Designing library services for the PDA*

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Abstract

Handheld electronic devices are becoming popular and are playing an increasingly important role in the distributed learning environment. Enabling library users to maximize their access to library resources though these devices involves challenges that include determining the level of interest among users, identifying relevant resources, and establishing technical and compatibility standards. Affordability of devices for consumers, and availability of resources and support for handheld computing initiatives within libraries must also be considered. This study examines issues and challenges surrounding the design and delivery of library services and resources for personal digital assistants (PDAs) at Royal Roads University Library, finding that there are beneficial research applications for handheld devices that can be implemented even while related technologies continue to evolve.

Personal digital assistants (PDAs) of various sorts are increasingly owned by members of the Royal Roads University community, with 33% of participants in a learner survey reporting ownership in 2004. Access to information resources such as eBooks, news, and journal articles figured prominently among the services most desired by survey respondents (Hawksworth, 2005). Further, a pilot project in 2005 in the use of Blackberry devices by university staff and faculty indicated that a more fully featured PDA, such as PocketPC or Palm, would better satisfy some requirements, such as browsing the Internet and reading eBooks (Grundy, 2005). In light of the findings of these two earlier studies, the Royal Roads University Library decided to identify faculty and staff who use PDAs, other than Blackberries, and to assess their level of interest in PDA-friendly services to complement existing desktop-based access to online library resources. A secondary objective was to explore which PDA applications our clients perceive to be of most use.

To date, programs at Royal Roads University have been delivered primarily online to distance learners across Canada and beyond. To support the University's commitment to e-learning and its interest in mobile learning (m-learning) environments, the library focuses on providing resources in electronic formats over print. This mandate to provide access to resources in electronic format wherever possible and practical makes it appealing to explore PDAs as another mode of access for online resources. With the growing popular adoption and increasing evolution of smaller devices, it seems natural to anticipate a demand for PDA-accessible library services. As Michael Seadle notes in his introductory article to the PDA issue of *Library Hi Tech*, we need to "[consider] how our patrons will use PDAs, just as in the past we had to plan for their use of computers, laptops, and Internet access" (Seadle, 2003).

*This is an electronic version of an article published as:

McFarland, D., & Mussell, J. (2006). Designing library services for the PDA. *Journal of Library Administration*, 45(1), 301-314.

Journal of Library Administration is available online at: <http://www.tandfonline.com> and this article is available at: http://www.tandfonline.com/doi/pdf/10.1300/J111v45n01_17

Literature review

The decision to embark on this study coincided with the implementation of a wireless network across the University. An earlier study (Carney, Koufogiannakis, & Ryan, 2004) suggests wireless as a necessary precondition to support a growing academic PDA user community. In another study where a wireless network was being implemented, the authors expected patrons with PDAs to become their main wireless users (Seadle, 2003). With so many libraries and academic institutions implementing wireless networks, librarians are well positioned to consider the experiences of early adopters in determining what services might be relevant for this new constituency within their own user groups.

Initially, health libraries took the lead in providing PDA services and instruction to medical students and clinical staff, with the Arizona Health Sciences Library in Tucson leading the way (Bell, Burnette, Dorsch, & Peters, 2003; Garrison, Anderson, MacDonald, Schardt, & Thibodeau, 2003; Shipman & Morton, 2001; Stoddard, 2001). More recently other academic libraries and some school systems have begun to explore the potential of this service area (Carney et al., 2004; Dahl, Koufogiannakis, & Ryan, 2005). Their experiences demonstrate the benefits and limitations of the PDA as a medium for instruction and for providing access to library resources.

PDAs allow for the benefit of learning on the go. The phrase “anytime, anywhere” becomes much more meaningful in the context of a device that can both fit in a pocket and exploit the power and resources of an institution’s wireless network. Post secondary institutions increasingly find themselves operating within this context: users may regard PDAs as an economical and more portable alternative to laptops, whereas institutions may find provision of a wireless network more attractive than maintaining costly and space-consuming labs full of desktop computers in constant need of renewal (Carlson, 2000). Besides saving space, Peters et al. (Peters, Dorsch, Bell, & Burnette, 2003) point out that wireless access to online resources may actually facilitate increased use, reflected in usage statistics, with access no longer limited to the available conventional computers.

As part of the ongoing development of PDA services, some ILS vendors have begun offering PDA modules. In 2004, Innovative Interfaces, Inc. launched airPac, a wireless OPAC interface that works with Internet-ready PDAs and cellphones (Innovative Interfaces, 2004). Some progressive websites are being designed to enable viewing and use through PDA browsers. In their article on a PDA deployment at the University of Minnesota Duluth, Deneen and Allert note that

viewing normal Web pages from the iPAQ [pocketpc] may require considerable scrolling, both horizontally and vertically... faculty needed to set aside time to reformat all crucial course Web pages to fit the iPAQ... The need to reformat Web pages, however, places additional requirements on the provider of this content. Ideally, Web sites should be formatted to reconfigure themselves to suit the device that is accessing them, but this also requires additional programming (Allert & Deneen, 2003).

If autoconfiguration is not possible due to restrictive templates or the nature of the content, web designers may still enhance PDA usability by paying attention to how content appears in browsers on the tiny screen.

The potential offered by the technology, together with growing ubiquity and apparent cost savings afforded by PDAs and wireless connectivity, are compelling reasons to experiment and to begin to develop services. Of course libraries will learn through experience which applications are viable and well-received, but initial efforts can be guided by research related to the pedagogy of online learning and interface design. The University of Minnesota Duluth project, focusing on PDA applications for computer science students, advises that “with productivity tools holding only marginal importance, the investigation centered on the capabilities of other iPAQ software, the role of the Internet and the wireless network, and the possibility of creating instructional software. Instructors needed to consider the curriculum and to identify key interaction points in

which mobile computers could be effective” (Allert & Deneen, 2003). A user study by the University of Alberta Libraries found that “the services proving most popular with users... were: the ability to download database search results to a PDA, the PDA training sessions, maintaining a Web site with listings of PDA resources, providing consultations, and loaning of PDA books” (Carney et al., 2004). These approaches and findings are consistent with online design principles that favour minimal screen scrolling.

Of the resources that are available for a fee through subscription, medical resources are most prevalent due to the profession’s early adoption of handheld devices for point-of-care reference. These resources include MD Consult’s Pocket Consult, PEPID (Portable Emergency and Primary Care Information Database), Ovid@Hand, Harrison’s On Hand, and Medline on Tap, to name a few. The scarcity of available content is a current limitation for non-medical libraries that are considering the incorporation of PDA resources into the collection.

Value-added features for PDA are not yet common in existing online information products, but there are examples. Libraries that hold netLibrary eBook titles have been able to purchase an additional “gateway” license that allows for download to PDA of selected titles, although it is unclear at the time of writing that this will be the case in future. Other information providers are developing features that can be used to enhance the research potential of the PDA. Highwire Press offers RSS feeds and table of contents alerts that integrate well with PDA. A new area with exciting potential is for audio or video file downloads, known as podcasting. McGraw-Hill’s Access Medicine already offers weekly downloadable podcasts on a variety of medical topics. Good quality non-medical podcast sources are also emerging, including Earthwatch Radio, Out of the Past (Film Noir), public radio documentaries, and others.

Method

The Library convened a focus group to assess the level of interest in PDA-friendly library services among university faculty members and staff. Potential participants were identified from among respondents to a questionnaire about PDA ownership and use (see appendix for questionnaire).

Because many staff and faculty work off-campus, the questionnaire was delivered online using a web-based survey tool. To reach the greatest number of potential respondents, the link to the questionnaire was distributed as part of an online staff newsletter that is delivered weekly to each staff email address. The link was advertised twice.

Respondents were asked to identify themselves and to indicate their willingness to be contacted for further participation. The responses received from the questionnaire were used to solicit potential focus group participants who were accustomed to using wireless enabled PDAs (other than Blackberries), to identify applications that were currently in use or of interest, and to gauge initial interest in having the Library develop PDA-accessible services. Based on the responses, researchers contacted individuals to form a focus group to experiment with and discuss a pilot collection of resources compiled by the Library. Investigators also anticipated learning about new resources and applications for PDA, particularly since most participants in the focus group had strong backgrounds in information technology or related fields. In the focus group one librarian-researcher acted as facilitator and demonstrated a selection of PDA resources and applications while the other recorded the events and discussion.

The pilot collection of PDA resources was identified through a review of the recent professional literature and listserv discussions, together with an analysis of existing online collections. This entailed testing the usability for PDA of our current collection of online resources, and looking for features in them that were specifically tailored to PDA use. For inclusion in the list, resources had to be:

- a) Relevant to the academic programs offered at Royal Roads University;
- b) Easy to view or navigate on a small-screen;
- c) Supported by both Pocket PC and Palm Pilot operating systems (unless freely available on the Internet); and
- d) Accessible preferably via browser with additional software requirements limited to stable and free or affordable applications.

The list of free and subscription resources was compiled and added to the Library website.

¹ The entries included e-journal and eBook collections, article databases, and an Internet search engine. Links to enabling applications, such as Acrobat Reader for PDA, RSS Readers for PDA and eBook readers for PDA were included to support the various file formats used to encode content.

The focus group met in a seminar room in the Library. The demonstration of resources for PDA was facilitated by displaying the PDA output on a laptop computer using the Microsoft Remote Display Control application. The laptop display was then projected to screen using a data projector. Speakers were used to provide sound for RSS feed items with audio enclosures. Participants were encouraged to follow using their own devices, and to comment freely throughout the session.

Results

The questionnaire to solicit focus group participation was made available to approximately 300 staff and faculty. Fifteen staff and faculty responded to the questionnaire. Because only eleven respondents actually owned a PDA, only eleven were able to complete the questionnaire. Of the eleven full respondents, ten (91%) used their PDA on a daily basis. Pocket PC (6) was the most popular type of device, followed by Palm (3) and BlackBerry (1).²

Respondents to the questionnaire expressed preferences for various applications for the PDA. Only six of the eleven respondents (55%) had wireless-capable PDAs. Figure 1 illustrates respondents' current uses for the PDA, while Figure 2 illustrates how they reported that they would like to use the PDA.

Ten respondents (67%) reported using the PDA on a daily basis at work primarily for the purposes of managing their schedules, contacts, and email. Eight respondents (73%) felt that the ability to conduct research using the PDA would be beneficial to their work. Specifically, there was interest in having access to eBook

¹ The list of PDA resources is found at <<http://library.royalroads.ca/info/pda.htm>>.

² One respondent did not know what type of PDA they owned.

collections, databases, online journals, PDA or small-screen friendly websites, and RSS feeds (Figure 2). Of the respondents who expressed interest in using the PDA to conduct research, three took part in our focus group.

Discussion

The questionnaire was intended to recruit a focus group, so although the questionnaire responses are of interest they are not statistically significant.

Respondents to our questionnaire were from units across the University. However, two of the three participants in the focus group were from Information Technology or related departments. This suggests that although PDA ownership is increasing, uptake of wireless-enabled PDAs to support academic research remains with the early adopters.

The focus group began with a librarian-researcher introducing the purpose and plan for the meeting, and inviting participants to follow along with the demonstration and to make comments or ask questions in the moment. A number of themes emerged.

Enabling applications:

The session began with a demonstration of online journal access for the PDA via the Library webpage for PDA resources. PDA display was projected for the benefit of focus group participants by means of a laptop computer using the Microsoft Remote Display Control (MSRDC) application, which was then displayed using a data projector. One participant remarked that he had used MSRDC, but to enlarge PDA display for viewing on desktop computer, and not for the purpose of projection. Other discussion followed that related to enabling software, including the suggestion that a browser other than Internet Explorer for PDA might offer more functionality for research purposes. Access NetFront was mentioned as an example of a browser that allows for viewing of multiple pages, minimizing pages, etc.

In viewing the library catalogue via PDA, one participant noted a marked difference in the appearance of the same pages on his own device. The group proceeded to explore browser settings to optimize the appearance of content on the page and thus improve navigability of the library catalogue for that device. Discussion as to whether it might be possible to configure a browser to view web pages in landscape orientation on PDA was inconclusive.

Wireless infrastructure:

Participants remarked that load on the wireless network may compromise speed, with perceptible consequences for Internet browsing, downloading files, etc. The stability of the wireless network and its limited availability, in only select buildings on campus, were also noted as factors that might compromise reliability of access.

Availability of content:

In questionnaire responses each focus group participant expressed interest in reading eBooks on PDA. Unfortunately, at the time of the focus group meeting the Library had no eBook product that supported download of eBooks to PDA for offline reading. Furthermore, testing confirmed that the Library's existing eBook products (netLibrary, ebrary, EnviroNetbase) did not support online viewing by PDA browser versions. Consequently the demonstration of eBooks for PDA relied on viewing and discussing freely available eBooks, particularly those from the Electronic Text Center of the University of Virginia Library. Librarians were concerned that these free eBook collections would not catch the interest of the participants, who might have been expected to prefer more recent and more technical content. However, participants clarified that their

interest in eBooks to date was principally recreational. In fact, one participant had previously visited the Electronic Text Center and commented favourably on the content available for download there. For viewing eBooks on PDA, participants preferred the MSReader format.

All focus group participants had experimented with downloads of MP3 files for music, but none had used the PDA for spoken word podcasting. There was general agreement that producing podcasts for local curriculum requirements could be done relatively simply, but there was also debate about the pedagogical value of podcasting “lectures,” and some apprehension that the technology might not be accessible enough for users. There was greater enthusiasm in anticipating applications in education for video podcasting.

Discussion summary:

The majority of our questionnaire respondents and focus group participants currently use the PDA primarily for time management tasks such as scheduling and email. It is perhaps surprising that focus group participants had not taken more initiative to explore the resources and services that they reported to be of interest in their questionnaire responses.

Usability was identified as a fundamental barrier to more diverse employment of the PDA. While websites can be created with formatting and templates that facilitate viewing content on PDA, most are not developed that way at present. In the absence of a critical mass of accessible content that demonstrably enriches the PDA environment, there was speculation in the focus group that the “killer app” for PDA has yet to emerge. Enhancing discussion group applications for e-learning to permit offline reading and processing of posts was suggested as an area with potential for the PDA.

Until usability improves and the added value of the PDA becomes obvious, focus group participants felt that economic factors will constrain uptake of this tool for research to early adopters. Older PDA models are not wireless capable and owners have to consider replacing or upgrading to enable wireless. Committing to a device that uses one or another of the available operating systems also has the effect of restricting access to content. These limitations notwithstanding, participants concurred that the University and the Library should monitor developments in the PDA environment so as to anticipate demand and enrich and integrate applications where possible. The question was posed as to whether this is the device with evolutionary impetus: perhaps convergence between laptop and PDA devices will address problems of portability vs. ergonomics, resulting in a more functional device to support research activities.

Conclusion

Examination of the literature and the outcomes of this study suggest both strengths and challenges to using a PDA for library research. The handheld device is not a technology that applies equally well to every aspect of retrieving and managing information. There are significant variations in functionality among available devices, challenging the notion that a library might present a uniform suite of services and resources for this format. Use of PDAs for library research is also limited by the availability of resources. Currently, most online resources are not designed for viewing on handheld screens. Scrolling and the distortion of graphical images are disincentives to using the PDA for some applications. As well, many resources and applications that have been developed for PDAs are not compatible with diverse operating systems, but rather are most frequently made available for either Palm OS or Windows CE operating systems. It is difficult to gauge which of the competing standards may prevail.³

³ Recently Palm Inc. has announced the production of a version of the Palm Treo that will run on the Windows operating system, suggesting that Microsoft may be winning the battle (Avery, 2005)

Although the PDA is one of the least expensive and most portable options for access to online collections, it is best employed as a supplementary tool. The devices presently do not have access to a critical mass of content that is easily viewed and navigated. Furthermore, to best serve PDA users until there is convergence of the technology to a set of standards, libraries may have to select and support resources for multiple operating systems. Nevertheless, within these constraints there are exciting niche applications, particularly in downloading video or audio files for mobile use. Much can be done using existing tools in ingenious ways.

To make research via PDA more appealing, web designers and online content providers should consider designing interfaces to be viewable on both desktop and small screen devices. Failing this, a solution that may be within the purview of the library would be to explore mediation by a PDA-compatible federated search interface to retrieve, compile, and present search results from across various online repositories within a PDA-compatible view. Beyond these solutions, the future may offer devices that allow for greater flexibility of application to research without compromising portability and convenience. (Thurrott, 2002)

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Appendix

Personal Digital Assistant (PDA) Use at Royal Roads University: Survey

Disclaimer:

The purpose of this survey is to investigate the use of personal digital assistants (PDA) by faculty and staff at Royal Roads University in order to determine whether or not there is an interest in the library providing PDA-friendly services to compliment our current collection of online and print resources. From this survey, we hope to identify a group of individuals who would be willing to participate in a focus group where we will provide library instruction via PDA for PDAs. If you have more than one PDA, we ask that you fill out one survey for each device. All responses will be kept confidential.

1. Name: _____

2. Position: _____

3. Program/Department _____

4. a) Do you own a personal digital assistant (PDA)?

- ☐ Yes
- ☐ No

b) If yes, is it:

- ☐ Owned personally
- ☐ Owned by Royal Roads University
- ☐ Other (please specify) _____

5. What brand is your PDA?

- ☐ Pocket PC
- ☐ Palm
- ☐ BlackBerry
- ☐ Don't know
- ☐ Other (please specify) _____

6. What operating system does your PDA use? (choose one)

- ☐ Palm OS
- ☐ Windows
- ☐ Don't know
- ☐ Other (please specify) _____

7. Is your PDA wireless capable?

- ☐ Yes
- ☐ No
- ☐ It can be made wireless capable by adding a card or accessory
- ☐ Don't know

8. How often do you use your PDA?

- ☐ Daily
- ☐ Weekly
- ☐ Less than weekly

9. What do you use your PDA for? (check all that apply)

- ☐ Managing appointments
- ☐ Managing contact information
- ☐ Word processing

- ☐ Email
- ☐ Web/Internet access
- ☐ Research
- ☐ Reading eBooks
- ☐ Games
- ☐ Other (please specify) _____

10. Do you use a PDA at work?

- ☐ Yes
- ☐ No (if no, skip to question 12)

11. How do you incorporate PDA use into work?

12. Would the ability to conduct research using your PDA be beneficial to work?

- ☐ Yes
- ☐ No (if no, skip to question 14)

13. What types of research resources would you like to be able to access via PDA?

- ☐ eBooks
- ☐ Databases
- ☐ e-Journals
- ☐ PDA-friendly Websites
- ☐ RSS feeds
- ☐ Other (please specify) _____

14. May we contact you for further information?

- ☐ Yes (if yes, please provide contact details below)
- ☐ No

Contact details:

Phone: _____ Email: _____

Thank-you for participating in our survey.