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Feasibility Study of Incorporating Personal Digital Assistants (PDAs) into a Problem-Based Learning Approach to Medical Education at the University of Wollongong

Introduction

Background

The University of Wollongong (UOW) established a Graduate Medical School (GSM) and accepted students for graduate entry in 2007.

The medical curriculum was designed to use 93 clinical problems based on the contents of the core curriculum.

The core delivery strategy is case-based learning by monitoring the students' progress through a whole course as an independent learning exercise.

The use of IT is integrated into the course in order to assist in course delivery. Students start to practice in the regional area from year 1, and are required to practice in clinical placement in a rural setting for a 40-week period.

IT will be integrated and facilitate learning while the students are practicing in the clinical placement.

Aim

To study the feasibility, applicability and functionalities of incorporating PDAs into medical education.

Research questions

What are the key functionalities of PDAs applicable for medical education in a problem-based learning (PBL) curriculum?

- How PDAs have been applied in the medical and nursing professions, and barriers to using such devices?
- What are the roles of using PDAs in medical and nursing curricula?
- How PDAs have been used in medical and nursing curricula?
- What functionalities have been integrated into medical education?

Introduction

PDAs have been applied in medical and nursing professions as well as medical education including

- clinical guidelines
- clinical references
- tracking clinical encounters and medical curriculum
- e-learning in medical education
- clinical decision making
- exchanging information between physicians during changeover of wards
- ordering additional clinical tests and checking test results
- Exchange information between physicians during changeover of wards
- ordering additional clinical tests and checking test results
- accessing medical images
- recording patient information [1-4]

Introduction

At present, many medical schools use PDAs in medical education, such as

- The Department of Family Medicine,
- University of Rochester,
- George Washington University,
- Johns Hopkins School of Medicine,
- Thomas Jefferson Medical College,
- Georgetown University,
- Columbia University,
- Stanford University,
- Medical College of Wisconsin and
- Wayne State University [5-12].

Example of how PDAs are used in medical professions.

PDAs have been used in various clinical placements such as the Canadian intensive care unit for wireless data transmission between the clinical staff, clinical data capture using pen-based PDAs [13], accessing medical images, clinical encounters and medical findings via their web-based interface [14].

Having medical information stored on PDAs means it is easy to use and access by clinicians and medical students at the point-of-care, moreover data can be downloaded to a central computer. Clinicians also use PDAs for recording patient information [15]. As a result, they can easily focus on their education [3, 6, 16].

Introduction

The roles of using PDAs in medical and nursing curricula

A major issue in the clinical area is errors in medication [15, 17].

Use of PDAs in the medical profession has the potential to decrease medical errors and increase efficiency [16].

Using PDAs to issue prescriptions result in less errors than with handwritten prescriptions. Therefore PDAs can play an important role in electronic prescription [15].

The Important Barriers for Incorporating PDAs into Healthcare Sector [4, 10, 13]		
• Data Security	• Patient Privacy	• Privacy Protection
• Interception	• Data Access	• Data Storage and Retrieval
• Loss of Data	• Usability	• Interference
• Interoperability	• Scalability	• Connectivity

Summary of PDA Applications in Medical Education [10, 18, 19]

- Student-patient Log
- Classroom assessment systems
- Gernal software applications
- Teaching and interactive evaluation
- Reference software applications
- Evaluation of medical training
- Communication software applications
- Monitoring clinical experiences of medical students
- Special software applications in other areas
- Objective structured clinical examinations (OSCE)

Methods

Methods

The objective of this study is to find the key functionalities of PDAs that are applicable for medical education. Interviews and focus groups were designed accordingly. In-depth interviews with 15 stakeholders, have been undertaken; these aim to bring out information about the meaning, complication and interpretation from participants [20].

Results from these interviews have yet to be analyzed into different themes using NVivo software. These themes will then be used to conduct focus groups in the next phase of the project.

Interviews

Relevant medical stakeholders were contacted and interviewed face-to-face. The open-ended questions were asked about …

- the appropriate PDA functionalities for students to use during their study years,
- what kind of information needed to be stored in the PDAs, how PDAs can be used in PBL approach,
- how to synchronize data back to servers, and what type of network connection is used.

The interviews lasted approximately 30 minutes for each participant. All interviews were transcribed and analyzed based on content analysis [21, 22]. The interview answers were analyzed and categorized.

Results

Four major functions have been identified to date, these being:

(i) Clinical logs,

(ii) Personal portfolio (or e-portfolio),

(iii) Reference information,

(iv) Communication and connectivity.

Clinical logs

Clinical logs contain patient contacts and information gathered over time.

The purpose of using a clinical log is to record the student interactions with patients during the four-years of their medical study.

For instance,

- Basic demographic information,
- Hospital locations where and when students see them,
- Signs and symptoms of clinical problems based on the 93-clincial problems,
- Medical treatments and physical examinations, and how comfortable patients are with what students have done with them.

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Personal portfolio (or e-portfolio)

The purpose of using an e-portfolio is to record student assessments, clinical attachments together with results of mini-examination, feedback, difficulties that students have encountered, learning needs and medical errors based on root-cause analysis.

Reference information

Reference information is an important functionality that students are able to have in PDAs, for instance

- Medical database
- Current clinical guidelines and
- Core medical textbooks.

Using available software applications can enhance students to access relevant clinical information any time while practicing in clinical setting in remote locations.

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(iii) Reference information,

(iv) Communication and connectivity.

Communication and connectivity

Communication and connectivity functionality is to be used for sending and receiving information, particularly for

- Clinical logs,
- e-portfolios,
- GSM weekly calendars,
- Changes in clinical placement and also including
- E-mail and Internet functions.

Discussion

We have studied the feasibility of incorporating PDAs into medical education.

Mainly PDAs are to be used as learning tool because of their portability and accessibility to information anywhere and anytime.

The stakeholders express many needs of incorporating PDAs to GSM.

Discussion

Security and confidentiality are the important concerns when using PDAs in the real world, particularly when recording patient logs and e-portfolios.

Furthermore, stakeholders want PDAs to have the ability to access medical references, e.g.

- medical dictionary,
- clinical guidelines,
- drug databases or even the core medical textbooks.

In addition, to fulfill the needs of using PDAs in medical education,

PDAs must be well equipped with the standard IT systems particularly for communication and data synchronization back to the central servers or data on demand (DOD) [23].

On the other hand, PDAs need to be connected to GSM systems for data transmission from remote location to central servers.

Currently UOW has access to medical databases such as AccessMedicine, MDConsult and to Medline. Having PDAs in hand will assist students in referencing material.

Conclusion

PDAs can facilitate learning in medical education particularly in a PBL approach by using clinical logs and e-portfolios in order to keep track of students' progress.

Wired or wireless PDA connectivity and communication functions would support and enhance students to learn as well as communicate with faculty while away in clinical placements.

In the future, we plan to continue this study by conducting focus groups with medical, nursing and IT experts in order to gain a better understanding of how *best* to incorporate PDAs into a PBL-based to medical curriculum.

References and Acknowledgement

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