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Wireless Handheld Computers in the Undergraduate Medical Curriculum

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Abstract: Wayne State University Medical School has implemented wireless handheld computers or PocketPCs (PPCs) into all four years of the undergraduate curriculum. A transition from a passive to an interactive learning environment in the classroom, as well as administrative solutions for monitoring patient encounter data by students in their clinical rotations was fostered by this educational technology. Implementation of the wireless devices into the curriculum will be described in this report. This will include the technical specifications and justification for the required device, as well as a detailed discussion of the different applications used for educational and administrative purposes by the preclinical and clinical students. Outcomes from the educational and administrative aspects of the project will also be presented in this report.

Keywords: PocketPCs, handheld computers, interactive learning

Mobile computers are becoming increasingly prevalent in clinical practice.[1-4] Physicians and hospital administrators are finding that the devices are invaluable tools for generating patient databases, prescription writing, and information retrieval. Handheld computers also facilitate a current focus in medical education which strives to promote small group, problem-based learning with acquisition of information from web-based resources.[5,6] Wireless computers can also be used as basic course management tools and to foster the establishment of an interactive learning community comprising students, faculty, and practicing physicians.[7] In addition to teaching the skills required of practicing physicians, medical schools have the responsibility of imparting technologic proficiency to the students. Future physicians will need a basic aptitude with wireless handheld computers for accessing up to date reference material, for communication, and to collect and retrieve patient data.[8,9]

In collaboration with CampusMobility, Wayne State University (WSU) Medical School introduced wireless PocketPCs (PPCs) into its undergraduate medical curriculum. A pilot project that provided wireless PPCs to a group of second year medical students was initiated in the summer of 2002.[10] A wireless infrastructure was established in the medical school and library to support this initiative.

There was full-scale implementation of wireless PPCs into the curriculum at WSU Medical School in 2004. Wireless PPCs and software applications developed by CampusMobility and WSU Medical School were used for educational and administrative purposes. Educational applications include interactive classroom sessions, computer-based exams, the delivery of digitized course content, and real-time feedback. The devices were also used to facilitate administrative processes such as clerkship encounters, course evaluations, and scheduling. This report will describe the development, implementation, and outcomes of integrating wireless handheld computers into the undergraduate medical curriculum.

Implementation

In 2003, second and third year medical students were notified by list-serve e-mail that they were required to purchase a PPC with the specifications listed in Table 1. The second and third year classes were chosen for several reasons: 1) current medical school enrollment at WSU is approximately 260 students per class and we believed that involving the second and third year students in the initiative would provide a manageable PPC-using group; 2) both groups were currently accessible as rising first and second year students and could be easily advised of the requirement; 3) the third year curriculum represented a transition from the classroom experience to clinical clerkships. Therefore, the educational and administrative applications for the two groups selected for the initiative would be diverse and provide

Table 1 Hardware Requirements

Processor	Intel 206mhz or better
Memory (minimum)	RAM: 32mb
	ROM: 32mb
Graphics/Video	240 x 320 resolution
	65,536 (64K) colors
Expandability	1 Type II CompactFlash (CF) Card Slot
	1 SecureDigital (SD) card slot
Communications	Wi-Fi (IEEE 802.11b) Wireless LAN (or capability)
Ports	Infrared
Operating system	Microsoft Pocket PC 2003

insight for full-scale implementation in the fall of 2004.

PPC Purchase - Table 2 shows the distribution of devices purchased by the second and third year students in 2003. Toshiba was the most popular because the devices available at that time (e740 or e750) offered the most options (processor speed, memory, two expansion slots, and built-in wireless) for the price. The Dell Axim was another popular choice by the students in 2003, most likely due to its lower base price, but this device required the purchase of an interface card to access the wireless network.

Our experience with several different devices in 2003 led to the selection of Toshiba PocketPC e800 (http://www.Toshiba.com) as the required device for the freshman and sophomore classes. Toshibas consistently caused the least hardware support issues and the e800 offered the best operating system and features for the price. The School of Medicine Mobile Device Steering Committee believed that these devices were well suited for our planned applications and would serve the medical students throughout their time in medical school.

Student Orientation - All four classes of medical students at WSU were required to use PPCs for educational and administrative functions in 2004. Therefore, we faced the challenge of managing over 1000 students via a wireless PPC implementation. Our experience, as well as a student survey, revealed that our technical support infrastructure needed expansion. We conducted workshops and training sessions for faculty, support staff, and the incoming class of students. Our support infrastructure included personnel from Biomedical Communications, the Office of Academic and Student Programs, and Medical Library Services.

As with the 2003 implementation, the medical students were notified by e-mail that they were required to purchase a PPC. Incoming freshmen were sent notification along with their orientation material and an introductory session was held for them during the first week of classes. The second and third year classes attended separate orientation sessions conducted by members of the PPC support team and CampusMobility. Basic device operation and the specific application software were covered during these sessions. In 2004, access to the wireless network at the medical school used a wireless authentication system that eliminated the need for an encryption code. Student registration with CampusMobility was provided by the School's e-mail authentication system. It was not necessary for faculty to have PPCs, but they were registered with CampusMobility

Table 2
Devices Registered with Campus Mobility by Second and Third Year Medical Students during 2003 Implementation

	Second year	**Third year**	**Total**
Toshiba 750/755	46	52	98
Toshiba 740	40	41	81
Toshiba 570*	0	20	20
Dell Axim	64	37	101
IPAQ	4	21	25

*Toshiba 570 provided to pilot group[10]

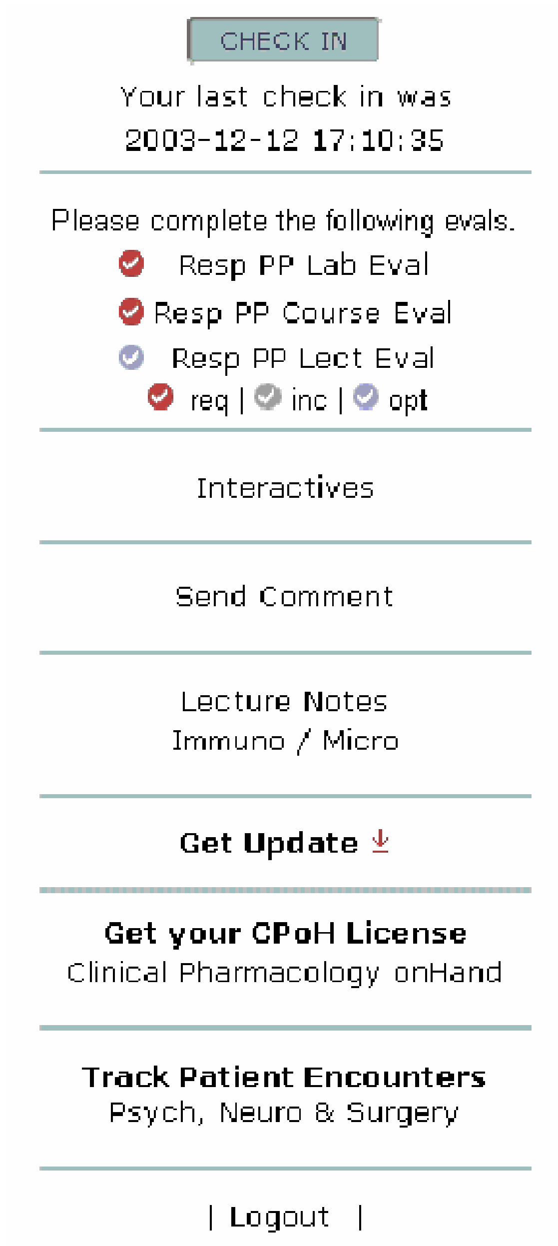


Figure 1 PPC start page showing applications for both second and third year medical students

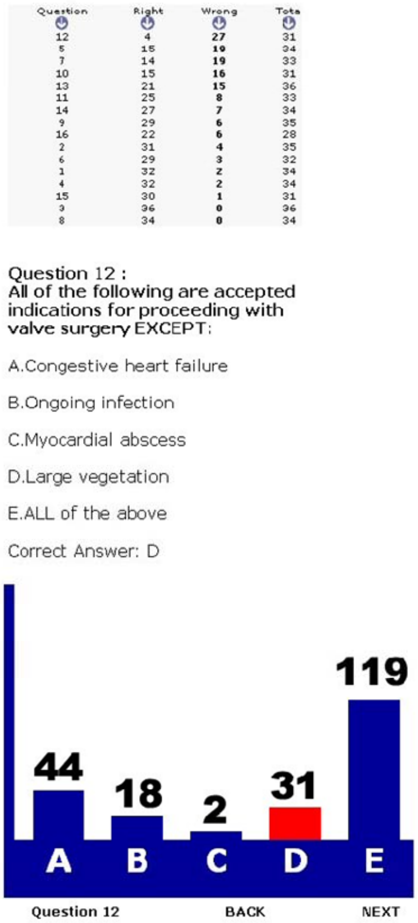
so that the evaluation database could be populated. Once they logged in to CampusMobility, students downloaded specific software applications for the second or third year classes. Second year students received links for the following applications: attendance, interactive lectures, evaluations, student-instructor instant messaging, and course content. Third year students could access these platforms plus the patient encounter application and third-party software license by the WSU School of Medicine and Medical Library (http://www.lib.wayne.edu/shiffman/pda/index.php).

Application Platforms

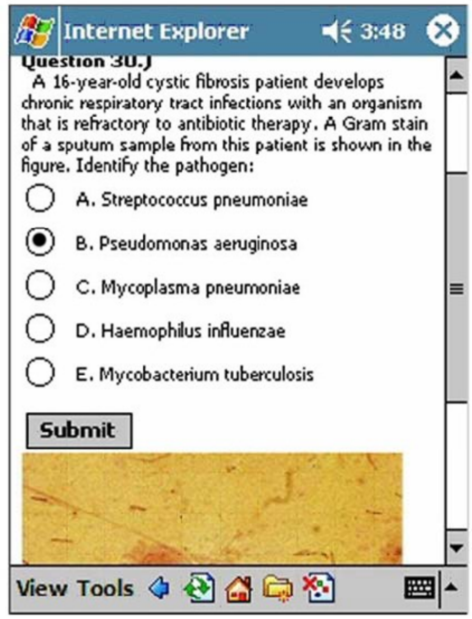
Figure 1 shows a screenshot of the daily start page that the medical students would access after logging into the CampusMobility site using their PPCs. All applications were available to the third year students while the sophomores could not access the patient encounter monitoring applications and did not have access to licensed third party software in 2003 or 2004.

1. Attendance tracking - This feature was used for the courses and third year didactic presentations with required attendance. Prior to this application, it was necessary to use a sign-in sheet that required manual tabulation. Using the PPC-based application, students entered the lecture hall or small group lab and tapped the check-in button. A time stamp was listed next to their name on the administration page and the icon switched to check-out on the start page. Students in attendance were reminded to check-out at the end of the session so that a second time stamp was placed next to their name. The IP address from which the student checked in was also listed next to their name to verify attendance at the required location. Because the IP address was unique to the location that the PPC establishes an internet connection, it was possible to identify those students attempting to check-in from home, the library, or a coffee house.

2. Course evaluations - WSU Medical Students were required to complete monthly evaluations of clerkships, courses, individual lecturers and lab instructors. The PPC platform replaced the paper and pencil version of the evaluation forms. It was no longer necessary to score each evaluation form and manually distribute the results to the faculty. To initiate the process, a course administrator would open an evaluation on the server and the link then appeared on the students' task list on the start page (Figure 1). Once the evaluation was completed, the link disappeared from the students' task list. Faculty and course directors login to the administration page of the CampusMobility website and view their evaluation results in real time. We assured anonymity by hiding data until the number of submitted evaluations exceeded five to prevent association of evaluation results with an individual student. Because PPCs have a note-taking feature, it was possible for students to enter free response comments in a text box at the end of the standard multiple choice evaluation form.



Panel B: Audience response presentation from a cardiac pathophysiology lecture



Panel A: Screenshot from the students' PPC with a sample microbiology question. A portion of an embedded image is shown at the bottom of the screen

Figure 2. Sample interactive presentation

3. Interactive learning - Wireless PPCs were used to introduce interactivity into the didactic large group presentations at WSU Medical School. Multiple choice questions were prepared by the lecturers and posted on the portal for the PPC users to access in the classroom. Questions could be opened and closed to meet the needs of the presentation. Some lecturers preferred that their questions were made available to the students immediately before lecture and closed immediately after. Others left the interactive sessions open for several days to permit review by the students.

Figure 2 shows an interactive question displayed on the PPC and the audience response graph that would be viewed on the administration page and projected to the class. Panel A shows a sample question viewed by the students and Panel B is the audience response results that were viewed during lecture by the entire group. Students accessed the multiple-choice questions in the lecture auditorium then responded in one to two minutes. It was possible to embed images into the questions (Figure 2A) and the PPC platform permitted images to be enlarged so that students could view fine detail if necessary. The instructor and the class viewed responses in real time during the presentation allowing modification of the lecture content "on the fly" based on subject matter deficiencies demonstrated by the responses in the large group setting.

In 2004, 11 self-assessment modules were introduced. These self-assessment modules correlated with the different units of the Immunology, Microbiology, and Infectious Diseases course. These modules were comprised of approximately 10 multiple choice questions each that were only available to students by PPC. These sample questions could be accessed and answered anytime before the exam. After completing the self-assessment module the student would receive a score and could review their choices along with the correct answer.

4. Send comment - Because our class size has consistently been in excess of 260 students, effective real-time communication with the faculty has not been possible until now. Students could anonymously post a question to the lecturer using the send comment button on the PPC start page. Student comments were viewed through the administration portal from the desktop computer in the front of the lecture hall. Time permitting, the lecturer would privately review the questions and address responses to the entire class. If there was not enough time to permit response in class, then the faculty would forward the questions to their e-mail account and respond to the whole class during the next lecture period or via the list-serve.

Although this feature was ostensibly no different from a student sending a question to the lecturer by e-mail after class, classroom use of the mobile devices made the process more dynamic. The send comment feature opened a live chat line between the student body and lecturer. The learning environment was enhanced by permitting the lecturer to respond immediately to areas of misunderstanding. This system created a connection between the student and teacher that did not otherwise exist in the large group format.

5. Lecture content - WSU used BlackBoard 6.1 in 2004 as a host for a variety of educational resources such as course content, on-line assignments, bulletin boards, and grade book. Because CampusMobility and BlackBoard are application partners, it has been possible for the Medical School to provide the PPC-using students access to course content developed for the web. The graphic user interface permitted filtering course content such as text, tables, and figures for the PPC. In addition, all lecture presentations were videotaped and streamed on the web using Windows Media. Students used their PPCs to access the streaming media to review lecture presentations or simply listen to the audio portion. Because the audio portion of the lectures contained no copyright-protected material, it was possible for our students to download these files and play them off-line.

6. Medical decision-making software - With implementation of PPCs into the curriculum, the School of Medicine is in the process of licensing medical decision-making software for our third year medical students (http://www.lib.wayne.edu/shiffman/pda/index.php). The following titles were made available: *Up-To-Date* (http://www.uptodate.com/), *5 Minute Clinical Consult* (www.infopoems.com), *Clinical Pharmacology On-Hand* (http://www.cponhand.gsm.com/), and *MDConsult Mobile* (http://www.mdconsult.com/). Medical software licenses for these applications were available for our third year students to use in their clinical rotations. This content is being used to train our students to use mobile devices to aid diagnoses at the bedside.

In the future, the software will be made available for the preclinical first and second year students. This will permit integration of these various applications into the basic science curricula, albeit on a more remedial level. For example, a first year small group learning assignment may be to make a differential diagnosis for pneumonia from a case presentation. Students could use the diagnostic algorithm provided by one of these applications as part of the problem-solving exercise.

7. Patient encounter monitoring - Monitoring the clinical clerkship experiences of medical students is required for U.S. and Canadian medical schools to meet the accreditation standards of the Liaison Committee on Medical Education (LCME).[11] Accurate historical logs of a student's clinical experiences permit the learner and physician-teacher to reflect on the educational outcome in a more controlled setting. WSU Medical School addressed this task in 1999, by using Palm Pilots to track the clinical experiences of third year students in the obstetrics and gynecology clerkship.[4] The Palm Pilots eased the burden of logging encounters using paper and pencil by permitting students to maintain records of their patient encounters on the mobile devices loaded with software that had defined database fields. Student data would be transferred to a dedicated server using a phone line connection. Our PPC initiative was a more robust extension of this pioneering application.

Patient encounter software was downloaded from CampusMobility and stored on each of the third year students' PPC. WSU Medical School clerkship directors authored unique experience encounters based on the educational objectives defined for a particular discipline. Students would select from a drop-down menu one of the seven third-year clerkships: Family Medicine, Internal Medicine, Neurology, Obstetrics/ Gynecology, Pediatrics, Psychiatry, or Surgery. Students would then select the participating hospital or clinic, admission status (consult, inpatient, or outpatient), age, ethnicity, the diagnosis and procedure.

Students would also rate the encounter and their level of participation. Data collection was an educational exercise and within the Health Insurance Portability and Accountability Act (HIPAA) compliance.[12] Free response fields were also included to permit the addition of unanticipated comments or experiences. Completed case logs were downloaded to the server via wireless connection or by cradling the PPC with a desktop computer that enabled pass-through to the internet.

During the 2003 implementation of PPCs in the clinical rotations, we anticipated that many of our students participated in clerkships at medical facilities that lacked wireless access. Therefore, the application developed for the patient encounter monitoring was downloaded during a syncing process and saved on the device. A log of patient encounter data was stored on the device until the student opened a sync gateway to the server. This was in contrast to the second year applications that required wireless capabilities with continuous internet access. Students could connect to the server to transmit data and receive software upgrades by cradling their devices to a desktop computer. In addition, we established an infrared (IR) kiosk to accommodate third year students without wireless cards. Because all PPCs have IR transmission capabilities, it was possible to provide a means for third year students to transmit their patient encounter logs to the server. This kiosk is currently available in the medical school, but WSU Medical School has plans to install IR kiosks at the medical library and at some of the clinical facilities that host our third and fourth year medical students. Until more facilities provide wireless capabilities to the students, these IR transmission portals provide a wireless means to synchronize data.

Use of mobile handheld devices for monitoring patient encounters eased the administrative burden on clerkship directors and is helping the Medical School administration meet LCME requirements.[11] Figure 3 (Appendix) is an example of a clerkship encounter summary for Psychiatry. In this sample, 37 students entered 647 encounters with 214 different diagnoses from 10 different Detroit Medical Center (DMC) affiliated hospitals as well as other non-affiliated sites. This system permitted identification of students who did not fulfill specific clerkship objectives. These students could be offered an independent training module or simulation to fulfill the requirement. Students also had access to the log of their clerkship experiences, which we expect will facilitate their preparation for step II of the USMLE.

Project Outcomes

Evaluations - In 2004, the paper and pencil evaluation forms were discontinued and all year one and two students were required to complete course, lecturer, and lab evaluations using PPCs. All students were required to complete the course and lab evaluations, but the class was divided into three groups of approximately 85 students for the lecturer evaluations. Using this method, each student was required to complete only one third of the lecturer evaluations, thereby lessening their burden of having to complete evaluations every month, while still generating a representative set of evaluations for the lecturers teaching portfolio.

Evaluation data was made available to the course directors and for the first half of 2004 (January 1 – June 1), 2,499 course evaluations were collected using this system. Evaluation of lecturers generated approximately 1,445 responses during this 6-month period while the number of lab evaluations was approximately 6,120. Formerly, this data would have been collected and tabulated using scantron sheets. An analysis of our return on investment (materials and labor) for the wireless evaluation system in comparison to the paper and pencil method will be the subject of a separate report.

Patient encounter data WSU Medical School pioneered the use of handheld devices for the collection of obstetric and gynecology patient encounter data in 2001[4]. Therefore, it was a natural transition to use the PPCs and patient encounter software for all seven clerkships. The advantages of the mobile device monitoring application over the previous system were significant. Previously, students recorded patient encounters using a paper log that were individually evaluated by the clerkship department office. The paper-based system was not standardized and the logistics of managing the large number of encounters made it difficult to assess accurately fulfillment of the clerkship learning objectives. With the current PPC system, it is possible to view a spreadsheet with encounter data for an individual student, clerkship, or site. Students who missed a required clinical experienced were assigned cases or simulations for individual review. It will be possible to use the data being collected using the mobile handhelds to measure outcomes and refine the clinical learning objectives.

Third year medical students collected patient encounter data in seven different clerkships (Psychiatry, Neurology, Family Medicine, Surgery, Pediatrics, Obstetrics/Gynecology, and Internal Medicine). During a 2004 test period from January 1 – June 1 the total number of cases collected by 60 third-year students during this period was 1,972, which averages to 32.87 encounters per student. Figure 3 shows an example of a patient encounter database for 37 students in the Psychiatry Clerkship.

Student surveys For the 2003 initiative, a voluntary survey was posted at the end of the semester on the second year students' PPC start page. Students responded to the survey that was designed to gather information about the educational and administrative applications, as well as technical aspects of using PPCs. In 2004, a web-based survey was also posted that allowed students to share their experiences with the interactive learning interventions provided as part of the PPC initiative.

Fifty-six percent of the students purchased Toshiba models while fewer students (42%) purchased the Dell Axim. The Dell device lacked internal wireless capabilities and was less expensive than the recommended Toshiba models. The third year students were not required to own a PPC with wireless capabilities so significant numbers purchased the Dell device (Table 2). Although most students expressed satisfaction with their PPC model in the survey, 39% expressed a desire to upgrade to internal wireless capabilities. These are most likely the same students who purchased the Dell PPCs that lacked internal WiFi cards.

Questions addressing technical support issues confirmed our experiences; a majority (60%) of the students required hands-on assistance with their PPC. We asked a specific question addressing accidental hard reset of the PPCs to gauge the incidence of lost data caused by battery drain; 44% of the students lost data due to accidentally resetting their PPC two or more times. We anticipated in 2003 that technical issues would decrease with increased implementation of interactive teaching sessions, evaluations, self-assessment modules, and the availability of PPC-based course content. Students began to assume greater ownership responsibilities, including charging their PPCs every day, as the daily use increased. Another issue was the use of wired equivalency protocol (WEP) encryption on our wireless local area network (WLAN) which required manual entry of an alphanumeric key code. An infrastructure change in 2004 eliminated the WEP encryption so that access to our WLAN was through an authentication server.

In a previous report describing our PPC pilot project[10], students were asked their preference for exams. In that project, 70% of the pilot group preferred paper and pencil exams. A primary complaint was that the PPC exams did not permit flagging questions for later review. Because each question was answered and submitted individually, students were not able to review their responses. A key revision to our application has been to allow students to download entire exams and self-assessment modules, select answers, and then submit the entire form at one time. This platform was first developed for the patient encounter application for clinical clerkships. Security measures such as the browser lockdown and proctoring console described in our previous report[10] will be used during the development of PPC-based exams. In comparison to the current paper and pencil exams, PPCs with appropriate security applications will better prepare our medical students for the computer-based USMLE step exam sequence.[13]

Feedback from those students who participated in the survey pertaining to the PPC-based interactive content was supportive. Eighty percent of the respondents participated in at least seven of the eleven self-assessment modules. Of these students, 60.3% found these interventions "extremely useful", a ranking of 9 or 10 on a scale of 1 (not useful) -10 (extremely useful). A majority of respondents would recommend the interactives to other students the as a tool to prepare for exams (88%) and organize course material (68%).

Conclusions

We chose to promote the use of PPCs by our undergraduate medical students based on the potential for mobile classroom and clinical applications.[5] This PPC initiative is training future physicians to use a tool that is becoming increasingly popular in the medical community for accessing patient monitoring applications, drug databases, and diagnostic algorithms.[14] Hospitals are migrating to mobile device collection of patient information and prescription writing.[1,2] Hospitals are also considering using handhelds to distribute, manage, and track graduate medical education requirements. Our 2002 pilot project permitted us to test a variety of wireless implementations in the undergraduate medical curriculum prior to the large-scale implementation described in this report. We gained insight into a variety of logistic issues, technical concerns, and student user styles.

Until we had implementation of PPCs, it was not possible to have true interactivity with the large class size. Introduction of interactive learning sessions into the curriculum proved to be a valuable educational tool. Students were motivated to participate and assess their own knowledge base prior to exams. Depending on the lecturers' preference, interactive sessions were conducted either during or immediately after a lecture while others were saved for one hour-long review sessions the day before an exam. Lecturers who participated in this activity discovered that the audience response system significantly enhanced the classroom experience. Student attention to the subject matter peaked at a time when concentration typically faded. An unexpected benefit of the interactive sessions was faculty training. A number of lecturers discovered that their problem solving questions were not challenging thereby providing little benefit as teaching tools. An aim of our faculty development office is to improve the problem-based teaching and exam writing skills of our lecturers.

PPCs eased a number of administrative burdens including patient encounter monitoring, collecting evaluation data, and attendance. All of these activities were paper and pencil based in the past, requiring hundreds of person-hours for collection and tabulation of the data. In comparison to paper and pencil methods, handheld-collected evaluation and patient encounter data had enhanced validity. Because completion of the entire evaluation was required before the task would disappear from the start page, students were more inclined to select a response for each question. In the past, a number of students received false credit for turning in blank scantrons when paper and pencil forms were in use. The log-in feature has resulted in an unexpected outcome: the increased accuracy using the attendance-tracker has renewed interest in professionalism standards for our students. PPCs have also proved to be invaluable tools for patient encounter monitoring and as partial fulfillment of LCME accreditation standards. Reporting accuracy and compliance improved because students used diagnosis parameters that were specifically tailored for individual clerkships and provided as drop-downs in the encounter software. This system also permitted clerkship administrators to monitor student progress, as well as the quality of the learning environment at participating hospitals. A future application for the devices will include preceptor-based evaluations of student performance using handheld devices. These evaluations were as part of the encounter databases.

We plan to introduce PPCs into the existing School of Medicine objective structured clinical examinations (OSCE) as administrative tools. PPCs will be used to score student performance by the graders during OSCEs and the assessment will be immediately entered into the database. As with the evaluations and patient encounter monitoring, we anticipate that using PPCs for OSCE administration will provide a return on our investment in the CampusMobility platform.

A value-added feature that raised support among the students was the medical decision-making software provided by the medical school. Students discovered that their PPCs could be used as medical reference tools in the clinic. PPCs and resident software are beginning to transform the clinical learning environment in Detroit metropolitan hospitals by providing our students with real-time access to contemporaneous information. We are witnessing a culture shift because at times, students gain an information advantage over their clinical faculty. Another feature under development is teach-me links associated with the different diagnoses. Content developed by our faculty or extracted from medical-decision making software will be used to enhance the educational experience of students monitoring their clinical encounters.

In addition to the third party medical software provided to our students, we are in the process of developing course content on the PPCs. In the past, our content has been available on desktop computers to our students using Blackboard. However, in 2003 Blackboard content was not universally accessible in the Windows CE format for PPCs. Implementation of Blackboard 6.1 in 2004 has made adaptation of existing course content for the PPCs feasible. Therefore, a current focus is to teach preclinical students to access course content during large or small group learning activities.

Student survey results reflected a satisfaction with the effort put forth by the faculty who contributed to the educational interventions described in this report. We continue to develop the application platforms used by our undergraduate students and plan to expand usage in participating teaching hospitals. We will be tracking and reporting the current class of PPC users into their clinical clerkships to assess the outcome that this initiative has on patient care. Reports of our findings may be useful for other medical schools considering the PPC-based educational interventions and administrative applications described in this report.

Acknowledgements

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Appendix

Figure 3 Sample Patient Encounter Application for Psychiatry

Psychiatry
January 1 – June 1 2004

Total Students: 37
Total Cases: 647
Average Cases/Student:17.49

Category	Description	Cases
Location	DMC Affiliate 1	118
	DMC Affiliate 2	97
	DMC Affiliate 3	80
	DMC Affiliate 4	48
	DMC Affiliate 5	47
	DMC Affiliate 6	40
	DMC Affiliate 7	28
	DMC Affiliate 8	20
	DMC Affiliate 9	20
	DMC Affiliate 10	1
	Other site	148
Service	Inpatient	204
	Outpatient	191
	Consult	161
	NA	70
	None	21
H & P Level	Expanded Problem Focused H&P	71
	Problem Focused H&P	140
	Detailed H&P	75
	Comprehensive H&P	93
	Observed H&P	253
	NA	15
Value of Encounter	Good Clinical Experience	367
	Adequate Clinical Experience	262
	Poor Clinical Experience	10
	NA	8
Continuity Patient	Yes	170
	No	462
	NA	15
Enrichment	Conducted extra reading on topic	35
	Discussed topic with resident	108
	Discussed topic with faculty	428
	Prepared/conducted presentation	25
	Prepared written report/essay	13
	Reviewed best practice guidelines	10
	NA	28
Decision Making	Evaluated Data	124
	Diagnosis of Patient	161

	Treatment Decisions	181
	No Clinical Decision Making	161
	NA	20
Procedure Level	Observed Procedure Only	198
	Assisted Procedure	69
	Conducted procedure w/ supervision	64
	NA	316
Diagnoses	Major depressive diagnosis	157
	Type I bi-polar	58
	Paranoid schizophrenia	54
	Alcohol abuse	40
	NA	34
	Dementia	33