Handheld Computers in Education: An Industry Perspective

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Five representatives from the mobile computing industry provide their perspectives on handhelds in education. While some of their ideas differ, they all agree on the importance of staff development, appropriate curriculum development, and teacher support to create the kinds of personalized learning environments that mobile devices make possible.

Introduction

Recently, we spoke with five industry luminaries about their perspectives on handhelds in education. They discussed their views on the effects of technology on education, the possible impact of mobile devices, and what schools need in order to make the most of currently available technology. Here is what they had to say:

Eric Johnson, Palm Inc. (www.palm.com)

It is difficult to say what impact technology has had on education. We know it has, but the biggest issue is finding ways to measure that. Technology’s impact on business productivity is not readily noticeable because it becomes invisible (email, for example). You cannot really measure its impact, but you can’t do without it either. A similar thing may be happening in schools. It’s difficult to say how the Internet changes education, but kids can’t be educated without it anymore.

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Technology literacy should be included in any education. Sometimes technology doesn’t have as much of an impact in schools because there’s not enough of it. There is a real difference here between home and schools.

Nevertheless, there are many handhelds in use in education. Some are having remarkable impact, others less so. Change is not as advanced as I thought, due to difficulty of acquisition; schools are slower to adopt, and there are often funding issues. When teachers have to bring in their own paper, it is difficult to be innovative sometimes. What do we need for innovation to happen? Certainly training and staff development. Palm provides the PETC program, because it strongly believes staff development is essential. What teachers need the most is time to make changes to their curriculum. One-to-one technology will eventually happen. It will take time and hardware and software solutions that are better adapted to the market. I expect this to be the case in twenty to fifty years. The current loanership model will be replaced by an ownership model. This is where you will start to see real learning and productivity gains. You have a much deeper interaction with things you can count on all the time. This is not terribly mysterious. Productivity will go up; in schools this is called learning.

Mike Lorion, LeapFrog
(www.leapfrog.com)

In some ways, technology has had a lot of impact on schools, but it depends on what you are trying to measure. This is similar to what happened in business. In the early 2000s, Alan Greenspan said that it took 10 years to get gains from technology. We are around that 10-year timeframe for education. Teachers have switched to email and the Internet as their information source for all types of things and this has had a large impact.

In student achievement there are still some issues. The USA is at a 4:1 student-to-technology ratio, so at most 25% of the classroom day a student may have access to technology. If it is only available that amount of time, it won’t have a large impact, so we need to figure out how to get the other 75% covered. More personalized, mobile, and individualized technologies should play a bigger role, because they give students more individual access to and time with technology.

Technology applied to the right process can make a huge difference. Digital whiteboards are starting to do so. The TI calculator has had a huge impact. Applied personal learning tools can be used more and are more cost-effective than the traditional computer platform, so the issue becomes: do I need a specialized tool for each subject area or a generic, ubiquitous tool?

Besides technology, content is a key area. The $100 laptop project at MIT is interesting, but we need to look at this from a classroom and not a technology perspective. Students change content publishers many times in a day. They may have Addison Wesley math textbooks, Open Court for reading, and Harcourt for social studies. How can we get a ubiquitous platform that can be used with all?

Leapfrog focuses on the learning tool, and providing the bridge between home and school. We apply technology to good curriculum practice, versus writing curriculum that fits on technology. Leapfrog enhances curriculum by adding low-cost technology, not rebuilding everything on an expensive platform. This lower cost approach can reach more kids.

Finally, we need staff development. New teachers can’t imagine teaching without computers, and current students fully expect it. We have to make sure that teachers are able to use technology effectively.

Dave Santucci, Texas Instruments
(education.ti.com)

While technology in general may not have had a strong impact on education, this may be because the focus has been more on the technology itself rather than on the uses of technology for educational purposes. The attitude has been one of, “If we get this wonderful technology into the students’ hands of course good things will happen educationally.” In contrast, graphing calculators, which were designed for a particular educational purpose, have had a proven impact on education, as shown by many research studies.

Handhelds in general won’t necessarily resolve this issue, but graphing calculators become part of a set of changes in curriculum, pedagogy, and assessment practices. Also, graphing calculators are actually an integrated combination of hardware and software. Other educational technologies seem to be thought of primarily as hardware with the promise of the potential of the software. In addition, many devices such as laptops and even PDA-type devices seem very costly, and given the lack of a sound educational model for the technology, the cost-benefit is not there yet.

We need a combination of pedagogy, curriculum, and professional development around a model of effective technology use. With graphing calculators and associated software there is the potential for greater engagement and exploration by students of the topics in a class. With a wireless classroom network (like TI-Navigator) there is more immediate assessment feedback and active participation by the students (see also Hegedus, this issue).

TI’s focus is on solutions for simple implementation in the math and science classroom. This includes handhelds, integrated computer software, and a wireless classroom network, to enable teaching of important topics. We put a huge focus in our product
development on making the product work well in a classroom environment. We focus on working with publishers to assure that teachers have strong options for curricular materials that integrate the TI handhelds and software. We also provide strong professional development programs through the Teachers Teaching with Technology and other organizations.

**Bill Hagen, Microsoft Mobile**

(www.windowsmobile.com)

Mobile technology can have an impact, but it hasn’t as much in the USA because there are many different organizations trying to create their own environments. In other countries (e.g., the UK) innovations are shared with the entire country. Schools and districts in the USA are setting their own standards. Instead, we need a nationwide, baseline standard, centrally managed, and updated every three years. This is a very controversial issue in the USA, but with money being cut, less time can be spent by school districts to create their own technology standards. Overall, we need better processes, more than better technologies. This is important, as other countries are gaining on us, and we have to get better and more efficient.

The PDA can be seen as a transition to smartphones. Smartphones will help out teachers, administrators, and students by converging many devices into one and providing mobile connectivity. For example, distance learning with podcasting is already happening. People are creating media servers, streaming relevant information to handhelds or smartphones. We’ll see a big increase in this over the next 12–18 months.

Handhelds can be a low-cost, effective way for students to have anywhere, anytime access to tools and data. Comfort levels and learning increase when students own a product, e.g., calculators, science probes, and reading helpers. Handhelds are more immediate, social, and allow for creativity; students take to them immediately. Thus, handhelds provide an improved way for students to access to more information and tools in a form factor they find extremely personal and very useful in and out of the classroom.

Handhelds and the $400 PC are close in price, but handhelds are probably easier to manage than laptops. They are less conspicuous and easier to replace. The biggest issue is knowing how to deploy and maintain large numbers of handhelds. We need at minimum statewide standards for a limited number of configurations for successful implementation. The only way to make this work is with state and federal support for handheld initiatives; we are currently too fragmented in K–12, to the detriment of students.

We owe it to our students to continually examine the role PDAs and smartphones can play in the classroom to enhance the education experience. The improvement of professional training, curriculum development, and local technical support for mobile devices will help adoption, enhance the mobile ecosystem of partners who integrate and support these devices for schools, and lastly, which device program the district can financially and politically embrace, whether it be a student ownership option, district-based option, or shared-device program.

**Graham Brown-Martin, Handheld Learning**

(www.handheldlearning.co.uk)

In the twenty years that I’ve been involved with ICT and education, digital technology hasn’t had the impact on teaching and learning that we hoped for because:

- We’ve got our timescale wrong. Just because we haven’t seen the impact yet doesn’t mean there won’t be one.
- Technology/computer use has changed tremendously over time, so the impact has changed; think, for example, about developments like wireless mobile devices and video/image sharing online.
- We’ve spent too much time on learning how to use technology, not what to do with it.
- There are issues of access. Technology use in schools should be seamless, like we use pencils. Labs and scheduling don’t work because they prohibit seamlessness.
- True embedding = invisible technology. We shouldn’t draw attention to it.

Educational transformation needs a serious reconsideration of what school means to us. Is it a building or a community where learners with mobile tools can access information in different locations? In my view, school has been a state-provided nanny. Is that really what we want educational systems to be in the future?

Mobile devices can be helpful in rethinking schooling. They are ubiquitous and allow for personalized learning, rather than one size fits all. The devices have already impacted the learners’ world while education lags behind. If schools don’t change, they are going to be digitized out.

With mobile technologies, we are seeing a change. Students can assemble their own learning materials. Teachers will still be around, and not be replaced by technology. There will actually be a need for more teachers creating materials for learners. Inevitably, the role of teacher is going to change from caretaker to real teacher.

The key is to embrace what young learners already have; 97% of children over 12 in Europe have a mobile phone. Symbian’s new version allows phones to go in the mid-market, which is huge. Nintendo DS sells 140,000 units a week in Europe. Sony PSP sold 20
million units worldwide last year. Ultimately, it’s about recognizing that technology now belongs to the user and is no longer controlled from above. Learning should be viewed in the same way, with mobile technology providing access to information and communication supported by learning coaches. In addition, we need wireless, mobile systems to collect and assess evidence of learning, e-portfolio types of systems using mobile devices that will enable learners to record what they do using rich multimedia. This will help reward creative thinkers, which the current system doesn’t do.

In sum, transformation of education requires a real change in the mindset of teachers, learners, parents, and government of what learning is all about. Learning is something we do from the cradle to the grave. I don’t think we’ve come to terms with that yet.

We’re headed for an interesting transition period in education. There’s a lot of technology out there and not all of it works yet. Anyone who gets involved now is an early adopter. Without them, we won’t get to the next stage.

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**Author Guidelines for Magazine Articles**

In preparing an article for *Educational Technology* Magazine the primary fact to keep in mind is that this magazine is not a formal research journal. It is, as the name implies, a magazine. The Editors are looking generally for articles which interpret research and/or practical applications of scientific knowledge in education and training environments.

Thus, your article should not be cast in the form of a traditional research report. The facts of your research, or that of others, should be stated succinctly. Then you should go on to explain the implications of this research, how it can be applied in actual practice, and what suggestions can be made to school administrators, trainers, designers, and others.

The style of writing should be on the informal side—an essay—since once again this is a magazine and not a formal academic journal. Authors are free to state their opinions, as long as the opinions are clearly identified as such. The use of specialized jargon should be kept to a minimum, since this magazine has a very wide interdisciplinary audience.

There are no minimum and maximum length restrictions. Make your article as short as possible to do the job you intend. As a general rule, most articles are about 3,000 words. Include graphics as appropriate.

Note too that this magazine is read in more than 100 countries, by persons holding prominent and influential positions. They expect a very high level of discourse, and it is our goal to provide major articles of excellence and lasting significance.

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**Blurring Lines with Mobile Learning Games**

**Eric Klopfer**

*Massachusetts Institute of Technology*

This article explores how the future of mobile learning games lies in the blurring of the line between fun and learning, between in-school and out-of-school. Accomplishing this requires new paradigms as well as new technologies. Mobile learning games can be the conduits between the world of school and the world of life, and make them both more fun and productive.

The scene is a shopping mall. A group of friends arranged to meet at the mall on Saturday afternoon to do some shopping, hang out, and maybe catch a movie. They all arrive at different entrances, not having specified an exact meeting location. A quick phone call is made, “Hey, meet me at the food court.”

Within minutes other similar calls are made and the group has gathered. A few of the friends want to pick up a just-released CD, others want the new video game, and they all want to go see the new action flick.

There is a race to find the starting time of the movie. One person uses the Web browser on her cell phone, another tries a text message, and just for kicks one tries calling the theater. The race is won by the boy who just dropped off his sister outside the movie theater. The sister quickly texts back “20 min.”

There are many stores in which to shop. To find the best price on CDs and games, the group decides to divide and conquer. Text messages are flying. “cd sale 12.99,” with a response “gr8 brt [Great. Be right there].”

The next scene is a school. It is now Monday and the same group of kids is back in science class. As the bell sounds, they take their seats in the orderly rows of desks and face the front of the room. It is day two of photosynthesis. The lecture begins and the students begin writing notes on their paper. The lecture moves too quickly to understand and too slowly to pay attention, so many of the students are lost. One of them turns to her neighbor and passes a note, “i m so lost. r u