The next big thing? Exploiting channels and handheld computers for student learning

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Beverley Oliver
Centre for Educational Advancement, Curtin University of Technology
Fiona Wright
Centre for Educational Advancement, Curtin University of Technology

The handheld computer (also known as the personal digital assistant-PDA) means that portable computing has become cheaper, lighter and more accessible. In addition, handheld computers can synchronise with desktops to download websites which work offline (known as channels). This paper explores the opportunities for teaching and learning with channels: that is, what are the new horizons and issues when the Web becomes portable? How can this technology (cost, capacity, screen size and battery life) change the online learning environment which has become more commonplace in recent years?

Introduction

A handheld computer is a small, mobile device that provides computing and information storage and retrieval, and that can be easily carried and used (Deneen, 2001). They are often referred to as personal digital assistants (PDAs). The more sophisticated devices offer software applications and tools such as a cut-down versions of Office products; email, tasks and calendar (Outlook, for example); a web browser; handwriting recognition software and more. Many synchronise with a desktop computer (or with a local area network), some using wireless communication. Again the more sophisticated have wireless connection to printers and projectors; many have voice recorders and play MP3 files. New developments will undoubtedly explore the option of including mobile telephony (British Educational Communications and Technology Agency, 2001).

Like all technologies, handheld computers have their advantages and limitations. On the positive side they are highly portable with a long battery life; they are simple to use and are turned on without having to boot up ('instant on'); and many are significantly lower in cost than desktops or portables. However, their functionality and potential for expansion and upgrade are more limited than more powerful devices, and there are compatibility issues between devices using different systems. Because they are new and evolving rapidly, it is difficult to predict which will remain supported (British Educational Communications and Technology Agency, 2001; Deneen, 2001; East Carolina University, 2001).

While enjoying popularity as an information tool for business executives, the handheld has more recently been used in universities, particularly in the United States. Some recent examples cited by Deneen (2001) show the use of PDAs is in its infancy, and largely used for information management and administrative purposes. Many appear to be supported by the manufacturers of the devices:
- The College of Science and Engineering at the University of Minnesota Duluth requires all incoming freshmen in engineering and computer science to have a Compaq iPAQ device.

- The University of South Dakota provides Palm PDAs to all first-year undergraduate students as well as first-year law and medical school students.
- The School of Computer Science at Carnegie Mellon has launched the Pebbles PDA Project to study how PDAs can be used in conjunction with personal computers and other devices.
- East Carolina University has a project with 125 students using Handspring Visor devices involving six courses in multiple disciplines.
- The University of Delaware is designing their campus portal to be friendly to PDAs.
- George Fox University was granted a proof-of-concept award from NWACC entitled Palm Professor: using handheld technology to enhance teaching and learning.
- Virginia Commonwealth University has a number of PDA projects, mostly medical.
- Wake Forest University has several projects with PDAs, including a party management system that uses a Symbol scanner-equipped Palm to check students into parties via the campus wireless network.

But how might PDAs be used to change learning in higher education? So far, little or no research has been done on the use of these devices in effecting better learning outcomes. It is possible that, like desktop and laptop computers, handhelds will be adopted by educational institutions because they are novel, or even because they give the appearance of an institution being very technology oriented. If they are used simply as cheaper, lighter mobile computers, then they will probably be a less expensive substitute for the laptop.

However, the PDA has spawned a new form of web access that has the potential to influence the current move to online education (which is currently confined to the desktop and the laptop). The new form of access is called a channel, and it is operated through a proprietary website such as AvantGo (http://www.avantgo.com):

> The AvantGo Mobile Internet service provides free interactive and personalized content and applications to your handheld device or Internet-enabled mobile phone real-time via wireless connection or desktop synchronization. With AvantGo you can seamlessly transition between wireless and offline modes to browse your favourite websites on your mobile device or select from our more than 1500 brand-name content and application channels for up-to-date news, financial, travel, entertainment, sports information and much more (AvantGo Inc., 2001).

Many companies have collaborated with AvantGo to reproduce their web content in the form of a channel; once synchronized with an Internet-connected desktop, the PDA carries a fully operational and accessible website which can be accessed at any time—whether or not the PDA is connected to the Internet. There are several types of channels available through AvantGo: some are repositories of static information; others are repositories of regularly updated information. An example of the former is the PocketDoctor channel which has several facets: it is a business venture which advertises access to a doctor on duty (called Pocket Healer) through a local telephone number. It also contains content on how to deal with doctors and medical jargon as well as a "complete medical encyclopaedia" which briefly describes the causes, symptoms and treatment for hundreds of ailments. The channel is fully self-contained and accessible. Because of the nature of its content, this type of channel rarely needs updating.

The second type of channel does require updates on a regular basis: such channels have been produced by leading newspapers such as the *Times* of London and the *New York Times* (and

many others). As they update, these channels download cut-down versions of the papers' main stories (which can be read at any time and in any place without an Internet connection). A second example of this type of updating channel is a purpose-built portal such as Sofcom PDA Portal, an Australian site which provides (brief) leading news stories, local weather forecasts (for capital cities), local television and movie programming, lotto numbers and so on. Both types of channels allow for email communication and some interactivity: readers of the Times are invited to "send us your comments" and locality changes can be made between synchronisations on the Sofcom channel (Sofcom Inc., 2001).

And there is more. The AvantoGo site currently offers ready access to hundreds of channels (sorted into global regions and languages) in categories such as news and media, entertainment, finance, travel, city maps, bus timetables, sport, and so on. It is entirely possible to have daily updates of horoscopes, recipes, sports scores, wine reviews and so on. You can also create a channel to be housed at AvantGo for international access. And (yes, there's still more) you can also download any existing website as a channel—going to a conference and want all the online abstracts handy? Want to keep your online staff page handy for remote access? Want your own version of the local cinema's website? Provided it's not to large or graphics intensive (there are limits on memory size), you can have any of the above on your PDA.

Sadly, the education channels housed at AvantGo are few in number, and rudimentary in form. Encarta's Language Learning—French To Go, for example, is little more than a brief list of vocabulary. However, possibilities exist for teachers in all levels of education to explore this new technology for use with their students. East Carolina University, for example, is using the PDA to deliver academic course content in six of its courses. Academic content is prepared by each course professor and placed on an AvantGo server (East Carolina University, 2001).

Access to information has always been central to learning, but it would be exciting if PDAs with their channels were used for more than simply providing mobile access to (lots of) information. New directions in this area need to try to exploit the PDAs potential for interactive learning—to become the patient tutor that less mobile workstations have begun to provide. Because of its size and cost, the PDA might truly become a wearable accessory which can provide a richer digital communication and information environment than the mobile telephone. If this is so, students will be able to carry with them large amounts of data, including websites and excerpts from textbooks and notes (commonly known as e-Books (Looney & Sheehan, 2001)), answer email offline, and create new documents. Exchanging files during group work is easier with the PDA's infrared beaming facility. Printing and projecting is done with wireless connectivity. The challenge is to harness best practice in online learning and learning management systems, and explore how these can be 'channelled' for use on the PDA so that learning environments become a part of our apparel.

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