

# EdnTop: A Portal for Education in the Post-PC Era

## of Wireless PDAs

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### Introduction

A “Post PC Era” looms in our future—a new reality are wireless PDAs—Personal Digital Assistants—and networked “portals,” such as EdnTop.com, dedicated to servicing them. The history of computing in education parallels that of the computing elsewhere:

- beginning in the 1960s with mainframe computers connected to classrooms, if at all, by wired teletype terminals;
- followed a computing generation later by mini-computers and dedicated terminals;
- followed in the 1990s by legions of personal computers, so-called “PCs” often wired to LANs (Local Area Networks) in client-server environments; most connected to the internet and the World Wide Web.
- and now comes the wireless Personal Digital Assistant, or PDA.

Most everyone recognizes that the internet is changing nearly every aspect of our world, making “globalization,” worldwide, a reality the far reaches of which are, as yet, only dimly perceived by most of us.

Today, the buzz word is “wireless.” And that word now means many things: PCs with “wireless” 802.11b LAN/WAN connections as well as small hand-held computers, “Personal Digital Assistants” or PDAs, from many sources such as Palm, Hewlett-Packard, Agenda, SONY, and soon many, many others. Some of these devices now have “wireless” connections to the internet. All of them promise a World of “ubiquitous” computing — access to programs and data, world-wide, 24 hours a day, 365 days a year.

Moreover, the accelerating pace of change guarantees that “education” in the traditional sense of teaching “facts and data and how-to-do things” is a hopeless race against time: the classroom and the teacher cannot possibly keep pace with changing world realities. Some of what is taught to a child of age 10 will be wrong or irrelevant by the time the child leaves high school. Some of what the student learns in high school will be out of date by the time that student leaves college.

We are now in an age of life-long learning. Our task is to provide learners at every age with a mindset, the skills and the tools to be effective and efficient at self-instruction for the many years following the end of formal education.

One of the tools that will play a role in life-long learning is the wirelessly connected PDA. Let’s now explore that reality.

### PDA Realities

The PDA is profoundly limited by one underlying reality: It needs to be small, light-weight, and battery powered. Moore’s “law” of computer capability doubling every 18 months has not applied to battery technology; battery energy density has improved very little over the past decades. If the PDA is small and light; its battery must also be small and light.

Thus, PDAs present a severe and increasing challenge since they do not have and will not soon have the energy and the processing power to execute in acceptable time large programs with much data. The limited battery power of all PDAs imposes fundamental limits on what PDAs can do.

A second reality is that to be useful in today’s world PDAs need wireless internet access. The answer is a new wireless, microwave technology that is just now arriving after several years of development and now acceptance and adoption, worldwide, by over 2,000 companies and organizations. The technology is called Bluetooth. See [www.bluetooth.com](http://www.bluetooth.com). For the most recent news, see [www.zdnet.co.uk/news/specials/1999/04/bluetooth/](http://www.zdnet.co.uk/news/specials/1999/04/bluetooth/)

In brief, a Bluetooth PDA communicates using very low power microwaves (that preserve battery life) over very short distances, (up to 10 m.) with any other Bluetooth using device. For example, to a classroom PC also with Bluetooth and a LAN wired connection to the internet.

Starting in 2001 and 2002, most newly designed cell phones, PDAs, PCs, and other consumer electronic devices including TV sets, autos, microwaves, CD players, and other household devices will be Bluetooth enabled. Bluetooth enabled devices are expected to be in hundreds of

millions of consumer devices worldwide by the year 2005. Nearly every possible consumer electronic and electrical device will soon be internet aware and internet addressable.

When and how will education benefit? Answer: when Bluetooth enabled PDAs are very inexpensive and in the hands of teachers and students. I expect that such devices will be made in China starting in 2001 and 2002 by companies that I am visiting this week and next.

SkyFire: an enabling technology

As it happens, the 1960s model of computing—powerful central mainframe computers connected to very minimal power “terminals”—is precisely a model that works well for PDAs that are also “minimalist” devices and (typically) connected to the computer servers using extremely modest bandwidth wireless networks, nominally 9600 Baud, but often as low as 1200 Baud. A Terminal-Server solution must deal with this reality.

A new terminal/server technology called SkyFire is one such solution. See: [www.marblesinc.com](http://www.marblesinc.com), and the white papers and the case studies presented there. SkyFire terminal software turns wireless, Bluetooth enabled PDAs into functioning “windows” into programs, processes and data resident on powerful computers that are SkyFire “servers” or “broadcasters” located anywhere on the internet worldwide. SkyFire enabled devices include Palm PDAs, PocketPC and Windows CE enabled PDAs, PCs, and soon data cell phones from manufacturers worldwide. Any SkyFire PDA can connect to any SkyFire server.

For detailed information on SkyFire, see [www.marblesinc.com](http://www.marblesinc.com). Note the white papers there in the Marbles online “library” and the various case studies showing SkyFire applications.

The result is a real-time, fully connected PDA, a true terminal using SkyFire to “run” a remote computer and the programs on it, without a need for a download of any programs or data to the local PDA. By keeping all programs and data on a central server, SkyFire neatly and entirely surmounts the PDA’s basic problems of little power and little processing capacity.

A SkyFire server provides an unlimited and changing menu of choices to all connected PDAs without ever a need to download or synchronize the contents of the PDA to the server, ensuring low total cost of maintenance and management overhead.

EdnTop.com: a PDA portal for education

Curriculum Associates, Inc., the company that I represent, is now developing a portal for wireless PDAs for education. We call it: EdnTop.com. It is both a web server (visit it with your browser to receive the most recent news) and a SkyFire server (visit it with an internet-connected PDA using SkyFire).

Eventually EdnTop.com will provide a wide range of services for administrators, teachers and students. Which of the many possibilities will emerge as high priority remains to be seen. Some likely possibilities are student attendance and performance data, some of which may be continuous assessments of things mastered and ongoing learning objectives for individual students. For students, data taking for math and science projects, email and instant messaging for joint projects and collaboration are easily provided. Graphing calculators for visualization of complex mathematical functions could be provided. What seems certain is that the PDA and “ubiquitous computing” over the internet soon will open vast new realms of opportunity most of which none of us yet fully understand, just as the PC opened new vistas for us all.

You may try EdnTop.com today, using your internet connected PC or laptop. Here’s how. Using your browser, go to <http://EdnTop.com>. Find the “How can I try it?” section. Follow the Download link. Click to download the three .pdf papers. And Click to download the EdnTopDemo.exe file.

Running EdnTop.exe puts a Palm V onto your PC in emulation mode. Follow the instructions for internet configuration. Then launch the Palm V emulator (click the Go! Button on the emulator). If your PC is connected to the internet, the SkyFire terminal in the Palm V on your PC will connect to our SkyFire EdnTop server or broadcaster in North Billerica, Massachusetts, USA. Follow the instructions in the .pdf files you have already downloaded to try the various applications on EdnTop.com.

In the future, many more applications for teachers, administrators, and students will be available. Many of them free. But some will be “pay to use” although we have yet to determine pricing and payment methods.

Where do we go from here?

We at Curriculum Associates are actively seeking educational partners who might wish to create SkyFire enabled applications that could be served worldwide from EdnTop.com or from another SkyFire server/broadcaster linked to EdnTop.com. A software development kit will be made available free to our partners. SkyFire applications are written in two widely used programming environments, Visual C++ and Visual Basic. The programmer needs some familiarity with modern Object Oriented Programming.

Meantime we are talking with a number of PDA manufacturers who have shown interest in the possibility of manufacturing low cost PDAs with SkyFire terminals and Bluetooth connectivity for use in schools worldwide. Our objective is to have such PDAs available by 2002 at a cost of less than US\$100. I am confident that this objective is within reach. Stay tuned. Return to [www.EdnTop.com](http://www.EdnTop.com) for progress reports. And let us know if you’d like to participate in this exciting journey in the post-PC era.

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