Capturing clinical experiences: supporting medical education through the implementation of an online Clinical Log

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Abstract

The capturing of data regarding medical students' clinical experiences contributes constructively to the delivery and enhancement of the curriculum. In order to facilitate the capture of this data the University of Wollongong's Graduate School of Medicine has implemented an online Clinical Log system using an iterative software development process to continually develop and refine the system to provide the most effective tool possible for students and staff. This paper reports on the progress of this project to date and outlines areas of future development and innovation.

Keywords

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Keywords: medical education, Clinical Log, reflection, technology implementation.

Introduction

Clinical experiences contribute significantly to the delivery of the curriculum in medical education. The ability to capture the essence of these patient interactions allows students to demonstrate and reflect on their skills and knowledge development. Medical faculties can also analyse the data to develop strategies to correct, maintain and enhance the relationship between students' clinical experiences and the curriculum. This paper reports on the implementation of an online system for the recording of students' clinical experiences throughout their medical degree.

Capturing clinical experience in medical education

The use of reflective records of clinical experiences as part of medical and nursing education has been widely reported in the literature. The capture of this rich data has a number of constructive purposes for medical education. From the students' perspective, making entries of patient interactions can help to promote reflective learning, the contextualisation of knowledge in the clinical environment, and enable students to identify areas in which they need further development (Garrett & Jackson, 2006; Thomas & Goldberg, 2007). The record of students' clinical experiences can also be used by medical faculties to monitor the achievement of clinical objectives in the curriculum and provide notice of areas that may need to be more thoroughly addressed (Bridge & Ginsburg, 2001). It also provides evidence of curriculum coverage and engagement to satisfy medical education accreditation body requirements.

Traditionally such records were maintained in paper format, but as technology has advanced, increasingly these records are being entered and stored electronically (Bertling et. al., 2003). Recent literature has expanded this technological focus to mobile devices, such as Personal Digital Assistants (PDAs) and Smart Phones, which facilitate flexible access and 'just in time' data entry to online clinical experience systems (Kho, et. al., 2006; Burdette, et. al., 2008; Garrett & Jackson, 2006).

Background

The Graduate School of Medicine (GSM) at the University of Wollongong was established in 2006 with the goal of addressing the shortage of medical practitioners in regional, rural and remote Australia. It employs an integrated problem-based curriculum organised around 93 clinical problems and a number of learning outcomes arranged in four themes: Medical Sciences, Clinical Competencies, Personal and Professional Development, and Research and Critical Analysis. Across the four-year graduate program students have exposure to clinical environments in each of the course's four Phases. Phase 1 of the program runs for the first 18 months during which time students undertake fortnightly clinical placements in hospital and general practice environments. In Phase 2 students complete seven hospital-based rotations in the areas of medicine, surgery, paediatrics, maternal and women's health, and mental health. The third Phase of the program incorporates a year-long General Practice placement with regular emergency department posts in the hospital. The fourth Phase of the program involves three six-week placements in a variety of clinical environments across the country and internationally. Given students spend over half the course in clinical placements away from campus, the Clinical Log plays a critical role in connecting students' experience with the curriculum.

Implementing the Clinical Log

In order to allow students to record their clinical experiences and monitor their progress the GSM developed an online Clinical Log in 2006. An iterative software development process has been adopted to facilitate the implementation of the Clinical Log. This user and task-centred development process involves requirements analysis, prototyping and evaluation in an iterative cycle with the evaluation of implemented prototypes informing the development of subsequent requirements and improvements (Wu et. al., 2006). The current version of the GSM's Clinical Log represents the fourth iteration of this cycle and a fifth iteration is currently in its requirements definition stage.

For each Clinical Log entry, students input details of the case, as well as the relevant clinical problem(s) to help them map their experiences back to the curriculum. They also note their level of involvement (observation, history and/or examination), their confidence levels in dealing with the patient, and the procedures they performed. Personal details that could identify the patient are not stored and students are instructed to protect patients' confidentiality. Students can allocate a number to a patient to track the continuity of care without identifying the patient.

Figure 1: The student view of the entry point to the Clinical Log

The Clinical Log stores the following fields for each clinical experience:

- Date Record Created
- Date Last Modified
- Visit Date
- Phase
- Location
- Presenting Complaint
- Problem(s)

- Gender
- Age
- Key Discerning Features
- Diagnosis
- Differential Diagnoses
- Procedure(s) Performed
- Level of Involvement

- Confidence at this level
- Comments
- Learning Needs
- Strategies for Addressing Learning Needs
- Supervisor Comments.

Students are encouraged to reflect on their learning and identify future learning needs which are entered in the 'Learning Needs' and 'Strategies for Addressing Learning Needs' fields. Students are then able to revisit their learning needs identified in the log at a later time to plan their study and revision strategies. The Clinical Log also incorporates the ability to share entries with other students or their teachers or preceptors. Students can request feedback for their entries by flagging the relevant entries and entering the contact details of their preferred reviewer. That reviewer then receives an email to notify them that they have been requested to review a log entry. When the reviewer logs into the Clinical Log they have a list of entries for review on their home page (see Figure 2).

During phases 2 and 3, with their heavy clinical orientation, the clinical log provides a way to monitor that students are accessing clinical skills and an appropriate range of patient presentations necessary to meet curriculum requirements (e.g. the clinical problems common in different areas or the change in students' confidence levels over time). By reviewing students' entries, the GSM have been able to make timely interventions to vary the students' clinical experience when it was apparent that they had not been exposed to an appropriate range of patients or clinical experiences. This has also been very helpful to ensure that there is an appropriate level of equivalence of experiences across the cohort. For example, the school has been able to map the Clinical Log dataset with that from the Placements Management System, allowing the monitoring of the types of clinical experiences across geography. From July 2009 a review of selected Clinical Log entries was also incorporated into the Objective Structured Clinical Examination (OSCE) which is the end of phase exam completed by all Phase 2 and 3 students.

The Clinical Log is an HTML-based system accessible via PC or a web-enabled handheld device, such as PDAs and mobile phones, allowing students to easily add entries while on placement. When viewed through a browser on a mobile device the Clinical Log will automatically adapt its layout and styling to the smaller screen. Access via mobile devices during placement helps students record their entries when they are fresh in their mind. It also helps students show entries to supervisors and peers for further discussion.

Figure 2: The staff view of the Clinical Log

The Clinical Log database stores a rich array of data which is used to create a number of reports for students, the GSM and the Australian medical accreditation body. At the student level, students are able to generate reports at any time in the Clinical Log which displays the number of entries they have to address each of the 93 problems. Periodically the GSM generates individual student reports which provide a summary of the students' recorded clinical experiences over the period of the students' current Phase. This report includes frequency data on the number of entries, location, age range, gender, confidence, level of involvement and graphs of entries made each month over the duration of the Phase. The second part of the report lists the 93 problems and how many cases the student has had for each problem in the current Phase, highlighting in particular which problems are yet to be addressed. These reports are available to students and also to their supervisors (Phase 2) or preceptors (Phase 3) and are used to identify areas that may need to be addressed or redirected in the program.

The Clinical Log currently houses over 37,000 entries for the current four cohorts of students. Usage over the Phases has increased steadily which correlates with the increase in clinical exposure throughout the program. Students who have just completed Phase 3 recorded an average of 333 entries over the course of their year-long placement. As the GSM approaches the delivery of the fourth phase of the program for the first time the integration of the Clinical Log into the phase's curriculum is being considered. With the first cohort of students to complete the new degree program graduating at the end of 2010, an evaluation of the use of the Clinical Log across the whole program is planned to inform future development.

Future directions

As a result of the feedback received to date about the clinical log from both staff and students several areas have been identified for future development. Actions are currently in place to improve the usability of the online tool and relevance of the Clinical Log to the curriculum whilst making better use of the data the Clinical Log provides through enhanced reporting. In terms of reporting, whilst the reports generated from the Clinical Log data have to date been very important in the development and enhancement of the program across each of the current phases, it is acknowledged that there is still a lot of data yet to be utilised and/or fully analysed and interpreted. The GSM's Educational Technology Team are currently working with an online reporting tool, Business Intelligence and Reporting Tools (BIRT), to allow for the dynamic generation of reports. This would enable students and staff to generate reports at any time in the program to allow for more prompt responses to areas in which experiences may need attention. The GSM also plan to delve deeper into the data to help inform the teaching of the program especially in relation to the needs addressed in the Learning Needs fields as well as a study of the confidence and level of involvement of the students over time and by location.

Another area that is currently under examination is the expansion of mobile device development of the Clinical Log. Currently students need internet access to use the Clinical Log. Often this is unavailable in clinical settings (regional hospitals especially). Thus students sometimes make paper-based notes or record their consultation later, when they are online, increasing the likelihood of errors and incomplete entries. The use of mobile devices in medical education to collect data on clinical experiences has been fairly widely reported in the literature (Kho, et. al., 2006; Bertling, et. al., 2003; Keane & Rege, 2003). However these studies tend to focus primarily on the use of identical PDAs containing native applications for the collection of clinical experiences. Recently studies have begun to emerge that go beyond the use of PDAs and look at the use of smart phones (Burdette, et. al., 2008), the synchronisation of logs with online portfolios (Garrett & Jackson, 2006), and the potential for mobile devices to support 'just-in-time' access to medical information in clinical settings (Smordal, et. al., 2002). The GSM are looking towards the development of an application that would work across several mobile device platforms that would allow for a user-friendly interface for the input of data and which would sync with the online version of the log when the student next connects to the network with their mobile device. Some preliminary work has been undertaken on an iPhone/iTouch application. However as only 28.6% of Phase 1 students own this form of device other options are under consideration so that this access method is open to a wider range of students. Consideration is also being given to tablet-based options as their form factor is much better suited to the task of 'just in time' data entry while on placement. Whilst the PC is good for data entry but not readily usable, and the mobile phone is handy but not well suited to data entry, tablets offer the portability and size to allow for user-friendly data entry.

The Clinical Log could be adapted to other disciplines with professional experience activities to connect the students' experience with the curriculum by simply modifying the entry fields names/types, aligning the current clinical problems with the discipline's professional body standards and amending reporting queries.

Conclusion

The implementation of the Clinical Log in the GSM has provided an effective tool to support reflective learning as well as supporting the delivery of the curriculum, especially when students are on regional, rural or remote placements. Ongoing developments are continuing to improve its usability and functionality. Investigations into the opportunities offered by new mobile devices including smart phones and tablet computers are also being undertaken to facilitate flexible options for engagement with the Clinical Log.

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