Mobile Computing | Q&A

Will Smart Phones Eliminate the Digital Divide?

- By David Nagel
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Within five years, every K-12 student in America will be using a mobile handheld device as a part of learning, according to Elliot Soloway, a professor at the University of Michigan.

"Smart phones are the one technology that can eliminate the digital divide," he told *THE Journal*. "Given the cost of the device, it is very conceivable that every child, rich or poor, can have one 24/7."

Soloway is founder and chief executive officer of GoKnow, an education consultancy that provides professional development seminars for educators, and a member of the faculty in the College of Engineering, the School of Education, and the School of Information at U Mich. He's been following education technology trends for the last three decades, focusing especially on mobile devices for the bulk of those years.

A frequent speaker on education technology issues and a fierce ed tech advocate, Soloway explained that mobile phones are ideal for K-12 students: They're the tool of choice for that generation; they're relatively affordable; they're appropriate 21st century tools for developing 21st century skills; and, maybe most significant of all, they enable more than just anytime, anywhere learning. They enable, as Soloway put it, "Everywhere, all the time learning."

David Nagel: You've described the cell phone as a "game changer" for education and as the "quintessential 21st century tool." Why the cell phone specifically?

Elliot Soloway: There are several reasons why the cell phone is a game changer:
It is the device of choice by students--the kids themselves are bringing the devices to school--we adults brought laptops into schools, and they are a yawn, as are netbooks because the kids see cell phone as their generation's technology.

The students are highly competent with the technology; the learning curve is very low. The kids can use the skills they have developed outside of school inside of school

Portability: The small devices fit into your hand, your pocket, your purse. Portability trumps everything-- bigger screen, more power, bigger keyboard. Being able to take it out and turn it [on] instantly is totally important to the mobile, instant gratification generation. The students play all sorts of games on small screens; they are comfortable with small screens. Kids are comfortable with the small keyboards;they have learned to thumb type. Give a kid a full-sized keyboard, and you will reduce the kid to hunt and peck.

Portability provides learning in context--while doing an experiment, [a student] can write it up; while on a field trip, [a student] can capture ideas. And portability enables relating abstract concepts in the classroom to concrete items in the world. For example, what is a complementary angle? What is an isosceles triangle? Well, take a picture after school of objects that illustrate those properties.

The small size matches the small size of the kids: Kids are small; their technology complements their size. Hulking, 7-pound laptops are seen as old technology, not interesting, by the mobile generation: They want to use their technology literally on the go. Can't do that with a laptop.

Laptops are way too expensive to maintain: Drop a laptop, kiss it goodbye; drop a smart phone, and there is a very good chance it will be fine.

You can do everything on a smart phone that you can do on a laptop, except maybe for high school geometry and except for a few scientific visualizations. But for 90 percent of what a student has to do, the smart phone can do it. Why do you need more than that in the palm of your hand, 24/7? And that is using today's screen form factor. Tomorrow we will able to pull out a screen or we will be able to project a larger screen onto a blank surface. In fact, Samsung's Galaxy already has a version that can shoot out a 60-inch image!

Smart phones make possible everywhere learning, all-the-time learning.

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What the kids can do and how the kids can do it has changed. For the first time in history, there is a device at a student-affordable price point that has sufficient computing power and networking to support 90 [percent] to 95 percent of what a student does in school every day.

Nagel: Android- and iOS-based slates share a lot of characteristics with cell phones, and they're starting to be adopted more and more in higher ed, especially the iPad at this point. What are the implications for K-12?

Soloway: What problem does an iPad solve? While they are being adopted, it isn't clear to me or my colleague [GoKnow Chief Education Architect and past ISTE President] Cathie Norris why there is such a rush to iPads. They are expensive [and] fragile, and creating content is a challenge. Since learning is all about creating, it seems like a funny device to focus educational attention on. But, it is beautiful, and everyone wants to be part of something beautiful.

Today, in the PC world, whether a computer is a Dell, a Gateway, a Sony, etc., one puts a layer of software on that device, and then from a user's perspective all those different devices are the same. That is what is going to happen shortly in the mobile device space. Different companies are going to build a layer of software that makes every smart phone--android, [Windows Phone 7], iOS, etc.--appear the same to the teacher and the student.

Nagel: We have some problems with cell phones as universal tools for students and educators, don't we? What do you think the biggest hurdles are? Policy? Cost of the devices? Reliable and affordable service? Software?

Soloway: The only problem with mobile devices is perception. "The screen is too small; the keyboard is too

small." "I never used one of those devices when I was in school." "The kids are going to cheat." "The phone causes disruptions in the class."

Those are the common negatives we hear.

Those are all easily addressable.

Turn off texting, and turn off voice functions--the smart phone is now truly a computer

Use the students' tools for learning just like we used students' tools in previous generations' for learning--i learned with paper and pencil, since that was the technology of my day. The technology of today is mobile--that's how kids need to learn. We need to prepare kids for the 21st century, not the 19th century.

Cost? Cost is dropping--the calculator was expensive at the outset. But over the next five years, the cost will drop to $5 to $10 per month for the device, the data plan, the software … everything.... That is definitely affordable. No more paper copying; no more paper textbooks. Cost is not an issue; cost is a phony issue. Even today the cost is not particularly high, compared with putting in a WiFi network capable of supporting 1:1. That is expensive.

Nagel: What will need to happen to overcome these issues?

Soloway: We need to accept the fact that mobile technologies are an integral part of the kids lives and an integral part of 21st century knowledge workers' lives. We need to stop looking at the past and look to the future. We need to step forward and say: We need to do 21st century education in the same ways we are doing 21st century commerce, 21st century health, etc. There are risks; absolutely. But staying where we are in schools--using 19th century technology and fooling ourselves that we are teaching 21st century skills and content--is truly doing our students a huge disservice. You can't teach 21st century skills and content with 18th century paper and pencil tools.

Nagel: What will be the impact of 4G and mobile broadband for K-12, and what else do you see on the horizon in terms of advancements to the technology of mobile phones.

Soloway: 4G will make it cheaper to use the data plans. The increased speed is important, but the reliability is more important. If we want to do cloud computing, we need always on connectivity--and that isn't here yet. The need for always on should be the driver, not faster speeds--that are still unreliable! Cloud computing and mobile technologies are the yin-yang, two totally intertwined technologies. Once we have reliable connections then cloud computing will take off. And then a student--or anybody--can do their "work" for anyplace because the information--their information--is available everywhere. I really don't like the notion of anywhere, anytime learning. That is too limited. Cathie and I favor the terms "everywhere learning, all the time learning." Adults do those two things; that's just what a 21st century knowledge worker does. So, that's what we need to prepare the mobile generation--the children, the youth, of today--for.

It doesn't take a crystal ball to see that mobile technologies are changing--rapidly, faster than any other technology before--our ways of doing things. Having a mobile device in the palm of your hand, connected to the Internet, 24/7 has never been possible before. It is possible now--finally--at a price point that is just about there--just about affordable by all. Can you imagine 7 billion people all with such a device? Currently there are 4.5 billion cell phones and 7 billion people. Mobile technologies are bigger than the Internet. The Internet is just a roadway; if you don't have a car, the roadway is useless. Mobile technologies are the cars for the

Internet roadway. Mobile technologies are giving voice to people who never had voice before.

Cathie and I make the following prediction: within five years, every child, in every grade, in every school in America will be using a mobile learning device, 24/7. Take that to the bank! Yes, while today, 99 percent of schools ban cell phones, we stick by this prediction? Why? Because mobile technologies is as necessary part of living in the modern world as is air, water, and food. Communications is the hallmark of what it means to be human; mobile devices support communication in new and exciting ways; mobile devices help make us human, help define us as different than plants and animals. Mobile technologies are essential to our lives-- outside of school. How can school resist letting mobile devices through the school door? We shouldn't be asking, "Why should schools adopt mobile technologies?" No! We should be asking: "How can schools be so cynical, so backwards-looking, and prevent our children, the children entrusted to the school's care, to be allowed to benefit from a technology that clearly is highly beneficial." Schools need to take their heads out of the sand, be brave and step forward, and truly help the children entrusted to them. Mobile technologies can make a huge difference in teaching and learning--the pilot projects are demonstrating that fact over and over and over again. Schools need to be on the right side of the 21st century: 1:1, 24/7 mobile device rollouts should be the norm, not the exception.

Soloway and his partner, Cathleen Norris, will be tackling the issue of cell phones in education during a special session at the [FETC 2011 conference](#) in Orlando, FL. The session, "Cell Phones in Education? It's Inevitable," will be held Wednesday at 12:30 p.m. in Room S320EF. Further details can be found [here](#).

About the Author

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