technologies; many teachers are not.
- **Limited resources.** In Red Lion, Mr. Mader is the only certified resource to provide professional development on technology in the district's 144 square miles. This makes creativity and scalability essential in thinking through how professional development is conducted.
- **Lack of time.** With all of the other pressures and time constraints on teachers, it can be challenging to get adequate time for PD that deals with mobile technology.
- **Attrition.** Mr. Carroll pointed out that huge investments are made to hire and train thousands of teachers each year, but five years later, 40–50% have left the classroom. Reasons include feeling unprepared, not having adequate support, feeling isolated and alone, and not seeing a career path.
- **Changing the practice of teaching.** Using mobile devices in the classroom means teaching in new ways. As Mr. Carroll remarked, it means moving from transferring knowledge from teacher to student, to instead learning collaboratively with students. However, teaching in this way means that a teacher has less control and doesn't know all the answers. This can be uncomfortable for many teachers, and requires a change in culture, mindset, and behavior.

> "How can we move the practice of teaching from knowledge transfer to collaborative learning with students?"
>
> Tom Carroll, President, National Commission on Teaching & America's Future

Professional Development Solutions

The panelists shared many ideas for overcoming these challenges and providing professional development that utilizes mobile technology to transform learning. Ideas and solutions included:

- **Personal use.** For teachers to incorporate the use of mobile technology in the classroom, they must be comfortable using this technology themselves. PD programs can have teachers use mobile technology, even for personal purposes, just so they become comfortable with it. Mr. Mader wants staff members to be comfortable using technology before students. Mr. Carroll's perspective was that teachers must not just use mobile devices to facilitate learning, but they must also become mobile learners themselves.

> "I truly believe that our staff needs to be able to use technology personally before they begin adapting it professionally in their context."
>
> Jared Mader, Director of Technology, Red Lion Area School District

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- **Creating a supportive educational community and ecosystem.** Mr. Carroll viewed professional development as "a team sport." He explained that NCTAF launched TLINC® (Teachers Learning in Networked Communities), which is a networked community for novice teachers. It provides professional support communities and access to mentors. Part of the goal is to reduce teacher attrition by creating a supportive learning team. TLINC also works to change the role of schools of education. Instead of just being in the "teacher preparation business," Mr. Carroll believed that education schools need to be in the "educator workforce development business." This involves creation of a continuous professional learning ecosystem where education schools stay connected to their graduates throughout their careers.
- **Making PD efficient and scalable.** Mr. Mader observed that face-to-face training workshops are dying off. To replace them, he conducts a GoToMeeting webinar every week on a different technology topic. These webinars are archived, allowing staff across the district to view and learn from them whenever they want. This makes PD more scalable and efficient, and staff can engage in PD when they desire. Ms. Treacy said that EDC's online courses provide the same benefits of scale, efficiency, and enabling practitioners to decide when to access the course.
- **Identifying the instructional design problem.** The most common problem that Mr. Mader had seen is when teachers become enamored with a technology and put the technology first. He believed in flipping the model and starting by identifying the instructional design problem, then finding the technology that best fits the solution.
- **Support to experiment.** Changing the culture of education so that learners have more control will be a process of exploration and experimentation for teachers. For teachers to get comfortable in this environment, the panelists felt strongly that administrators must create a culture when experimentation is encouraged, not penalized. Mr. Carroll advocated creation of a "safe culture" where administrators encourage exploration, recognize that some experiments will fail, and always have teachers' backs.

> "The leadership in the school has to create a safe space, a culture of professional growth in learning that says, 'We support your continued exploration challenge. . . . We're backing you as a learner.'"
>
> Tom Carroll, President, National Commission on Teaching & America's Future

- **Personal growth.** Professional development is about far more than just showing a teacher how to use a smartphone and how to incorporate it into the curriculum. It must be about personal growth. Ms. Treacy actually preferred the term "professional discovery." It should be about teachers learning how to discover what they need to know, passing on that capability to students, and inspiring students to learn in self-directed ways.

> "We can look at professional development not as teachers getting developed but as teachers learning how to discover what they need to do and how to inspire that approach in their students."
>
> Barbara Treacy, Director, EdTech Leaders Online, Education Development Center (EDC)

Assessments

The session titled *A New Frontier: Mobile Devices and 21st Century Assessments* focused on the role that mobile technologies will play in future assessments, which is particularly salient given the impending requirement for digital assessment that goes into effect for the 2014–15 school year. This panel was moderated by Judah Karkowsky, the vice president of business development for Wireless Generation. Wireless Generation focuses on data-driven instruction that is powered heavily by the company's algorithm-based assessment and professional services.

Panelists

This panel included three experts on technology-based assessments. Susan Van Gundy is the associate director for assessment technology at Achieve, where she focuses on technology strategies and implementation systems for the Partnership for the Assessment of Readiness for College and Careers (PARCC). Michael Russell, who holds a PhD in educational research, is senior vice president for strategic development at Measured Progress. Among his responsibilities is coordination of the company's assessment systems. And, Barbara Ahlersmeyer is the principal at Northrup High School, a large, diverse urban school in the Fort Wayne Community School District in Indiana. Her district and state are members of PARCC.

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Session Context

Assessment is on the minds of every educator these days. That includes using formative assessments to support student learning, and preparing for the upcoming 2014–15 digital summative assessments. Education leaders are pondering the potential of tapping mobile devices to support assessments and are considering the role that mobile technology might play in assessments. Among the questions posed to the panel were:

- How are mobile devices being used today to help teachers with assessments in the classroom?
- Are mobile devices a viable option for the 2014–15 assessments?
- What key challenges must be overcome to fully leverage mobile capabilities within assessment?

As schools approach the deadline for conducting assessments online, the role of mobile technologies in assessment is still taking shape.

Current Issues with Assessments

A member of the audience who was involved in developing the National EdTech Plan said that teachers she talks to around the country are miserable due to concerns about assessment. She claimed that the focus placed on assessment has narrowed the teaching that goes on in classrooms, because administrators and teachers are so focused on test scores.

Ms. Ahlersmeyer said that teachers are very anxious about the impending assessments. Many don't see a benefit from it, view it as another item to check off, and are concerned that their compensation will be affected by how students perform on a test. Other current and potential issues raised about assessments and the effect of technology on assessments included:

- **Inequity.** Ms. Ahlersmeyer expressed concern about how students will fare on tests that use technology if students haven't been able to routinely use that technology. Lower-income schools and large schools may not have enough devices for students to use them frequently and develop necessary skills, putting these students at a disadvantage if having to take a meaningful test using technology. At Ms. Ahlersmeyer's school, students have performed better on tests when using pencil and paper than when using computers.
- **Infrastructure and interoperability.** Ms. Van Gundy said that a complicating factor is the huge diversity of technologies currently used in schools, with a tremendous number of legacy systems. Interoperability is a major issue and at the moment, having mobile assessments is not feasible.

Vision for Assessments

Ms. Van Gundy painted a vision for the potential of assessments involving technology, particularly mobile technology. She cited several ways that technology can improve testing and learning:

- **Faster results.** Technology can yield faster assessment results which enable more personalized current-year instruction for each student.
- **Multiple assessments.** Instead of a single year-end summative assessment, technology will make it possible to have multiple assessments of learning and performance. As a result, there can be more of a systems approach to testing.
- **Adaptive testing.** Instead of having a pre-developed test, the next question might change based on how a student answered a prior question.
- **Greater precision.** Instead of a simple multiple choice test, by using technology, different types of assessments could provide different types of information about student learning.
- **Rich data.** By using technology, every click can be captured and measured. This rich data provides the opportunity to glean insights far beyond just a student's score. Also, this data can be used to study and improve the testing process.

Ms. Van Gundy also sees the need for there to be flexibility and modularity in the technology infrastructure so that components (including assessments) can be swapped out over time as new technology is developed.

Moving Toward This Vision

There is a gap between where schools are today in terms of use of technology for assessments and the vision of how assessments could be used in the future to personalize learning. Thoughts from each panelist in moving toward this vision include:

- **More thought needs to be given to measure what is being learned.** Mr. Russell sees tremendous potential for the use of technology in assessments, but believes that educators need to think carefully about matching devices to the purposes of the

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assessment, and think about the context in which the assessment is occurring.

> "There are interesting challenges the field is grappling with, and we need to understand them before we can say, 'Sure, in 2014–2015 we're going to use pad technologies for summative assessments.'"
>
> Michael Russell, Senior Vice President, Strategic Development, Measured Progress

It is often clear that kids are learning when immersed in creativity-fostering apps. But how to assess what they are learning and how that compares to what they should be learning is not clear. Mr. Russell described how one of his children is a self-starter and will use mobile devices to learn in multiple ways outside of the classroom. But it is not clear what gets measured, what an assessment report would look like, and how it would be used. Standardized assessments measure core curriculum knowledge, but these assessments are out of their realm in measuring the deep learning fostered by practice/doing via mobile technology. Mr. Karkowsky thought that this might represent an opportunity for embedded assessments that measure how the student performs certain tasks.

- **Formative assessments that affect what is taught may have the greatest immediate value.** Ms. Ahlersmeyer is concerned about the use of technology for high-stakes summative tests. She sees greater value in the uses of technology in formative tests that can impact students' classroom learning experience.

> "I think the formative test, that's done in the classroom and including project-based learning opportunities for students, is more important than [using technology for] any high-stakes test to measure a student's total learning."
>
> Barbara Ahlersmeyer, Principal, Northrup High School

- **Assessments shouldn't drive schools' technology decisions.** Ms. Van Gundy said that schools often wonder what type of technology they need for assessments. Her perspective is that schools should focus on determining what technology and infrastructure they want for instruction that will enable student learning. Technology for assessments doesn't stand alone.

> "We should be planning for instruction first. What is the technology that will really enable learning against the common core? What will allow students to infuse their learning with technology? . . . If you're ready for that, you will be ready for what technology you need for assessment."
>
> Susan Van Gundy, Associate Director for Assessment Technology, Achieve

- **PARCC Call to Action.** PARCC has a technology tool to gather data on schools' readiness to use technology for assessments. It involves schools providing data about their number of devices, how devices are being used, their bandwidth, and a number of other questions. More data is needed. Those who are interested in sharing data are encouraged to contact Ms. Van Gundy.

Funding

Keith Krueger, CEO of the Consortium for School Networking (CoSN), moderated the session *The Funding Conundrum: Evaluating Different Investment Strategies for Mobile Implementations*. CoSN is a national association for school district chief technology officers. In this session, Mr. Krueger presented data from several sources, described his experiences visiting districts in the U.S. and in South America, and engaged attendees in several real-time polls.

Mr. Krueger mentioned that CoSN convened 20 national associations that agreed on advice for school boards and state legislatures thinking about mobile technology. Key elements of this advice are: 1) Banning mobile devices isn't the answer; 2) Responsible use is the right way to go; and 3) Provide professional development for the teaching staff.

Panelists

This panel comprised leaders from three different school districts who described how their districts are using and funding technology. Matt Akin is the superintendent of the Piedmont City School District in Piedmont, Alabama. The district has 1,200 students and has a one-to-one initiative where MacBooks and Internet access are provided for all students in grades 4 through 12.

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Elizabeth Hoover is the executive director of technology services for the Alexandria City Public Schools. This district has more than 13,000 students, 57% of whom receive free and reduced meals, and has had one-to-one at its high school since 2003.

Susan S. Quinn is the chief financial officer for the Fairfax County Public Schools, the 11th largest district in the country.

Session Context

The challenge of funding technology initiatives has never been easy, but the current budget situations in many districts and communities mandate that education leaders carefully evaluate a wide range of different investment strategies for all technologies, especially mobile. With this as the context, the panelists addressed the following questions:

- How are districts funding their mobile and wireless broadband projects?
- What critical factors must be considered when deciding upon a particular investment strategy, such as to buy vs. lease devices?
- What information and support do district leaders need to make these kinds of investment decisions?

The funding conundrum can be addressed when school leaders see advantages in supporting mobile learning and make it a priority.

Key Facts

- Ratio of students per device. In a poll of session attendees, most had a ratio of students to devices of about two or three to one. Mr. Krueger said that data from the U.S. Department of Education shows that nationally the ratio is around four students per device. He also said that MDR (Market Data Retrieval) has published data indicating that only 13% of classrooms in the country report a one-to-one technology environment. Among the panelists:
  - Piedmont City School District is 1 to 1.
  - Alexandria City Schools are 1 to 1 at the high school (data wasn't shared for the ratio in the entire district)
  - Fairfax County has a ratio of 2.5 computers per student.
- **Percent of budget on technology.** Piedmont and Fairfax both spend about 5% of their operating budget on technology, including personnel to support it. Alexandria spends about 1% of its budget on IT.
- **Financing method.** All three districts lease their devices over two to four years, citing similar reasons. This avoids an enormous and unfeasible capital outlay and is more conducive to predictable budgeting. Ms. Quinn stressed the importance of level funding, year after year.

> "Having a lease program is the best way to buy the computers. It keeps your computer funding at the same level, so you don't have to go back to the board [and ask for more money]."
>
> Susan Quinn, Chief Financial Officer, Department of Financial Services, Fairfax County Public Schools

Making Technology a Priority

Three examples were shared of one-to-one in poor communities. In each situation the key was passionate leaders who see one-to-one as a priority in transforming education and the entire community.

- **Piedmont, Alabama.** The Piedmont City, Alabama, school district has embarked on a revolution in education to be a catalyst for change in this economically challenged community. Keys to this revolution include providing all students with a computer; securing a grant to ensure that all students have Internet access at home; providing a "summer virtual academy" with online courses (in which more than 50% of students participated, as doing so meant they could keep their computer over the summer); and requiring that all high school students take at least one teacher-developed online class, which resulted in high student engagement and better grades. Piedmont embraced mobile learning as an economic imperative to revitalize the struggling community. The school invested in equipping every student with a laptop and with 24/7 Internet access, which students can keep over the summer if enrolled in classes. Enrollment has surged 10% in each of the three years since the initiative. Mr. Akin believes that if a poor community like Piedmont can invest in technology to transform itself, any district can do so.

> "When you talk about funding, I truly believe it's all a matter of priority."
>
> Matt Akin, Superintendent, Piedmont City School District

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- **Mooresville, North Carolina.** Mr. Krueger described this district as one of that state's poorest, ranking 100th out of 115 in dollars spent per student. Yet the district decided to equip every student with a laptop, creating a ubiquitous environment. The impact has been enormous. From 2008 to 2011, attendance is up and dropouts are down. The graduation rate increased from 80% in 2008 to 91% in 2011, and the district achieved the third highest proficiency in the state in reading, math, and science. (See the *New York Times* article, "Mooresville's Shining Example (It's Not Just About the Laptops").

> "Most school districts, even those that are affluent, would say they can't afford the ongoing cost of a ubiquitous technology environment."
>
> Keith Krueger, CEO, Consortium for School Networking

- **Uruguay.** Mr. Krueger was recently in Uruguay. Despite the country's extreme poverty, it has adopted a one-to-one program, with numerous hotspots to provide Internet connectivity. This initiative did not come from the Ministry of Education; it was a social program. Uruguay's leaders showed political will, which Mr. Krueger sees as lacking in the United States. He asked, "Why is it that Uruguay can do this and we can't?"

Internet Access for All

Ms. Hoover said Alexandria does not provide Internet access at home, which is a problem because at least 20% of kids in Alexandria lack Internet access. Mr. Akin said his teachers believe that even more important than giving all students devices is ensuring Internet access at home. This raises the question, "What are we going to do about low-income kids?" Mr. Krueger mentioned a survey by Peter Hart Research Associates where over 60% of parents and teacher see this as a big problem. He also shared data indicating that among families with income under $30,000, only 40% have broadband connectivity versus 80% of families with income over $75,000.

A solution mentioned by an attendee is subsidized Internet access from providers, such as Comcast. This attendee mentioned that when schools actively support such programs the adoption in the community is much higher.

BYOD

Per Mr. Krueger, districts often say they can't afford one-to-one, but at the same time, they don't allow teens to use their own devices within the classroom. He cited data from the Pew Internet and American Life Survey indicating that the majority of teens actually have cell phones with them at school, yet 86% are not allowed to use these devices in the classroom. Mr. Krueger said, "Those devices are not being leveraged for learning." (This applies to smartphones and tablets as well.)

Ms. Quinn expects this to change, as Fairfax is working to adopt a BYOD policy, and she expects other schools to do this as well. This leverages the technology that most students already have, but it is not without issues. For example, districts must invest heavily in order to support the users on the network. Also, many educational publishers are using Flash, which can't be accessed by iPads. There is a way for iPads to get around this, but it turns off content filtering, which jeopardizes E-Rate funding.

Creative Funding Approaches

In addition to BYOD, the panelists mentioned several creative approaches to fund mobile technologies. These ideas include:

- **Minimal personnel.** In Piedmont, one way that Mr. Akin has been able to afford one-to-one is by minimizing personnel expenses. There is just one person (the director of technology) focused on IT, and local college students (paid for by a college as part of a work-study program) assist with support.
- **Reduced spending on textbooks.** In Fairfax, reduced textbook spending has freed up funds for technology.
- **Compare technology costs to spending on sports.** By looking at how much his district spent on football coaches ($300,000), Mr. Akin was able to justify spending the same amount on technology.

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Equity

Chris Dede, Timothy E. Wirth Professor in Learning Technologies at Harvard University, moderated the session titled *The Equity Opportunity/Challenge: How Wireless and Mobile Technologies are Changing the Playing Field*. Professor Dede noted that he had been attending education technology conferences since the late 1970s, and there has long been an absence of people of color. He believed that Wireless EdTech 2012 is actually better than many because mobile devices are perceived as "owned" by people of color in a way that other educational technologies were not.

Panelists

These panelists came from very different backgrounds, but all have experience dealing with issues of equity and the application of technology in education. Shirley Malcom is the head of education and human resources programs and the chair of the Center for Careers in Science and Technology at the American Association for the Advancement of Science. She offered a firsthand historical perspective on equity issues, having been born and raised and educated in the segregated South.

Paul R. Caputo said that he "offers insights from the trenches." He is currently the superintendent of Upper Dauphin Area School District in rural Pennsylvania and has been in the field of education for 30 years, working in numerous roles in small, rural schools, where many children come from impoverished families. He is also passionate about technology.

Lauren Dawes works as head of mLearning, Mobile for Development for the GSMA. She works in developing markets where access to a mobile device can be a person's only way of accessing services like banking, health, or education.

Session Context

Emerging technologies are spawning new and creative trends in education such as the flipped classroom, blended learning, and social learning. However, if students don't have access to the Internet outside of school, these trends could create new equity challenges. Many schools and districts and now thinking about mobile technologies as a potential solution to the equity dilemma.

Questions the panelists discussed included:

- How can mobile devices with wireless capabilities help districts address their concerns about equitable student access to the Internet and digital resources?
- To what extent are BYOD implementations creating a new form of the digital divide around device access and functionality?
- How should education leaders approach this digital equity puzzle within their local community?

Issues surrounding equity exist, but the ubiquity of mobile devices provides cause for optimism.

Inequity Persists

Of no surprise, there remains tremendous inequity in America and across the world, which includes inequity in the use of technology in schools. One audience member shared her frustration in that little progress has been made in at least 20 years in closing the digital divide. Ms. Dawes, who preferred the terms "digital difference" to "digital divide," contended that there have always been differences in the tools and technologies available to different groups of students, referencing previous days of BYOC (bring your own calculator).

The Impact of Inequity

Having grown up in segregated schools, Ms. Malcom said that a school with inadequate infrastructure and resources sends a message to students that not much is expected of them. As a result, said Ms. Malcom, "Disparities and lack of access to resources can disadvantage students in powerful ways that reverberate throughout their lives." Students may not go to the next level, or may go with inadequate experience or lacking in confidence, which can lead to failure.

> "We have to make sure that there are experiences that are available to students that will position them to move forward."
>
> Shirley Malcom, Head, Education and Human Resources Programs; Chair, Center for Careers in Science and Technology, American Association for the Advancement of Science

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In Mr. Caputo's district, there are schools where the poverty rate approaches 80%. Yet even in such situations, educators attempt to be scrappy, aggressive, and form partnerships in order to provide students with the same opportunities as more affluent communities with greater resources.

Mobile Technology is Different

Ms. Malcom said she knew early on that "there was something very different about this technology . . . it was no ordinary innovation." It makes possible things in learning that could not have been imagined. This includes mobility, and the ability to personalize learning to fit with each student's diverse learning style, to engage students based on their personal interests, and to educate students in the community where they live.

Professor Dede agreed. He explained that "all learning is local." However, education hasn't traditionally been local in nature. For example, when students learn about the Great Depression, they learn about what FDR did as president on a national basis. But technologies such as Augmented Reality provide the ability to author educational experiences where students can learn what the Great Depression was like in their own community; they can learn about the politics and economics of the time.

Engagement and Support for Mobile Learning

Professor Dede described how an effort at Harvard to provide urban districts with mobile devices gained little traction until members of the community were engaged and empowered in the process of deciding how to best use this technology.

Ms. Malcom emphasized that the key to gaining buy-in and support was to "go directly to the community" to build demand and support. She viewed that going to the schools can be slow, bureaucratic, and limiting. If there is demand within the community, schools will move to adopt technology.

> "If I work with the community and build an appetite for this, once demand is built, demand actually pushes into the school."
>
> Shirley Malcom, Head, Education and Human Resources Programs; Chair, Center for Careers in Science and Technology, American Association for the Advancement of Science

There is certainly demand for mobile learning among students. Referring to his poor, rural students, Mr. Caputo said, "I know my students want this." He also referred to the Project Tomorrow Speak Up Survey among grades 9 to 12 which found that "mobile devices" is the top answer for what an ultimate school would use as its infrastructure. Also, Ms. Malcom stressed that the school, the community, and the home must be connected and work together as learning spaces. Professor Dede agreed that in the 21st century, the school is not the sole location for education.

> "If it [education] is life-wide, then in fact most of the educational forces in a child's life will be outside of the school. The challenge is to orchestrate all these people and get them on the same page. But it's not going to be educators giving marching orders."
>
> Chris Dede, Timothy Wirth Professor in Learning Technologies, Harvard University

Partnership

Mr. Caputo said that changes in leadership at the national, state, or local level is a significant risk for any technology-related initiatives. There is always fear that, with a new governor or school board, an initiative will be ended. The key, from Mr. Caputo's perspective, to sustaining a technology initiative is having a consortium that involves multiple supportive partners.

> "I agree that the community needs to be involved. But we also need business and industry partnerships as well if we are going to do this right."
>
> Paul Caputo, Superintendent, Upper Dauphin Area School District

Summary

As these breakout sessions made clear, despite the maturation of mobile learning in schools, challenges exist that threaten to keep mobile learning from reaching its full potential. Major challenges discussed in these breakouts included professional development, assessment, funding, and equity. While each of these challenges is significant, the good news is that these challenges and the issues surrounding them are known and, as was discussed, there are significant efforts underway to address each of them.

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BREAKOUT SESSIONS EXECUTIVE SUMMARY

PLANNING FOR THE FUTURE OF MOBILE LEARNING

Overview

The future of mobile learning is incredibly exciting. As the breakout sessions focused on mobile learning's future illustrated, mobile devices and applications will make learning more personalized and engaging. These technologies—which are enthusiastically embraced by children and increasingly accepted by parents—can be a truly transformational agent within education. A key part of planning for the future is aligning all stakeholders around a shared vision.

Context

In breakout sessions focused on the future of mobile learning, panelists described how mobile technologies support a wide range of applications that create entirely new learning opportunities.

Key Themes from Breakouts

Personalizing Learning

Julie Evans, the CEO of Project Tomorrow, moderated the session *Personalizing Learning: New Speak Up Findings on Student, Parent, and Educator Aspirations for Mobile Learning*. She kicked off the session by summarizing the key findings of the Speak Up National Research Project from 2003 to 2011, shared major findings from Project Tomorrow's recent research on personalized learning, and moderated a conversation on how technology is being used in a fifth-grade classroom in Baltimore.

Panelists

Alita Walker is a fifth-grade teacher at Liberty Elementary School in the Baltimore City Public Schools. For the second year, her classroom has had one-to-one iPads in the classroom. Raven Long is a tech-savvy student in Ms. Walker's fifth-grade class.

Session Context

Project Tomorrow's Speak Up National Research Project, which began in 2003, has yielded many important insights about how technology is used in schools and the aspirations for various stakeholders for using technology. Ms. Evans shared insights from this project. In addition, Ms. Evans described the key findings from a new Speak Up report, "*Learning in the 21st Century: Mobile Devices + Social Media = Personalized Learning*." This report provides insights about leveraging mobile learning to increase student engagement and teacher productivity. These research insights provided a context for the following questions to the panelists:

- What can we learn from the Speak Up report about how students (and parents and educators) want to use mobile devices to create more personalized learning environments?
- How should schools be preparing for the future of mobile learning?
- What are lessons learned from a school that has just adopted mobile learning?

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Students are frustrated with the unsophisticated use of technology in education and want more personalized mobile learning environments.

Speak Up National Research Project 2003–2011

Since 2003, the Speak Up National Research Project has gathered information from K–12 students, teachers, parents, and administrators. Online surveys (2.6 million have been completed to date) and focus groups explore how technology supports learning and teaching. As schools plan for the future of mobile learning, they can benefit from considering the key findings from this research:

- **Students function as a "digital advance team."** Students are tech trend setters. They regularly adopt and adapt emerging technologies for learning. Raven Long confirmed this. She's had a smartphone since third grade and reads books on the device.
- **Students are frustrated with the unsophisticated use of technology in education.** Students' frustration is not so much about the lack of technology in schools, but that technology is not used to support learning.
- **A "digital disconnect" persists between students and adults.** In their lives outside of school, students use technology in very sophisticated ways. In 2003, Ms. Evans would never have believed that this issue still would remain in 2012.

> "We continue to see this disconnect between how students are living and learning outside of school with technology . . . and what happens in the classroom."
>
> Julie Evans, CEO, Project Tomorrow

- **Students want a more personalized learning environment.** Students are already personalizing their learning lives outside of school, which is placing new demands on teachers in school.

"Learning in the 21st Century: Mobile Devices + Social Media = Personalized Learning"

This report, produced in collaboration with Blackboard, Inc. and supported by sponsors such as Wireless Reach from Qualcomm, yielded specific findings related to mobile learning. They include:

- **Mobile devices, combined with social media, are enabling more personalized learning opportunities.** It is the combination of devices and social media that is creating greater opportunities for personalized learning. Ms. Walker explained that students in her class each use their iPads for independent reading, based on their personal reading level.
- **Increased parental support for mobile learning is changing the conversation.** Parent support for the use of mobile devices for learning purposes has grown in the past two years, and almost two thirds of parents would be willing to buy a device for their child if used for academic purposes. There is little variation based on geography, income, or age of children. However, parents still have concerns about Internet access and safety. Ms. Walker described how video reports created by children in class can be shared with parents, showing the parents how technology is used in the classroom and better engaging parents in the educational experience.
- **Changing teacher practices is still a critical challenge.** Ms. Walker said that using iPads in her classroom has definitely changed how she is teaching, though it took her some time to master this new teaching approach. Now in her second year with iPads, she is much more comfortable with this technology, is using more apps, and is "rocking and rolling." She sees this as the future and would encourage other teachers to overcome their fears and dive in.

> "I would say to teachers, 'Don't be afraid to use it [mobile technology]. Try it."
>
> Alita Walker, Fifth-Grade Teacher, Liberty Elementary School, Baltimore City Public Schools

- **Many schools and districts are exploring the use of student-owned devices.** Even fifth grader Raven Long has her own smartphone, which she got in third grade. But like so many other students around the country, she can't use this device as part of her classroom learning. Ms. Evans said that the concept of BYOD is getting a great amount of attention as administrators are interested in how to leverage students' own devices.
- **The future of mobile learning depends on a shared vision for personalized learning.** Going forward with using mobile devices for personalized learning requires a vision that is shared by all stakeholders.

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Mobile Devices in Use Today

Ms. Walker is using various websites and apps to "bring the world inside my classroom." She posts quizzes to a website and her students use the iPads for video editing. Raven Long spoke enthusiastically about the value of having a tablet in general. She likes using it to read and access various apps and sites.

Mobile Technology in the Future

According to the national Speak Up research, students say they would like to use mobile devices for learning to: 1) improve how they do school now, which includes checking grades, taking notes, accessing online textbooks, using the calendar, and more; and 2) personalize the learning process, which includes anytime, anywhere research, reminders and alerts, and collaborations with teachers and peers.

Ms. Walker is hopeful that mobile technology will lead to a completely paperless classroom, and Raven Long doesn't want to even think about going to a school that doesn't use mobile technology.

> "My vision is, in two or three years, that all teachers will open up to technology."
>
> Raven Long, Fifth-Grade Student

Enabling Learning

Karen Billings, vice president, education division of the Software & Information Industry Association (SIIA), served as moderator for the breakout session *Enabling Learning in New Ways: A Collection of Leading Edge Mobile Applications*. SIIA has 500 members, which are software companies. This includes 200 education technology companies which are part of SIIA's education division. One of SIIA's important programs is the Innovation Incubator Program.

Panelists

This panel was made up of three individuals with experience developing leading-edge educational mobile applications. Tricia Sulpizio Estrada, who began her career at Qualcomm, is the founder and president of Brighter Futures for Beautiful Minds. The company makes Wonkido, which is an application that helps children develop critical skills they need to succeed.

Bob Hirshon is the program director of technology and learning at the American Association for the Advancement of Science (AAAS). He is focused on making science more accessible to children. He has been involved in developing a planetary exploration game and has led the development of Active Explore, a Wireless Reach Augmented Rreality project that allows educators to engage students in inquiry.

Daniel Torres Mancera is director general of El Centro Superior para la Educación Virtual (CSEV), a private foundation promoting eLearning projects and the use of mobile technology.

Session Context

What capabilities will the mobile device of tomorrow have, and what new types of enhancements to our lives will this enable? What will be the next big impact of wireless technologies on our culture and society? This session presented a strategic perspective on how mobile devices and wireless broadband are evolving. Panelists were asked to address:

- What new types of capabilities do you see on the short-term horizon?
- How could those capabilities change the way we live and learn?
- How can education leaders make good tactical decisions within this strategic context?

Mobile applications allow children to participate in inquiry and develop organizational skills.

Applications for mobile phones and tablets open entirely new avenues for learning. They can help students engage in deeper inquiry, as well as develop better skills for daily life. Panelists described two apps designed for K–12 students:

- **Active Explorer.** This project, sponsored by the American Association for the Advancement of Science and funded by Qualcomm Wireless Reach, uses mobile phones as discovery tools. With the app, teachers act as leaders who create quests for student explorers. Students identify data they will collect through their phones including video, audio, photos, maps, sketches, and text. When explorers are finished with their quest, they upload their information to a personal website. This gives students authorship and ownership over their data, as well as the ability to share information in creative ways. They can create slideshows, posters, comics, or e-books.

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> "As mobile phones and tablets become ubiquitous, there is an unprecedented opportunity for children and youth to use them to explore the world around them."
>
> Bob Hirshon, Program Director, Technology and Learning, AAAS

- **Wonkido.** With this visual organizer app, kids use an iPad to develop executive functioning skills, such as problem solving, prioritizing, and organizing. Children are given a personalized visual daily schedule. Parents can track progress and communicate with educators. Educators have the ability to customize and manage students' lessons and schedules. Wonkido also uses animations to model daily functions like getting dressed. Mobile apps and devices support children with different learning needs, without stigmatizing them. For example, a child with functional autism can use an iPad for his schedule, which is much cooler to his peers than a laminated, Velcro schedule.

> "I'm encouraged by 24/7 learning because this is how life is. Having a mobile device that coordinates learning and integrates it all the time is promising."
>
> Tricia Sulpizio Estrada, Founder and President, Brighter Futures for Beautiful Minds

Postsecondary learning

CSEV, a private foundation in Spain, is committed to making mobile learning a reality in higher education in Europe and Latin America. Mr. Mancera explained that CSEV has leveraged mobile technologies for projects in multiple countries centered on postsecondary learning.

- **Entangle-City.** This initiative targeted at college students integrates humanities and augmented learning. Students can travel around Madrid with different mobile learning exercises that provide technological and cultural immersion.
- **Laboratory for Chemistry app.** This app, also for college students, has been very popular in the educational app store online. Additional apps in other disciplines are under development.
- **Entrepreneurs' social network.** This app is for adults in Latin America who are interested in entrepreneurship and connects individuals via a social network to acquire the necessary skills to become entrepreneurs.
- **Platform for creating massive open online courses (MOOCs).** This open source platform, for both college students and adult learners, will soon be available for universities to use.

When Kids Get Phones

Ms. Estrada changed her position on this while attending Wireless EdTech. Previously, she was opposed to providing her own children (ages 10 and 7) with mobile devices. But while attending this conference, she developed a new point of view. The reason adults are averse to providing devices to their children is because they are currently just viewed as entertainment devices. But if mobile devices were viewed as an extension of learning and if children were taught about appropriate use, she believes that mobile technology can have tremendous benefits and should therefore be provided to children at an even younger age.

Extending Learning

Harvard University professor Chris Dede moderated the session *Extending Learning: Using Augmented Reality Throughout Life*. Professor Dede has been a thought leader in areas such as virtual environments and augmented realities, which extend how and where learning takes place.

Panelists

Matt Dunleavy is assistant professor in instructional technology at Radford University. He is the director of the Radford Outdoor Augmented Reality Project and previously worked with Professor Dede at Harvard. Shari Metcalf is project director at Harvard University. She has led the EcoMUVE project and is now co-director of the EcoMOBILE project.

Session Context

Augmented Reality in the hands of a child with a mobile device not only engages the learner and enables new knowledge, but also empowers life-wide learning. To expound on Augmented Reality, the presenters were asked questions including:

- What are the lessons learned from the EcoMOBILE project?
- Based on multiple research projects, what is the impact of leveraging Augmented Reality through a mobile device on student engagement and learning?

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- What is the likely evolution of Augmented Reality in education over the next few years?

Augmented Reality is a "next generation" educational application; planning should start now to take advantage of its potential.

Augmented Reality technology allows educators to embed information into the physical environment, which contributes to learning. Two forms of Augmented Reality are emerging:

1. **Location based.** This type of Augmented Reality leverages GPS and compass technologies. As people walk around within a physical environment, they encounter hotspots with embedded media designed to educate.
2. **Visual based.** Vuforia, a software developers' toolkit from Qualcomm Labs, supports development of visual-based Augmented Reality experiences. When individuals point a video camera at a two-dimensional image, it triggers a 3D model on a phone or device.

Evidence suggests that Augmented Reality applications can make students more active and engaged in learning. For example, with EcoMOBILE, which was funded through grants from the NSF and Qualcomm's Wireless Reach initiative and which uses the FreshAiR platform, students can assume scientific roles and explore a virtual ecosystem in an outdoor location, such as a pond or forest. (FreshAir is a platform developed at Radford University, and is a web-based editor that allows anyone—even those without any programming skills—to create their own Augmented Reality and deploy it to a smartphone. FreshAir works on an Apple phone or a Google-based device. Learn more at www.playfreshair.com.) When using mobile phones to engage in Augmented Reality, students interact with hotspots and actively engage in observing, calculating, collecting data, and measuring. Other benefits include the following:

- **Students make connections between field trips and the classroom.** Data collection done in the field, such as pictures tagged with GPS locations, are shared in classroom discussion.
- **Learning is increased because experiences are interactive and situated.** Students are more interested in EcoMOBILE field trips because they make connections with their own neighborhoods. Dr. Metcalf emphasized that in Augmented Reality activities students are much more active than with traditional field trips. Also, Augmented Reality has the potential for highly individualized learning pathways.
- **Augmented Reality helps students see the unseen.** Hotspots help students notice new things, such as models of photosynthesis and other atomic-level processes.

> "The features of Augmented Reality I want to highlight are playing different scientific roles, individualized pathways, making connections, and seeing the unseen."
>
> Shari Metcalf, Project Co-Director, Harvard University

- **EcoMOBILE is easy for educators to customize.** To create an experience at a different location, teachers simply pull up a new map and relocate hotspots. Professor Dede described work underway to develop templates which will make EcoMOBILE much easier to scale. Also, a key advantage of Augmented Reality is that it allows people to design learning experiences, which results in deep learning.

> "Augmented Reality lets you design, and we know that the best way to learn something is to teach it. If you're designing a learning experience . . . you're really getting down into very deep learning."
>
> Chris Dede, Timothy E. Wirth Professor in Learning Technologies, Harvard University

Also, increasingly Augmented Reality is being done through games. Two examples of Augmented Reality-based learning games are Wolf Runner and Space Walker.

Although Augmented Reality holds considerable promise, it has some limitations. Some applications are complex and students may experience cognitive overload. In addition, the fidelity of GPS, as well as jitter and lag, can create problems. A fatal flaw in some Augmented Reality designs is focusing too much on Augmented Reality rather than the context it is intended to support. When that occurs, kids center their attention on their mobile devices rather than exploring the environment and on social interactions.

> "If kids are looking at the screen of their phones more than twenty to thirty percent of the time, then we're starting to fail with Augmented Reality."
>
> Matt Dunleavy, Assistant Professor, Radford University

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However, despite the limitations and the vulnerabilities of Augmented Reality, which is in its infancy, Professor Dede said that, of all of the emerging educational technologies that he sees and works with, Augmented Reality has the most upside.

> "Augmented Reality is an area where the primary limit is creativity."
>
> Chris Dede, Timothy E. Wirth Professor in Learning Technologies, Harvard University

To date, most Augmented Reality development has been done by engineers and programmers. However, several platforms for training and education have been created which allow development to be easily done by a broader community. These include ARIS from University of Wisconsin Madison, Seven Scenes from Amsterdam, and FreshAiR.

Measuring Effectiveness

In response to a question asking about evidence of the effectiveness of Augmented Reality, both Dr. Dunleavy and Dr. Metcalf said that Augmented Reality is early in its development, but evidence is needed to justify this tool. Ms. Metcalf explained that for EcoMOBILE, robust measures are being developed for content and understanding, as well as to assess a student's understanding of inquiry.

Future of Education

Professor Dede asserted that, as the developing world evolves, there will not be a school every few miles with a university every 20–30 miles. He believes that Augmented Reality and MOOCs could play key roles in the 21st-century educational system for these countries, which could have an enormous impact on civilization.

Summary

As these breakout sessions illustrated, the future for mobile learning is bright and this future is coming about incredibly quickly. Already, a wide variety of exciting applications for mobile phones and tablets exist that open new avenues for learning. Examples include apps that promote inquiry and apps that develop executive functioning skills. In addition, Augmented Reality, which is advancing rapidly, provides the ability to change how and where learning takes place, including in a community or a forest, and links these experiences with learning in the classroom. Many resources are already available, and a great deal of experimentation is taking place in inventing the future.

Other Resources

The new Speak Up Report referenced in this session, "*Learning in the 21st Century: Mobile Devices + Social Media = Personalized Learning*," is available to download at http://www.tomorrow.org/speakup/MobileLearningReport2012.html.

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CONCLUSION

This is a tremendously exciting time for mobile learning. Mobile learning has quickly advanced from infancy to adolescence and is poised to take the next step. As practitioners and other educational leaders at Wireless EdTech 2012 made clear, there is an enormous need for a fundamental transformation in education, and mobile technologies can serve as a critical catalyst.

The societal transformation in how people connect, communicate, access, and share information has already begun, due to the rapid uptake of mobile technologies, including adoption by students. The transformation that is needed in education involves changing how classrooms are structured, how teachers teach, and how students learn. It involves better engaging students through individualized learning, bringing the outside world into the classroom, and using methods such as Augmented Reality to enhance student learning in a range of environments both in and out of the classroom.

This transformation is already underway, evidenced by the numerous examples that were shared at Wireless EdTech 2012 by educators around the country, and the world, who are already using mobile technologies in a host of creative, effective ways.

But while excitement is high and much progress has been made in a relatively short period of time, schools are not yet fully leveraging mobile technology and face numerous challenges in doing so, including infrastructure, integration, professional development and capacity building, funding, policies, equity, and rapidly scaling what works.

The good news is that solutions to these challenges exist and were discussed throughout Wireless EdTech 2012. Bringing about the revolution that is required in education takes urgency, cooperation, partnership, and leadership.

As mobile learning enters its adolescence, those who are passionate about improving learning are encouraged to actively participate in this process. While the challenges are significant, so too will be the impact.

Feel free to share the insights in this summary from Wireless EdTech 2012, and for more information, see www.WirelessEdtech.com.

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