高岡短期大学紀要　第19巻　平成16年3月
Bull. Takaoka National College, Vol.19, March 2004

Possible Applications of Handheld Computers in Language Education and Educational Administration by

Christopher Covey* and Tetsuya Fujita*

1.0 Introduction

This paper will describe both the potential uses of Palm OS handheld computers as multimedia learning platforms in language education, as well as recent developments in the applications of handheld computers in educational administration. Recent progress in handheld computers design and functionality, overall data storage, and the ability to export and store several different formats of PC documents for use on Palm OS handheld computers clearly demonstrate that they hold a great deal of promise. This paper will attempt to show the progress that has been made in the past year or so, as well as elaborate upon the progress that needs to be made in order to reach the stage where they can truly function as useful multimedia learning platforms in language education. Then, the use of handheld computers as data collection tools for administration in conjunction with Student Administrative Systems and web sites that can be continuously updated and accessed by students, faculty, and others with proper access will be described.

KEYWORDS
Personal Digital Assistant (PDA); e-book; Portable Document Format (PDF)

2.0 The Present Generation of Handheld Computers & Software

During the last year to two years, Palm OS handheld computers have made great strides in processor speed, going from an average of about 33 MHz to a high of around 400MHz. Concomitantly, internal memory for applications and data storage went from 8 Megabytes to its present max of 64 Megabytes in Palm 's highest priced unit, the Tungsten C. The quality of LCD displays, as well as cross-platform compatibility with Windows PC software has also improved dramatically.

The emergence of Bluetooth and Wireless Fidelity – two new wireless protocols for handheld devices – has improved their connectivity to peripheral devices, other PC's and the Internet. Handhelds compatible with both wireless standards are also beginning to emerge, as are hybrid PDA/cell phones like Handspring's Treo 600. Each of these wireless protocols aims to give the next generation of handhelds some kind of telephony capability as well, but in all likelihood, the GSM/GPRS cell phone data protocol used by the Treo 600 is the best choice for providing wireless internet connectivity with telephony and a fully functional handheld computer. Wi-Fi, which routes telephone calls through the Internet and has been heavily hyped as the wave of the future but seem to have many inherent limitations, the biggest one being their limited coverage when compared to

＊地域ビジネス学科

cell phone protocols like GSM/GPRS.

Multimedia educational content designed specifically for PDAs has begun to emerge, but in a form that is greatly limited by the lack of storage capacity. Complicated and device specific data compression schemes to store large audio files for self-study language study have been used with little or no market penetration for the new products. In the opinion of the author this shows the potential for multimedia on handhelds, but also provides a clear illustration of its present limitations.

The author has field tested a variety of applications that allow users to port documents created on Windows PCs to the Palm and vice versa. Without a doubt the slickest and most useful application suite for this purpose is version 6 of "Documents to Go" by Dataviz Corporation. Version 6 of this software provides virtually all of the features that users would expect to find in fully functioning PC software. For word processing and spreadsheet files this includes spell checking, word count, as well as support for various kinds of file formats that are often not even supported in Microsoft Word (WordPerfect, RTF, Quatro Pro, Lotus 123, etc.) All the standard Microsoft PC programs are supported; this also includes Microsoft Outlook and PowerPoint. All of the applications that the author used worked well, with the caveat that the word processing software tended to crash occasionally. However, it should be pointed out that these crashes only required soft resets, which did not result in any loss of data or anything more than a minor inconvenience. The major issue in using both the Palm OS version of Word and Excel was that, while the transfer of file formatting back and forth between both platforms usually went smoothly, occasional problems with fonts and images were encountered. In spite of this, it is feasible to assume that the inherent bugs in the "Documents to Go" software as well as Mobile Word and Mobile Excel will be corrected in short order.

Without a doubt, the most significant development in terms of handheld computer software was the emergence of a version of Adobe Acrobat Reader for the Palm, and several other handheld operating systems. This software, which operates on the PC, prepares Adobe documents and e-books to be viewed on handhelds. This development, coupled with the creation of proprietary handheld reader software from Palm and others, has increased the utility of handheld computers by an order of magnitude in this writer ㄱ s opinion.

All of this e-book reader software has suddenly created an existing library of thousands of books and an almost unlimited number of documents written in Adobe PDF (Portable Document Format.) Due to the fact that creating a PDF from Microsoft Word or many other word processors/desktop publishing programs is incredibly simple, it stands to reason that textbook publishers could easily start to offer both PDF and traditional hardcopy version of college or high school textbooks. This development makes it almost inevitable that at some time in the future, significant numbers of students will begin to choose to buy their textbooks in Adobe PDF format instead of a traditional hardcopy textbook.

Adobe PDF is not without its problems, however. The Adobe user's forum, which can be found on Adobe's web site, clearly shows that there are a variety of technical glitches, especially for the Macintosh platform, preventing more widespread adaptation of PDF documents. Hopefully, future versions of this program will be able to display graphics adequately, as well as have some kind of basic multimedia functionality. If and when these deficiencies are corrected, the PDF format should have a bright future and help encourage more widespread use of PDAs or similar devices.

The author feels that a significant trend towards more widespread PDA use is likely for one main reason. Basically, this generation of handhelds now has enough internal and external capacity (memory) to store several full-length textbooks, dictionaries, thesauruses, and any number of auxiliary programs necessary to facilitate study, such as specialized calculators, databases, etc. Clearly, nothing beats having all of the functionality described above in one pocket sized device.

All of these developments have made it much more feasible to take handhelds seriously as mobile work platforms/essential devices that are so small and portable that they can be taken virtually everywhere we go. The same cannot be said for even the most compact notebook computer on the market, although this may change in time.

3.0 Towards Handhelds Functioning as Multimedia Learning Platforms

As Bob Tinker, president of the Concordia Consortium has noted, the term "personal computer" is mostly a misnomer when applied to educational settings. The author agrees with Mr. Tinker's assertion that a more accurate term for computers used in schools is "institutional computer." The implication is that students who do not specialize in computer related fields often do not get the kind of exposure needed to fully understand how to use computers as tools for learning and creative expression.[1]This, coupled with the reality that many students do not yet have access to computers at home in spite of consistent drops in the retail prices of personal computers creates a picture that would suggest that personal computers may not be the ideal platform for language learning. The issue that is crucial here is lack of access, and there is no doubt that this is what has prevented multimedia computer assisted language learning making a significant impact here at TNC.

Widespread introduction of handhelds may indeed provide a solution to the persistent problems of providing students with continuous access to multimedia learning. However, in spite of the considerable progress that has been made, handhelds still have to overcome several obstacles before they can become truly multimedia learning platforms. First, to handle the demands of multimedia data storage and retrieval, internal data storage capacity must increase by at least a factor of at least 50 times the capacity of today ı s high-end units. In order to be useful, therefore, PDAs would have to have an internal storage capacity of at least 3 Gigabytes. This kind of storage would be adequate for large audio and visual files needed for multimedia language learning.

---

1 "The Whole World in Their Hands" by Robert Tinker, http://www.ed.gov/Technology/Futures/tinker.html

Although achieving a quantum leap like this in internal memory might seem like a near impossible feat, miniature storage devices small enough for use in PDAs have existed for quite some time. Devices such as the Apple I POD, which, although heavier than most PDAs, are as small as or even smaller than most PDAs, and have a capacity of 40 Gigabytes, clearly prove that larger storage capacity is readily available.

Unfortunately, the limiting factor preventing the emergence of more sophisticated PDAs with larger storage capacities is that present battery technology is completely and totally inadequate for this purpose. Currently, PDAs utilize rechargeable Lithium-Ion and Lithium Polymer batteries that are approaching their theoretical energy densities. This means that until better battery technology is found, more powerful handheld computers, smart phones and other portable electronic devices can only by built by sacrificing use time between recharges.

Currently, the most promising technologies being developed to extend the practical use of the entire range of portable electronic devices are undoubtedly in the field of miniature fuel cells. Miniature fuel cells promise to offer an increase of several times the energy densities of present Lithium-Ion batteries, but technological and regulatory obstacles to their introduction to the consumer suggests that perhaps they are at least two years away from widespread adaptation.

Finally, an intuitive, user friendly hypertext authoring language for PDAs has to emerge in order for educators to fully take advantage of better PDAs with adequate battery life when they actually do emerge. Concomitantly, Adobe Reader for the Palm should also improve its ability to display graphic files and play audio files. Since the most recent version of Adobe Reader already shows signs of making progress in this regard, the author is cautiously optimistic that future versions of Adobe Reader will handle these tasks better.

4.0 Recent Developments in the Use of PDAs in Educational Administration

The use of PDAs in educational administration has also continued to expand. As illustrated in Figure 1, PDAs are used as data collection tools in the classroom to, for example take classroom attendance and enter grades. This data is then transferred to the teachers'PC, which in turn syncs with a central Student Administrative Server.

An interesting system for providing each school with a password protected web site has also been developed by a private US company. Teachers, faculty, students and their parents can access the school's site to retrieve information after they receive a password. The system also can automatically send updates to registered parties via e-mail. Use of this and similar systems are become more popular in public school systems in the US because of the fact that they save time, while increasing the accuracy and accessibility of student record systems.

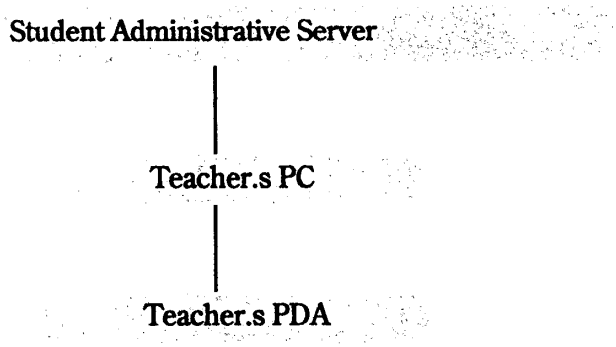

Figure 1. Example of Current Use of PDA's in Educational Administration

Bibliography

1. "Palm Tungsten C - Handhelds - CNET Reviews."
http://reviews.cnet.com/Palm_Tungsten_C/4505-3128_7-21120743.html?tag=pdtl-img
(09/02/03 13:33:45)

2. "読売新聞社の PDA コンテンツ紹介"
http://home.airbitway.com/yomiuri_e/

3. "Kaplan GRE Verbal Workbook, E-Book Edition"
http://www.amazon.co.jp/exec/obidos/ASIN/B00006HCEX/250-7991838-0853011

4. "eLearning Business Idioms from Silicon Valley"
http://www.amenglish.com/products/palm.cfm

5. "Toshiba to Launch PDA For Phone Calls on Web"
http://www.WSJ.com_Toshiba_Launch20PDA_For_Phone

6. "Edline for Educators"
http://www.edline.com/solutions/educators.html
http://www.edline.com/solutions/technology.html

7. "Getting a Handle on Handhelds: What to consider before you introduce handheld computers in your schools."
http://www.electronic-school.com/2001/06/0601handhelds.html

8. "Handhelds Track Student Progress: Instant Feedback Through Beaming Identifies Student Misconceptions."
http://www.concord.org/newsletter/2002winter/handhelds.html

9. "The Future of Handheld Computers in Education: A conversation with Palm, Inc."

http://www.concord.org/newsletter/2000fall/futureofhandhelds.html

10. "The Whole World in Their Hands"
http://www.ed.gov/Technology/Futures/tinker.html

11. "Adobe PDF User Forum"
http://www.adobeforums.com/cgi-bin/webx?14@@.ee6b2f2

12. "About Easy Grade Pro"
http://www.orbissoft.com/about.html
http://www.orbissoft.com/feature.html

13. "Mobile Word Users Guide"
http://www.mobi-systems.com/

14. "Mobile Multimedia Systems" by Paul J.M. Havinga. Ph.D. Dissertation, submitted at Unversity of Twente, Netherlands, January, 2000. ISBN 90-365-1406-1

15. "Documents to Go Product Descriptions"
http://www.dataviz.com/products/documentstogo/index.html

16. "Adobe Reader for Palm OS"
http://www.adobe.com/products/acrobat/readerforpalm.html

17. "Impressive Treo 600:Handspring 1 s new Palm-based PDA/cell phone hybrid offers a slew of additional features."
http://pcworld.shopping.yahoo.com/yahoo/article/0,aid,113087,00.asp?

語学教育および授業管理におけるPDAの利用に関する検討

クリストファーR. コビー, 藤田 徹也

本稿では、Palm OS PDA（携帯情報端末）の語学教育におけるマルチメディア教材としての利用可能性、および授業管理用アプリケーションの現状について述べる。

近年のPDAはデザイン・機能・データ容量等の各面で進歩を見せている。また、PCの多様なフォーマットのドキュメントがPalm OS PDAで利用可能となっていることから、PDAが大きな可能性を持っていることは明らかである。本稿では、ここ一二年に見られたPDAの進歩について述べ、PDAが語学教育におけるマルチメディア教材として真に機能する段階に到達するために必要な課題について考察する。

さらに、授業管理用データ収集ツールとしてのPDAの利用についても述べる。このツールは、PC上の学生管理システムおよび学習用Webサイトと連動しており、データを迅速に更新することができる。学習用Webサイトは学生、教職員、および適切な制限下の他者がアクセスすることができる。

KEY WORDS

Personal Digital Assistant（PDA）; e-book ; Portable Document Format（PDF）