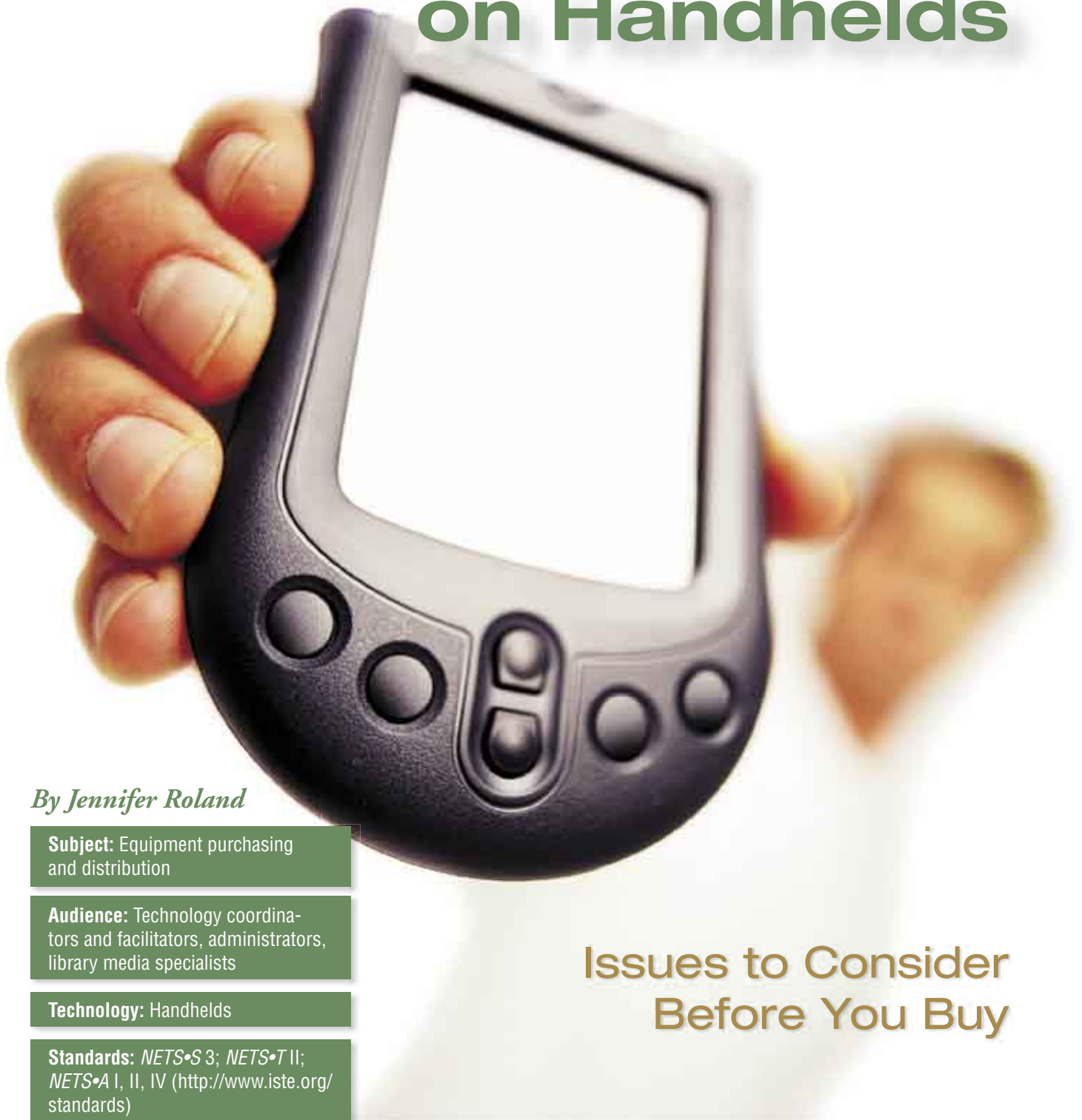# Getting a Handle on Handhelds

By Jennifer Roland

Subject: Equipment purchasing and distribution

Audience: Technology coordinators and facilitators, administrators, library media specialists

Technology: Handhelds

Standards: *NETS•S* 3; *NETS•T* II; *NETS•A* I, II, IV (http://www.iste.org/standards)

Issues to Consider Before You Buy

Handhelds are one of the hottest educational technologies right now, but how do you provide this resource to your students? Some schools buy enough handhelds for students to check out for the entire school year and use much like their textbooks—a one-to-one model. Other schools purchase sets of handhelds that students use in class as needed, more like microscopes used in the science lab—a lab model. But which of these models is right for your school?

First, you'll need to think about your budget constraints and your goals for using handhelds in your school.

Budgetary Issues

Handheld computers cost less than desktop and laptop machines, but they are not free. A low- to mid-range handheld with a cradle, keyboard, and carrying case can run you at least $300 with educational and bulk discounts. Wireless network cards, memory upgrades, digital cameras, and other peripherals add to the cost. Software can also be an additional cost. (Many free programs for student use are available on the Web, but you may not find all the tools your students need. In addition, few administrative tools are free.) So, you need to see what sort of initial purchase your budget will support. You can find many sources of grant funding for the initial purchase. For example, the Handspring Foundation offers grants of handheld technology and funding. You can find many general education grants at the SchoolGrants and the Foundation Center's Foundation Finder Web sites. (***Editor's note:*** Find these and other URLs under Resources on p. 11.)

Then, you need to think about training and ongoing support costs. (See Don't Forget the Training on p. 8.) In 2002, the Gartner Group estimated the total cost of ownership (TCO) for a handheld in the business world at $3,000 per user, per year (compared to $5,000 for desktop computers and $8,000 for laptops). This seems like a staggering figure, but it takes into account the specialized needs of business users. It is likely that TCO in education would be lower but still significant. Susan Brooks-Young, educational consultant and author of *Making Technology Standards Work for You: A Guide for School Administrators,* offers free tools on her Web site to help you assess the initial and ongoing costs of technology purchases, as well as many other tools useful to technology coordinators and administrators, including links to information about handhelds, TCO, and technology planning.

Paula Jameson, technology resource teacher at Green Middle School in Green, Ohio, says her school chose to provide mobile labs of handhelds "to give equal access to all children." Her district could not afford handhelds for all students, all the time, so they chose to provide handhelds to all as needed.

To control costs while still providing each student with his or her own handheld, some schools have limited the implementation to single classrooms or grades. One example is St. Joseph Catholic School in Ponchatoula, Louisiana. Technology coordinator Mel Dressel oversaw the distribution of handhelds to all eighth-grade teachers and students. Even though the costs of providing these machines to all students were high, the school leadership decided the purchase was worth it because the costs of handhelds were so much lower than those of laptops. Mel says, "I would desperately love a set of laptops, but I know it's not going to happen anytime soon. I see the handhelds as a really good option."

Michael Curtis, lead author of *Palm Handheld Computers: A Complete Resource for Classroom Teachers,* sees another method for controlling costs to the school or district: leasing. He says the "student might have to pay a rather small fee to use the handheld for a year, but the handheld remains property of the school. This can be justified by the need to offset additional purchases of more advanced and modern handhelds in subsequent years." This modification could help schools and districts afford to provide each student with his or her own handheld for the year, which is the model Michael advocates.

Handheld Uses

Handhelds can be used for tasks that improve student learning and teacher productivity whether students have them all day every day or just when needed. Before you can decide how many handhelds to buy, you need to figure out what your goals are for providing them to students. Do you want students to use the handheld as one of many educational tools at their disposal? Do you need to control the hardware and software students use in school? Or do you want to use hand-

Handhelds can be used for tasks that improve student learning and teacher productivity whether students have them all day every day or just when needed.

PHOTO COURTESY OF CAL YOUNG MIDDLE SCHOOL.

A lab model allows the greatest access to the greatest number of students at the lowest cost in most cases.

helds as a vehicle for restructuring your curriculum and assessment? The answers to these questions can help you decide whether to go with a lab model or a one-to-one model.

A lab model shows students that handhelds are like many other technologies, old and new—one of many tools for learning. Michael believes sharing handhelds can provide great opportunities for student learning, as long as the handheld activities have clear educational objectives—that is, students are using the handheld because it is the best tool to teach what they need to learn. For example, he says, look at "the power GoKnow's program Cooties can bring to the classroom for a specific science unit. Using Cooties, students can wrestle with and understand the concepts of immunity, initial carriers, and communicable diseases in a way that is simply not possible using any other technology or paper." Linda Kieffer, a researcher at Eastern Washington University, is involved in a PT³ project studying use of handhelds by

fifth graders. The students she studies share handhelds in pairs. She found that the handheld "became the natural tool for the kids to use" even when they had other tools available. SRI International's evaluation of Palm Education Pioneers grant recipients (as summarized on the Center for Applied Research in Education Technology, or CARET, Web site) supports this finding.

The lab model also keeps control over the handhelds and how they are used in learning in the hands of the instructor. As Terry Collins, technology facilitator at Calcasieu Parish Public Schools in Louisiana, says this model "places the responsibility of the charging, installation of needed applications, and general care of the handheld on the instructors."

A one-to-one model allows schools to reinvent a student- and handheld-centered curriculum. Michael says, "When students can use their handhelds both at home and at school is when truly revolutionary things happen." Teachers can begin to change

the way they teach; "for example, what does it mean that all students can have their rough draft and a word processor in their pocket? How does it change the teacher's strategies when they can beam an important Web page covering content that is not in their textbook?"

This model also allows you to use handhelds to track student data and offer tests. In Mel's school, teachers can beam quizzes to students, who complete them and beam them right back. (When she handed the handhelds out to students, Mel required them to sign the school's handheld Acceptable Use Policy, or AUP, which states "students may not beam answers of assignments to other students.") In their September 1999 *L&L* article, Debra Sprague and Christopher Dede discussed how teachers could use handhelds to easily track student data because of their small size and portability.

You will lose some control over the software installed and the ways students use the handheld outside of school, but many educators don't really see that as a problem. Mel mentioned at her presentation at NECC 2003 that giving her students handhelds and the responsibility for keeping them up and running led to increases in those students' leadership, responsibility, and empowerment.

The Right Model

Now that you've looked at how budgetary constraints and desired uses handhelds in your school can affect your choices for providing handhelds to students, you can compare the two models.

A lab model allows the greatest access to the greatest number of students at the lowest cost in most cases. Seven students sharing one handheld lowers the cost per student from approximately $300 to about $45. This provides an excellent resource for overcoming the Digital Divide, especially in poorer school districts.

DON'T FORGET THE TRAINING

Once you decide how many handhelds you will buy and how you will provide them to students, you have one more critical aspect to think about: teacher training.

Terry has found that some instructors are not comfortable with using such a small device. Michael has an answer for this (just as he has an answer for most obstacles to handheld integration). He says, "if I have 30 minutes with a teacher or administrator, I can easily overcome this perception of the handheld computer as a PDA. Simply ask the teacher, 'What do you use the computer lab for in your school?' Then, I can show them the same thing on the handheld."

Mel provided the teachers with handhelds about one month before giving them to students. She taught the teachers basic use and then allowed them the freedom to play with the machines in and out of school to become comfortable with them before they had to coach students in using the handhelds.

Paula's school got a grant from the Omnova Solutions Foundation to provide training not only in the use of the handhelds but also in planning lessons that incorporate handhelds. She found that, "Because teachers designed a use for the handheld, they took ownership of the technology."

Terry confirms that training teachers in the use of handhelds and allowing them time to use them "as an organizing tool for their school work, schedule, calendar," and so on is a good model for helping teachers become comfortable with the handhelds. In addition, he suggests, "Also providing training from instructors who have successfully implemented them in the classroom would help teachers easily adapt their classroom curriculum."

Paula cautions you to remember that in a lab model, teachers are responsible for the management details, such as remembering to charge the machines before using them with students: "We put chargers throughout the building and give each teacher five when he/she borrows a set. They are to return [the handhelds fully] charged. They don't all listen (imagine that) … so I always check them when they are returned and charge the ones that need it."

In *Administrative Solutions for Handheld Technology in Schools,* David Pownell and Gerald D. Bailey stress the importance of effective staff development. They suggest that you keep these guidelines in mind:

• When designing training, keep in mind the characteristics of adult learners.
• Create an environment that allows and fosters change.
• Provide all necessary equipment, time, personnel, financial rewards, and growth opportunities.
• Make sure training is based on actual classroom integration, not isolated from the curriculum.
• Encourage teaming and community building while teachers are learning how to use handhelds with students. You can encourage teachers to join online communities where they can talk to teachers with different levels of experience with handheld integration.
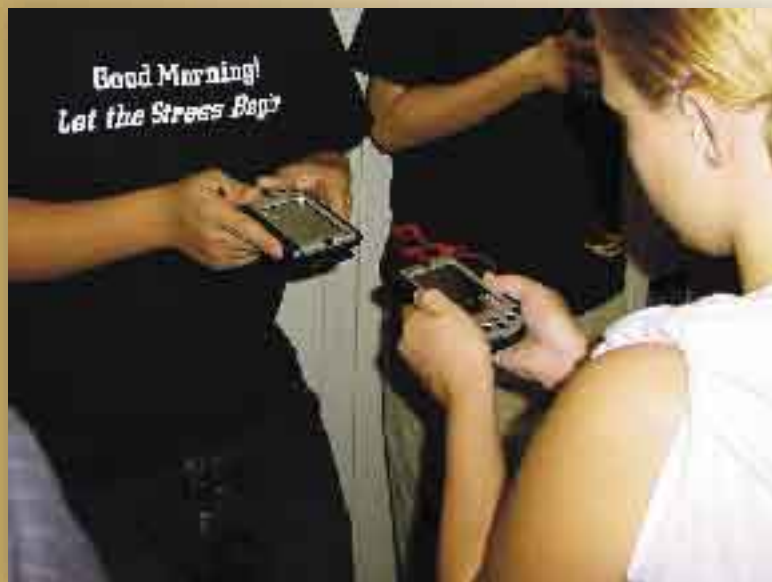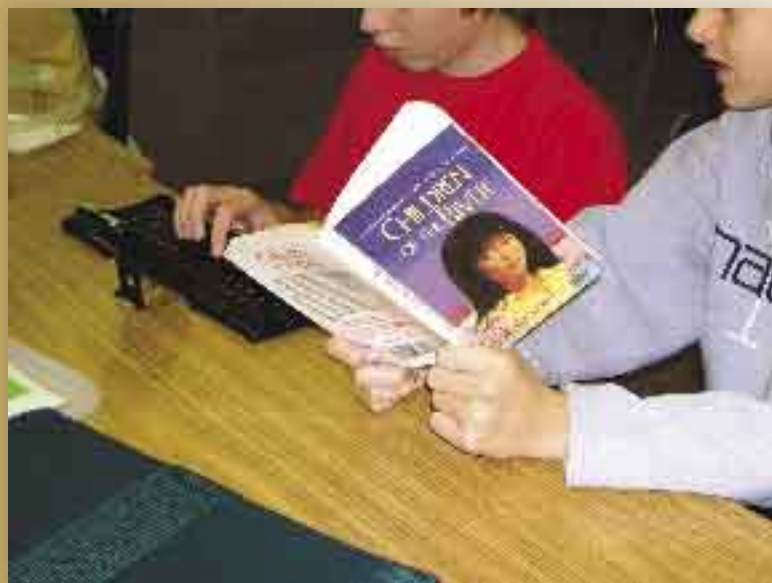
The lab model also ensures that each handheld is ready for the task at hand, with the appropriate software installed and ready to go. Some educators express concern that students will delete needed files, use up all the handheld memory with nonessential programs, or use up the battery so that class time is wasted charging the device. Terry says, "Having the school or teachers maintain the handhelds and the applications on each device allows for maximum use and productivity in the classroom during the school day." And, maintaining the handheld and its software is not the only issue. As Paula reminds us, "We have concerns that with students each having their own handheld, we will have the same issues as with supplies. They will forget them at home or in their locker, not charge them, lose the data, etc. With the system we use currently, we know we have all the handhelds with all the peripherals and software ready to go when the kids get into the room."

Advocates of a one-to-one model believe these issues can be dealt with. Another section of St. Joseph Catholic School's handheld AUP requires students to take responsibility for keeping their handhelds charged and ready to go. Mel says the students also know that if memory becomes an issue, it is their personal programs that need to be deleted, not their assignments or the programs installed by the school. Finally the AUP states that the parent is responsible for replacing the handheld if it gets lost or damaged.

Michael's experience supports Mel's finding: "When a student *needs*

The benefits of a one-to-one model, advocates argue, outweigh any costs incurred by loss, theft, or breakage. This model gives students access to learning anywhere, anytime.

[his or her] handheld to participate in science, language arts, math, or social studies, they respect and care greatly for the handheld. They simply don't lose it, forget it, sell it, or break it." He says most schools show only 2%–6% loss.

And the benefits of a one-to-one model, advocates argue, outweigh any costs incurred by loss, theft, or breakage. This model gives students access to learning anywhere, anytime. Michael says, "the handheld offers much more than what might be just an extension activity (albeit a powerful one), in a particular classroom. When students have notes, references, books, Web content, assignments, and homework with them at *all* times, pretty amazing things happen." Mel also points out that because of their small size and easy mobility, handhelds are easy to integrate into teaching without rearranging the classroom.

SRI International found that a one-to-one model frequently increased communication between parents and teachers, specifically about homework.

Finally, a one-to-one model is also a way to address the Digital Divide, because you can provide home access to a computer to all students, though it is more costly to the school or district than the lab model.

It seems as if the one-to-one model is the preferred model for most of the educators featured here, but the lab model is a good backup solution for schools and districts who can't afford to provide handhelds to all. As Paula sums it up, "We talk about moving into a model where each student has his or her own handheld. … We would love it if we could afford

color Palms, cameras, keyboards, and probes with all the software for every one of our 1,060 students."

Resources

Books & Articles

Curtis, M., Williams, B., Norris, C., O'Leary, D., & Soloway, E. (2002). *Palm handheld computers: A complete resource for classroom teachers.* Eugene, OR: ISTE. Available: http://www.iste.org/bookstore/detail.cfm?sku=palmbo.

Pownell, D., & Bailey, G. D. (2003). *Administrative solutions for handheld technology in schools.* Eugene, OR: ISTE. Available: http://www.iste.org/bookstore/detail.cfm?sku=handso.

Pownell, D., & Bailey, G. D. (2002). Are you ready for handhelds? *Learning & Leading with Technology, 30*(2), 50–55. Available: http://www.iste.org/LL/30/2/50p/.

Sprague, D., & Dede, C. (1999). Constructivism in the classroom: If I teach this way, am I doing my job? *Learning & Leading with Technology, 27*(1), 6–9, 16–17. Available: http://www.iste.org/LL/27/1/06s/.

Williams, B. (2004). *We're getting wired, we're going mobile, what's next?—Fresh ideas for educational technology planning.* Eugene, OR: ISTE. Available: http://www.iste.org/bookstore/detail.cfm?sku=whatnx.

Web Sites

CARET: http://caret.iste.org

Foundation Finder: http://lnp.fdncenter.org/finder

Handspring Foundation: http://www.handspring.com/company/foundation/

ISTE bookstore: http://www.iste.org/bookstore/

Omnova Solutions: http://www.omnova.com/commfr.htm/

SchoolGrants: http://www.schoolgrants.org/

Susan Brooks-Young's Resources: http://sjbrooks_young.tripod.com/sjbrooksyoungconsulting/id13.html

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