computing in the palm of your hand

In the past decade, we have seen the emergence of powerful portable computers, laptop computers and more recently, handheld computers. Also known as palm computers, personal digital assistants (PDAs), digital organizers or pocket PCs, these devices are very varied in price, in power and in the applications for which they can be used. What they have in common is that they fit in the hand (well, in most adult hands) or the pocket (if you have a decent-sized pocket), and can be operated away from a main power source.

Handhelds initially found a place in business computing, enabling people to access databases, create documents, carry out calculations and collect information, even when a long way away from their desks. In addition, most handhelds could be linked to a desktop or laptop machine and share data with that machine, so that files on the larger machine could be updated through information and data collected while away from the desk. For example, a salesperson visiting clients could use a handheld computer to record orders for products, and when back in the office, add these new orders to a database on a desktop machine.

Another important application of handhelds has been for information access. AvantGo developed a range of business, news and other information services for palmtop computers. Meanwhile OVID, the medical online information provider, has created a service called OVID@hand for use by physicians during consultations away from their desks. OVID@hand provides quick access to medical databases. Newspapers such as The New York Times, The Sydney Morning Herald and Iceland’s Morgunbladid, have services that deliver news to subscribers’ handhelds. Some research libraries, including medical libraries, have begun making more catalogs, data and library notices accessible through handhelds.

Since around 2000, there have been a number of monitored trials of handheld computers in schools. The one that received most publicity, as “the largest educational deployment of handheld computers in the United States,” involved almost 1,700 students and 75 teachers in the schools of Illinois’ Consolidated High School District 230 (Walery, 2000; Dean, 2000). Palm* handheld computers were selected for the trial because at a cost only $225 each, they allowed for a much better student to computer ratio than any alternative. The school district bought the devices and either leased or sold them to the students. The district also provided extra Palm Pilots* for classroom use by students who did not lease or buy the computers.

Fitness and nutrition teachers used the handheld computers with Vivonic Fitness Plan software to help students to monitor their nutritional intake and physical activity. In biology classes, students used the handhelds to collect data on housing, clothing, transportation and eating habits, in order to better understand the effect that today’s human lifestyles have on the ecosystem. In English classes, students used their handheld computers (with standard keyboards attached) to record journal entries and to share their ideas with their classmates. In science classes, the handheld computers (with a special software program) were used to...
study the speed of sound by measuring strikes of lightning and claps of thunder. What is disturbing is that there is no indication of school library involvement in this school-based trial of what is essentially a portable information processing system.

An action research project based on handheld computers was carried out at about the same time at Ballard High School in Seattle, WA (Brown, 2001). The computers in this case were the Handspring Visor Deluxe. They were used in a Grade 9 language class for access to curriculum materials on the school web site and for managing personal information—the latter involving assignment calendars and "to do" lists, among other things. The aim was that the students would "develop stronger organizational skills, improve academic achievement, and gain valuable proficiency with technology" according to the school principal Dr Engle (Rev. 2001). Participating students paid a $50 deposit at the beginning of the project and had the option to purchase their handhelds at a discount price at the end. Handhelds were also used elsewhere in the school. For example, the members of the school's administration team used them, as did security personnel. This project was seen as being the beginning of a long-term commitment to the use of these "real-world technologies" in the school.

At Willowdale Elementary in Omaha, NE, Tony Vincent's Grade 5 class has a web site called "Planet 5th: Learning in hand" (Vincent, 2003). Each student in his classroom has been assigned a Palm™ handheld computer and keyboard. "When students have a personal computer with them all day, education possibilities are greatly expanded," he says. Activities undertaken with the help of handhelds include revising and editing original writing, keeping a reading journal, reading book reviews, composing book reviews, reading and writing news articles, using a thesaurus, reading interactive stories, "learning interesting facts from the Web," recording science data, recording and graphing observations, reporting on group work, playing word games, composing music and solving math problems. Most of these applications have clear relevance to school libraries! The web site provides access to complete lesson plans for a number of grade levels and content areas. Visitors to the web site can also watch a video of students describing their favorite activities.

Despite many reports of successful educational applications of handhelds (for example, the collection on the "K-12 handheld success stories" web site listed under Other Resources below), the response to the use of these small devices in schools has not been all positive. Indeed, "some administrators have banned their use, saying some students use the little computers to cheat on tests, play non-educational games, or e-mail friends inside or outside the school" (Trotter, 2001). Mobile phones could also be used for these purposes, of course; it is not just a handheld computer problem.

In the various tests and trials, a number of potential problems were identified and often resolved. For one thing, just getting software onto the handhelds of a whole class, and then coordinating a wireless network of handhelds, is not easy. For another, "the lack of appropriate software" (Brown, 2001) is a big limitation on the more widespread use of handheld devices in schools. While some business applications (such as word processing, spreadsheets and presentation software) have a place in the classroom, and classroom management software has been developed for such tasks as managing gradebooks or schedules, there is still a general lack of high-quality curriculum-related software for these devices, though by late 2003 this situation was improving. A side effect of the use of handhelds is that they can open up new avenues for the generation of new forms of mischief. In one school, for example, students downloaded software from the Internet that enabled them to use their handhelds to switch on the school's television sets at inappropriate times. On the positive side, though, the anticipated problem of loss or theft of the little computers does not seem to have emerged as a significant issue in the reports of the monitored trials described above.

Another positive aspect is that, although different types of handheld computers vary greatly in price, they are nevertheless all relatively cheap when compared with larger computers. The price range is generally from around $250-$500, depending on memory, screen capabilities and other features. This makes a school goal of "one computer per student!" a more realistic one. On the other hand, a wireless network that will extend the value of the handheld computers as educational tools is not necessarily cheap or easy to maintain.

David Pownell and Gerald Bailey (2001)
have predicted that handheld computers will be "the next machines that will change the face of our everyday lives." Handhelds can, they say, "be used to enhance teaching and learning." To guide schools that are venturing into this area, they have identified factors in the school setting that can facilitate the effective educational use of new technologies such as handheld computers. Among these factors are the following: leaders who understand new technology and its benefits; a realistic assessment of the way in which the new technology is likely to have an impact on the curriculum; the availability of appropriate staff development opportunities; the provision of technology support in the school; an overall planning approach that takes new technologies into account; addressing security concerns; and paying attention to ethical and equity issues.

Are handheld computers a useful tool or just a fad with problems? Handhelds represent not just new opportunities for using technology but also new ways of interacting with information and learning resources. Given this, teacher-librarians should be looking at the opportunities offered by this new technology as well as the potential problems.

REFERENCES


OTHER RESOURCES

K-12 handheld success stories
http://www.palm.com/education/studies#k12

Kathy Schrock's digital gadgets
http://school.discovery.com/schrockguide/gadgets.html

1-1 Computing, from Berrien County Intermediate School District
http://www.remz11k12.mi.us/bcisd/classes/mobile.htm

101 great educational uses for handheld computers for teachers http://www.k12handhelds.com/101list.php

Palms in special education
http://www.palm.com/education/studies/study3.html

pdaEd.com
http://www.pdaed.com/

A report card on handheld computing

Supporting science inquiry in K-12 using Palm computers: A Palm manifesto
http://www.pdaed.com/features/palmmanifesto.xml