PDAs @ THE LIBRARY

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Medical Students Find Power in Their Palm: PDAs in a Clinical Rotation

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ABSTRACT. Librarians partnered with School of Medicine faculty to integrate the use of handheld devices into a third-year course. This was an excellent opportunity for the library to integrate emerging technologies into the curriculum. The course planning team met regularly for three months to design the lessons. Using a list of criteria for selecting a device, the team chose the Palm Tungsten C and obtained funding for the project. Technical issues needed to be resolved before the first clinical rotation. In addition, course content was developed, faculty trained, course implemented, and challenges met. Student surveys and faculty interviews indicated that students perceived the course as worthwhile.

KEYWORDS. PDAs, handheld computers, mobile technology, health sciences libraries, clinical rotation, medical school curriculum, Palm Tungsten C

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OPPORTUNITY

The Spencer S. Eccles Health Sciences Library has a tradition of providing leadership in initiating, supporting, and promoting leading edge technologies for educational efforts at the University of Utah Health Sciences Center. When the School of Medicine initiated their curriculum reform in 1996, members of the library's education team participated on various subcommittees and encouraged the integration of information literacy into course work.

Over the years, the library faculty has established collaborative working relationships with School of Medicine faculty. In one instance, librarians worked with the third-year Topics In Medicine course master to develop and teach an informatics component during the Obstetrics and Gynecology rotation. This course includes a review of literature searching techniques and clinical case presentation skills. Due to the library's history of continuing success with this course, the library faculty was asked to assist the Topics In Medicine Pediatrics course master in presenting a new informatics session using personal digital assistants (PDAs).

For the 2003-2004 academic year, librarians partnered with School of Medicine (SOM) faculty to integrate the use of PDAs into an existing third-year Topics In Medicine pediatric clinical rotation. The results of this partnership proved to be an excellent opportunity for the library to advance the use of emerging technologies in the SOM curriculum.

PLANNING THE COURSE

The course planning team consisted of two library and two medical school faculty who met regularly for three months to design the course curriculum. The primary objective was to integrate handheld computing into the Pediatrics clerkship for third-year medical students. The team proposed to introduce the students to the technology by placing them in a real-world context. It was determined that library faculty would introduce the students to the technologies and provide support.

Each of the medical students in the clerkship would receive a handheld PDA. Handheld devices would also be provided to each library and pediatric faculty member participating in the course. This was important in order to familiarize the faculty with the technology and to assist them so they would be able to encourage and support the students. A training program was established to prepare the ten librarians who were teaching the course. The six pediatric faculty would receive their PDA training along with the students taking the course.

As the outline for the course took shape, the team established a timeline for implementation. Many technical issues were discussed and an initial implementation plan determined. It was decided that the course would use devices that ran the Palm Operating System (Palm OS) because there were more relevant software applications available than with other operating systems (e.g., Pocket PC). The Palm Tungsten C was released at exactly the same time the team was evaluating devices and all agreed it fit the criteria for the course. A list of applications for general use and those relevant to pediatrics were selected. Hardware and software had to be purchased, and some of the pediatric applications required licensing, so the team worked together to identify costs and potential funding sources.

FUNDING THE COURSE

The Eccles Library and School of Medicine jointly funded the purchase of Palm Tungsten C devices and software licenses. Because the course design required hardware purchases for three distinct groups of participants, students, medical faculty, and library faculty, a variety of funding sources were approached. The course master worked with a librarian to write and present a proposal to the SOM Educational Resource Development Council. This council administers funds that are available for faculty development. The proposal was accepted and the council provided $3,000 for the purchase of six handheld devices for the pediatric faculty.

At the University of Utah, students pay a computing fee that provides money for SOM curriculum based, student focused purchases. The SOM Educational Computing Committee administers these funds. A second proposal was presented to this committee requesting money to buy the student devices. This source awarded $9,750, which covered the costs of the 15 student handheld devices and all software licenses.

A third proposal was prepared by the librarians and submitted to a third funding source, the University's Technology Infrastructure Committee. This committee oversees funds available to libraries on campus for improving library infrastructure with the goal of better serving the students and the curriculum. This group awarded $4,200, which partially funded 10 handheld devices for the participating library faculty.

With funds from these three separate entities, the course was fully funded. The total actual cost for the project, after the miscellaneous discounts, was $16,567.

TECHNICAL ISSUES

The working team established a list of desired features that would be used as criteria for selecting an appropriate device. There was a wide array of devices from which to choose. The list of basic features was:

- **Palm Operating System** – The course planning team determined that most applications of interest to the pediatric faculty were written specifically for the Palm OS. Since the interface was user friendly, the team decided to go with Palm OS devices.
- **WiFi (802.11)** –Wireless functionality was not required for the course work, but the team decided it was important that this feature be available to students and faculty participants, taking advantage of the Health Sciences Center's wireless infrastructure.
- **Color Screen and High Resolution** – Medical students are using more digital medical media in their learning process. The higher screen resolution better accommodates digital images and video.
- **Fast Processor –** The planning team wanted a fast and responsive device that could handle large databases, Internet browsing, e-mail, and multimedia.

Using this list of criteria, the planning team selected the newly released Tungsten C, the first Palm brand device with integrated WiFi. In addition, it met all of the above criteria. The Tungsten C also came with an integrated keyboard, voice memo recorder, and 64 megabits of memory. By the end of the year, the device proved that it was a tough workhorse, even after rotating through 100 medical students.

Software Licenses, Negotiation, and Configuration

During the process of purchasing software licenses, it was discovered that the producers had not anticipated providing group licenses that would accommodate programs such as was planned for this project. Software licenses are traditionally designed for individual ownership and typically require an e-mail, first and last name, and in some cases, the device's unique identification number. Many of the applications required a live connection to the Internet to complete the installation process and to receive content updates, and if any of the original registration configurations changed, such as the user name for the device, the application no longer worked. Unfortunately, even after negotiating with software developers the only solution was to create individual identities for each devise rather than for each student rotating through the course.

Another objective of the course was to have each student treat the device as if it were his or her own (adding personal addresses, non-class related applications, etc). The students were assured that their privacy would be respected and that each device would be completely erased at the end of the rotation with a hard-reset, to restore the device back to its original settings.

The course uses computers located in the library's teaching lab with a cloned image of the hard-drive and system settings. The image, designed specifically for this course, included the Palm Desktop software, all of the course applications, and documents with a generic username "Palm." The image was created using the Palm backup file, a feature that makes copies of all the applications, documents, and settings for the device. The device was restored back to class readiness by performing a hard-reset

and then syncing each device to the cloned image. The process of configuring each device took 30 minutes. Multiplied by 17 devices, the entire process took up to eight and a half man-hours. Even with a team of librarians, setting up the devices for the first session was time intensive.

After recruiting the ten librarians to teach the Topic in Medicine course, it was discovered that the librarians had more enthusiasm about participating than knowledge about PDAs. It was very important that each librarian have a high level of confidence about the handheld devices and their operating system so they could answer questions or be able to do problem solving. The team established a weekly training program, called Training Tuesdays. Each week, the librarians would meet for about 50 minutes to work systematically through the basic features and to share newly discovered functions. After everyone became familiar with the basics, more advanced applications were shared.

COURSE CONTENT

Working together, the course masters and library faculty developed the course goals, objectives, and content. The three main goals were that:

- Each student will use the device to locate, install, and use clinically relevant PDA applications.
- Each student will use a handheld device to manage personal and clinical information.
- Each student will use the handheld device to evaluate journal literature.

Over the academic year, the librarians met with eight groups of students. Each group attended five two-hour sessions over a six-week rotation. Sessions were outlined as follows:

- Session I: Building your Palm
- Session II: Assigned application evaluation
- Session III: Student selected application evaluation
- Session IV: Searching the literature for evidence
- Session V: Evaluating the literature

Session I: Building Your Palm

Students were issued a Palm Tungsten C with selected software. Students would download two additional software programs to ensure they were comfortable with the process. Library faculty introduced the basic calendar, address, memo, and preference features.

Session II: Assigned Application Evaluation

During this session, students presented a critical evaluation of an assigned application to their peers. They were asked to talk about:

- the purpose of the software
- navigation and indexes
- advantages and disadvantages
- the download and install process
- practical examples of ways the software could be used.

This exercise helped the students become more familiar with the software on the devices and encouraged their use.

Session III: Student Selected Application Evaluation

For this session, students were expected to find a new application, download it to the device, do a critical evaluation, and present the software to the group.

Sessions IV: Searching the Literature for Evidence and Session V: Evaluating the Literature

These final two sessions were led by the Course Master, a pediatrician. He introduced the concepts of searching the literature for evidence-based answers to clinical questions. Students had the opportunity to work in teams to develop a clinical question and then search PubMed MEDLINE for an answer. In addition, students read assigned journal articles and then evaluated the strength of study results. The goal was to have the students use some of the evidence-based Palm tools to verify study results.

IMPLEMENTATION

Library faculty met with the students on the first Wednesday of the rotation. At the initial meeting, the students were asked to convey their experience with handheld devices. Their responses ranged from “have never used a handheld” to “let me create this program for you during class.” The intent was to divide the larger group into two smaller groups, making sure that the experienced users were evenly represented. Each group was

led by a library instructor and a teaching assistant (who was also in training to lead the next session).

Library faculty provided instruction on the basic Palm functions. Students created their business card and then beamed it to their classmates and instructor (this was useful when faculty needed to contact the students). They also entered the dates for the class and a memo reminding them to return the devices at the end of the rotation. The course master created a list of exercise questions to be used with the specific clinical applications that were provided on the devices. This helped the students appreciate the immediate importance of the programs and gave them experience navigating and using the programs from the start of Session I.

At the end of Session I, students signed a loan agreement stating they would return the device and all the components in good repair. For tracking purposes, the devices were checked out to the students using the library's circulation system.

For Session II, students were asked to do a critical evaluation of one of the applications provided on their Tungsten C. This was repeated for Session III, except in this case, students were expected to search the Web to find a program of interest. In both sessions, the students presented a critical evaluation of the application to their peers. They filled out an information sheet and either turned in or beamed the form to the instructor. For the class presentation, students connected their devices to a projector using the Margi Presenter-to-Go. This allowed students to see the application as it is used. This class served the dual purpose of introducing the faculty to the wide range of software programs available. Information learned during Session III allowed faculty to made

course corrections; some of these student-selected applications were integrated into the course.

Librarians attended Sessions IV and V and were available to help students with their literature searching and use of other resources. At the end of Session V, students returned the devices, which were checked in using the library's circulation system.

CHALLENGES

First Session Was Time Intensive

The solution that proved to be most time saving and reliable was purchasing Palm's Multimedia Card Mobile Backup Card ($49.99 each). Once a device was configured to class readiness, the Mobile Backup Card was inserted to create an image of the application on the device. After each device was reset to original settings, with all personal data from the previous student erased, the Mobile Backup Card was inserted and all applications were reinstalled. This method reduced the set up time from nearly 30 minutes to about three minutes per device.

Projecting the Device

Initially it was planned to use the Palm Emulator for Sessions II and III when students evaluated applications. The Emulator was insufficient, as there was not enough memory to install each student-selected application. Additionally, the installations were time consuming. The Margi Presenter-to-Go proved to be more flexible as it allowed images to be projected from each individual device, eliminating pre-class preparation.

Evolving Software Options

As new software applications were identified, the set of course applications changed. For example, one of the drug formularies selected for student use displayed erroneous information. Additionally, the prescription information was not compatible with the hospital pharmacy's formulary. A more accurate and institutionally compatible program was chosen. During the student evaluation sessions, faculty learned of better software options. These would often be used to replace existing course software. Over the course of the year, many of the initial software selections were replaced.

Student's Device and Operating System Preferences

During the first year, it was obvious that students had personal preferences for PDA devices. It was decided to accommodate the students who preferred Pocket PCs or their own Palm devices in order to improve student satisfaction with the class.

PDA Damage and Loss

Some students were reluctant to sign the checkout loan agreement, fearing the cost of damage or loss of the device. Rather than penalized these students, the library decided to cover the cost required to repair a PDA. Damage and loss has not been a significant factor as only three devices required repair during the first year.

Maintaining Faculty Skills

A team of ten library faculty was used to distribute the heavy teaching load. Five afternoons during a six-week period was too much for one faculty member to carry. It

was a challenge for instructors to maintain their knowledge of course content as the curriculum and applications evolved over the year.

OUTCOMES

Overall, the course was well received. Student surveys and faculty interviews indicated that students perceived the course as worthwhile. Students learned the value of new technologies and had the opportunity to develop their critical evaluation skills. Library faculty had a unique opportunity to interact with medical students and develop positive perceptions that will last throughout the students' careers. Finally, librarians provided leadership, thereby enhancing their role in promoting leading edge technologies in the health sciences curriculum.