



# Power

## in the Palm of Your Hand

Using handhelds to transform teaching and learning

Over the past two decades, pilot programs for infusion of technology into the classroom setting first took the form of small pods of student-shared desktop computers. During the last five years, the model has been modified to provide a one-computer to one-student model utilizing laptop computers, and, in the past three years, has been expanded to incorporate the wireless protocols for extending the reach of networks and the Internet to all students with a laptop. As technology has advanced, and as the wide range of choices for handheld computer hardware and software has expanded, the next tool to significantly impact the teaching and learning process will be the handheld computer. With a lower price and thousands of subject-specific programs, the handheld will herald the large-scale growth of “ubiquitous computing” devices in schools. Recent research studies illustrate the benefits of the use of handheld computers in the classroom and the many ways that creative classroom teachers can utilize the no- or low-cost software available to meet student needs.

### What the Research Says

A study on the use of handheld computers in the classroom was prepared by Crawford and Vahey of SRI International. This report, entitled “Palm™ Education Pioneers Program: Final Evaluation Report,” provides information gathered through a survey study of 102 classroom teachers. These teachers completed a plan and formal application process and were selected as members of this pilot program to integrate the handheld computer into the classroom setting. These teachers are from all levels and subjects of the K–12 spectrum. The premise was that these early adopters would provide valuable feedback on the use, abuse, management, and implementation of a handheld computer program to provide information for other teachers as they begin to consider the use of these devices in the classroom. The results of the study are clear. Both students and teachers reported the positive impact of

handheld computers on the teaching and learning process. In summary,

- 89.1% of the teachers agreed that Palm computers are an effective instructional tool for teachers.
- 92.7% of the teachers agreed that use of Palm computers in learning activities has the potential to have a positive impact on students’ learning.
- 45.1% of the teachers reported that their experience using handhelds has very much changed the types of educational activities they plan for their students.

One factor that was mentioned throughout the report was the “flexibility and portability of handhelds, as compared to desktop computers, are probably the key factors that allow handhelds to be used more frequently and in a wider range of activities.” However rich the variety of software choices for the use of the handheld is, it will probably not replace the desktop as the “production tool” for the final work of the student. The need for faster processing speed, multimedia creation ability, a larger screen size, and a myriad of other tasks will still require the use of the desktop computer. Roschelle (2003) notes because of the lower cost of handhelds, students will be able to use them more often with true infusion into the curriculum and also goes on to state that a software program for the handheld computer “performs a small, well-defined function uniquely.” Crawford and Vahey reinforce this concept when they discuss the use of the desktop computer software programs to continue the instructional work started on the narrower handheld computer programs, but also present their findings that teachers began to think of the handheld computer in a different way and to use it exclusively for some specific functions.

### Handheld Technologies in the Classroom

Since 2001, when the SRI study was initiated, there has been an entire new crop of handheld technologies introduced. The speed, power, readability, and technological advances have created the ability to use handheld computers in new and exciting ways. With the introduction of **Bluetooth** ([www.bluetooth.com](http://www.bluetooth.com)), a small area networking protocol, there have been many collaborative software tools developed to allow handheld users to share common whiteboards and communicate in real time. With the widespread use of the larger area wireless technologies and handheld Web browsers, there is now access to the Internet and a school’s network directly from the handheld. The recent development of a Windows Terminal Services client for the handheld will allow direct access to a user’s desktop computer and all the applications from a remote location.

The SRI study outlined some of the problems encountered when students were off-task and playing games on the handheld or beaming notes to one another. With the newer wireless technologies, there are a host of new practices that can draw students off-task including IRC chat, Instant Messaging, checking email, browsing for pleasure, or reading an eBook for fun. As with any technology use in the classroom, the careful planning of ways to use it when appropriate and needed will keep students working on the task at hand.

Lamb (2003) suggests that the following questions be answered so the use of "technology for technology's sake" does not occur.

- What can technology do that we cannot do without technology?
- How does technology fit into the learning experience?
- What does it take to make the use of technology worth the time and effort?

The use of the handheld computer to meet a specific need at a specific time has been shown to be successful at all levels. There are many examples provided by teachers who share their use of handheld computers and the successful infusion into the classroom curriculum in a meaningful and pedagogically-correct way.

### Student-Centered Handheld Computer Use

A recent publication by Caughlin and Vincent (2003) presents successful practices of handheld use by classroom teachers in various schools in the United States. The authors conducted both site visits and interviews to provide a snapshot of creative teachers utilizing the handheld computer as a tool to enhance their curriculum, extend the availability of technology for students, and raise the student consciousness of the use of the handheld as an integral tool in the instructional process. The teachers included offered many creative ways to use the handheld hardware and software to meet specific needs of students, to reinforce concepts taught in class, and to extend and refine the knowledge of the students. Some examples include

- a Web-safe color chooser program to demonstrate to students that white light is composed of three colors.
- a lightning/thunder computation program to investigate the "mathematical rule for the relationship between the number of seconds between the flash and boom of lightning and its distance away."
- a drawing/animation program to illustrate and practice the use of homophones.
- a handheld version of concept-mapping software to help in the organization of information before the writing process begins.
- a handheld computer and free Web-page downloading software to move Web pages to the handheld for support of the information literacy skills of location and access.

Other teachers use the software that is built into the Palm™ handheld for creative ways. Since the Address Book is a database and the Memo Pad is a cursory word processor, there are all types of ideas for utilizing these applications for other purposes. Some

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of these ideas are to use the Address book for vocabulary and related information, and to use the Memo Pad for keeping track of projects and assignments.

### POWER in the Palm of Their Hands

The free applications for the palmOne™ OS handhelds number over 14,000 at this point. One model for classification of these programs is the POWER model, which seeks to classify the activity utilizing the handheld software. In this way, a single software program can be used for many different activities and might appear in any number of the POWER categories.

- **P**: Palm-skills activities
- **O**: Organizational activities
- **W**: Web-usage activities
- **E**: Educational activities
- **R**: Reference activities

Developing the activity and then locating and adapting an existing handheld software program to meet the needs of students during the activity will ensure the handheld computer is integral to the lesson or unit and not simply an add-on. By exposing classroom teachers to a range of suggestions and ideas, the infusion of handheld computers in the classroom will not seem to be such a daunting task, but simply a technology-enhanced extension of the lesson or concept already being taught.

The exciting new technologies available in handheld computers provide classroom teachers with a low-cost method to provide each student with an individual piece of technology and the software to support teaching and learning. The ability of the handheld computer to run function- and subject-specific software, as well as the creative ability of the classroom teacher to adapt existing software to meet differing content needs, allows yet another avenue for students to practice the concept of choosing the right tool for the job. With the addition of the advanced capabilities of access to the Web, collaboration via Bluetooth, and infrared beaming, the handheld computer becomes an exciting and motivating tool for both accessing and sharing information. For more information, visit **POWER in the Palm of Your Hand** ([kathyschrock.net/power](http://kathyschrock.net/power)).

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