



# The Future is in Your Hand

In an exclusive interview with *Tech & Learning*, ed tech luminaries Elliot Soloway and Cathleen Norris spell out how mobile computing is the ultimate answer for twenty-first century education.

Q&A by Scott Traylor

**T&L:** When will we see true technology integration in the classroom?

**Elliot Soloway:** It will soon be a given that all children will have a computing device. It probably is going to happen faster than most people think. Right now, a large percentage of schools in the United States ban cell phones. But once this dam breaks, when schools see that kids are already bringing computers to school and schools don't have to pay for those computers, the light bulb within administrators will light up.

Administrators will begin to notice that one child brings a Motorola, another brings a Nokia, and yet another brings an iPhone. The solution? You just put a layer of software on top of the phone that makes all those non-homogeneous devices homogeneous with respect to the teacher and the learning activities. Just like a Dell and a Sony and a Gateway. They're different computers. You put a layer of software on top of them and now they're all the same. That's the same idea that will happen in the cell phone computer world. And when this happens, we think it's going to happen very quickly. Not in five years, more like two to three years.

**Cathleen Norris:** The biggest single problem now is how teachers integrate this technology into the classroom. Up until now, technology is either the focus of the instruction—they're teaching children about Word and Excel and that sort of thing—or it's an add-on to a lesson—"Here



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we're going to be doing a lesson on the Civil War, let's look at this Web site"—but it's not an integral part of the lesson.

We determined that it couldn't be an integral part of the lesson because there weren't tools available that easily allowed teachers to create lessons around the technology. There are products out there. But I can understand why teachers aren't authoring their lessons everyday in these tools. It's like asking them to program in HTML. How good are they at that? I would say many of them don't even know what HTML is, especially when we see elementary education majors who are only required to take one three-hour course in technology. So what we did was create the Mobile Learning Environment. It is a tool that runs on top of Windows Mobile, Windows CE, or Windows XP. It

allows teachers to easily take whatever applications they normally use and build a cohesive lesson in a short time with very little training.

**ES:** What Cathie's explaining is that schools have existing curriculum that they have to teach. They bring that pencil and paper curriculum to the table and set it down next to a computer and say "How do I take this pencil and paper stuff and integrate it with the technology?" Some companies try to replace the curriculum through a new computer-based



Third-grade Singapore school students using mobile computers in a mobile, conversational manner

environment. These companies are saying, "You adopt this technology, and with it, you also adopt this curriculum." We feel that this doesn't work. School districts have existing curriculum they teach with, you can't tell them to change the curriculum because of the technology.

**T&L:** Some critics argue that handhelds present an opportunity to empower student learning in a way we've never before imagined possible, but it could come at the expense of teacher control. Can student empowerment and teacher control coexist in the classroom?

**CN:** The teachers who are out of control when students have handhelds are the same teachers who are out of control when the students have pencils and paper. I was a classroom teacher for 15 years and back then the threat was that computers were going to come in and replace all teachers. All of the good teachers felt that any teacher who could be replaced by a computer should be.

There is always room for and a place for good teachers. In this case the role of the teacher is different. It's not necessarily a role of handing out the information. You don't open up students' heads and dump in the information. Rather, teachers provide direction and contextualize things for students as they do their les-

Cathleen Norris and Elliot Soloway are both pioneering educators who are defining the future of technology and learning.

**DR. CATHLEEN NORRIS**, a former high school teacher for over 14 years, is a professor in the Department of Technology and Cognition at the University of North Texas. Cathleen is also the past president of ISTE and the past president of NECA, the organizing body for the country's leading technology and education conference, NECC.

**DR. ELLIOT SOLOWAY** is a faculty member at the University of Michigan. In addition to teaching at the university, Elliot is involved with a number of grant initiatives for the development of middle school science instruction through technology. His research also involves working with many different school districts to define technology-based curricula.

Together Cathleen and Elliot have authored and published over 100 different research papers on a variety of different learning technologies through the professional organization the Association of Computing Machinery (ACM). They are also founders, partners, and collaborators of the handheld software company, GoKnow.



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sons. Students are not sitting there like little birds waiting to be fed. To create autonomous learners you must contextualize things for students as they find them or as they run into difficulties trying to fit pieces together because you've structured the lesson for them.

**T&L:** So twenty-first century learning skills can be addressed properly with handhelds?

**CN:** Yes. The way we learn and what we learn is changing, and that is really the majority of the issue around twenty-first century skills. Children need to learn how instead of what. How do I find this information? How do I determine from this Internet what is valid information? How does this fit into everything else that I'm



Fifth-Grade Singapore school students using mobile computers tethered to desks

mobile computers, handheld computers, in a classroom the kids are looking at each other, talking to each other, putting the handhelds in front of each other's faces. They're working together. They're actively engaged in teamwork. It's a completely different flow in the classroom.

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reading? How does this merge with my textbook? It's the how. Again, it's helping the child take the wealth of information that's out there, assimilate it, and determine what's a valid source, what's real information.

**ES:** The twenty-first century skills are about teamwork and the "soft skills" kids gain when working and collaborating together. If you watch classrooms with big desktop computers, the kids are sort of sitting hunched over looking up at the machines. They're not talking to each other. They're not sharing. They're just staring at the screens with headphones on. But when you put

The smallness, the immediacy, the ease of use of these handheld devices is exactly what is needed to support the twenty-first century skills, where your dynamic workgroups change over the course of a day. If different children work with different kids on different problems, no problem! That's what happens with these handheld computers because you're not tethered.

*Scott Traylor is the CEO and Founder of 360KID, a content and technology company developing learning products for toy companies, publishers, and broadcasters.*