

Postgraduate Medical Council of Victoria

Education and Training Grants (2002) : Category 2 - Special Innovative Project.

Short tutorials over an intranet.

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Executive Summary

Postgraduate educational support is difficult to provide, particularly in regional hospitals, due to the widely scattered distribution of doctors. Traditional forms of education are of limited value, and are difficult to implement. We propose an innovative solution using the hospital's computer network (including local high-speed links to smaller hospitals) to develop and deliver a system of web-based interactive mini-tutorials to junior doctors. The proposed system will document learning as it occurs and incorporates QA measures.

If successful, the system is easily transferable to other hospitals (or other disciplines) for minimal capital outlay.

Funding is sought to develop the educational content for the system, and to evaluate its effectiveness in a pilot study.

Project Methodology - Background

Learning at the bedside is often cited to be the optimum way to learn medicine¹. The connections between cold facts are made concrete and given relevance in a way that can never occur in books. Much of this learning and shaping of behaviour in the early postgraduate years come from a doctor's immediate peers in a form of apprenticeship.

Educational research has demonstrated that learning which occurs in context ('situated learning') is appreciated and retained better than that which does not². In practical terms, this means delivery of medical education ideally takes place in the ward/ operating theatre/ emergency department, rather than the lecture theatre.

Knowledge management suggests that much of the learning necessary to succeed in a job is the 'how we do things round here' embedded (or 'implicit'³) knowledge, rather than the 'explicit' knowledge contained in the textbooks.

A constant tension in trying to organise good quality education for the early postgraduate years is the need to balance educational and service needs. Formal education sessions are unpopular with senior clinicians, and often tend to drift towards lectures, with more teaching than learning going on.

The ideal learning tool for the immediate postgraduate years would:

- ▶ be available 24/7/365 as needed.
- ▶ encourage reflection and self-directed learning, and stimulate small group learning.
- ▶ offer real-time self-assessment and integrated evaluation of learning, and generate objective evidence of learning.
- ▶ be cheap to develop and implement.

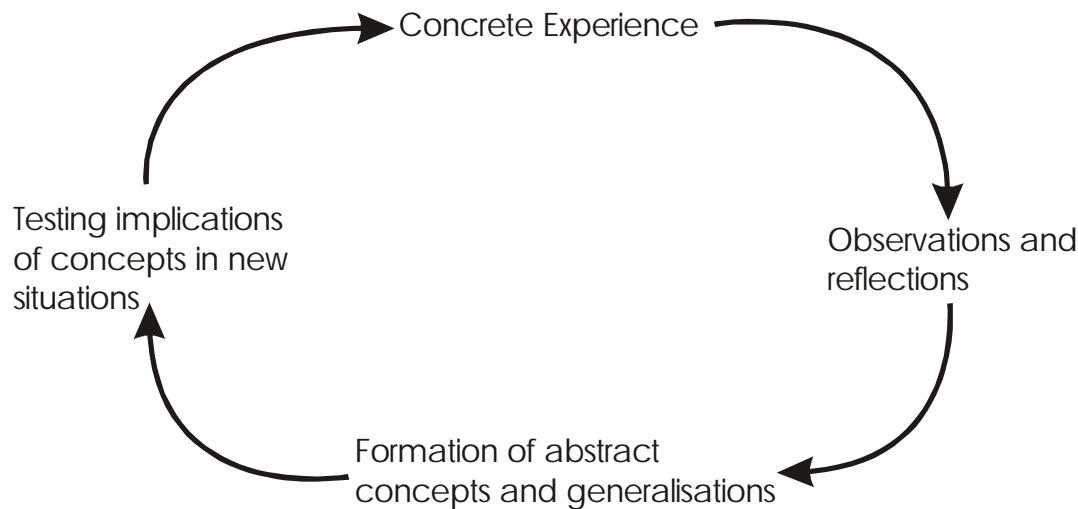
¹ Linfors E, Neelson F (1980) The case for bedside rounds; 303:1230-3; **NEJM**

² Brown J et al. (1989) Situated cognition and the nature of learning; 18: 32-42; **Educational Researcher**

³ Polanyi M (1966) The Tacit Dimension; **Routledge & Kegan Paul**

Project Methodology - Theory and Practice

Kolb's learning cycle⁴ is a commonly used model for describing adult learning.



Junior medical staff have plenty of concrete experience, but much of the value of the learning is lost through lack of timely observation and reflection. The key to extracting maximum learning from the concrete experience is a well-structured, self-directed learning package targeted at this point.

Existing technology - Brief Learning Materials

Pioneered in the UK, this system was developed to deliver small chunks of education in the immediate postgraduate years.

Implementation has been limited by significant practical barriers:

- ▶ the need for the learner to have to carry multiple thick A4-sized books.
- ▶ the difficulty in monitoring their use.
- ▶ the need for a 'champion' within each department to generate enthusiasm and support for their ongoing use.
- ▶ the system relies on a senior doctor to initiate (and follow-up) the learning, so participation tends to be limited to times that they are available.
- ▶ the long feedback loop in developing/ refining the educational material means out of date or poorly worded material is not reviewed.
- ▶ inability to customise the educational material to local practices.
- ▶ the limited range of educational material that can be presented.
- ▶ expensive to develop/ validate/ print – approx. \$ 300 for a set for one subject.

In summary, while attractive in theory, Brief Learning Materials are cumbersome and difficult to use in practice.

⁴ Kolb D (1984) *Experiential Learning*; **Prentice Hall**

Project Methodology - Short tutorials over an Intranet

The system proposed is a innovative system of web-based short tutorials, developed and delivered using a hospital's existing computer network.

The purpose of these tutorials is to enrich a junior doctor's job by making use of the small chunks of free time which occur in a junior doctor's day, while still achieving the service delivery necessary for the hospital to function.

This grant application is to fund development of a pilot system in Ballarat. If successful, it is hoped to expand the scheme next year to other hospitals in Victoria.

Rather than trying to re-develop the Brief Learning Materials a completely new solution is proposed that addresses the practical problems outlined above.

Short tutorials over an intranet:

- ▶ operate 24/7/365.
- ▶ can deliver a wide variety of educational media (colour pictures, video, sound)
- ▶ allow monitoring of the use, enabling a record of learning to be established. A key requirement in criteria for Postgraduate Medical Council funding is that learning in PGY 2 and 3 be documented. This has tended to favour formal education sessions, as they are much easier to document. A summary of the *use* of the medical tutorials (N.B. not the performance, just the use) is objective evidence that can be used in a clinical supervisor's report.
- ▶ enable real time feedback to improve the quality of the educational material. The learner should feel actively involved in the development of the tutorials, rather than feeling that the tutorials are static knowledge to be passively absorbed.
- ▶ encourage collaborative work by learners to answer formative (rather than summative) self-assessment questions.
- ▶ can use collaborative working over the internet/ intranet to develop/ validate the content.
- ▶ are cheap to reproduce: All software and content developed as part of this project ***will be freely available for anyone to use without cost***. A suitable computer system has been bought by the hospital, at a cost of \$250.
- ▶ uses a web browser interface, which has the advantage of being familiar and easy to navigate, even to people who would consider not themselves computer literate.

Negotiations are in progress with the developers of the Brief Learning Materials about re-cycling some of their content. Although such content would need re-writing and re-validation for the proposed system, it would give a headstart to the development process. In addition, Professor Grant of the Medical Education Department of the Open University has expressed interest in a collaborative project if the pilot is successful.

Project Methodology - How will it work?

- ▶ Learner identifies 10-15 minute period to complete topic.
- ▶ Learner logs in with a password into the secure (encrypted) web server.
- ▶ Learner selects from a menu of education topics related to their current field of work.
- ▶ Learner views a series of five pages, which may contain pictures, video, sound etc. and answers one MCQ per screen. The questions are formative rather than summative.
- ▶ Tutorials can be printed out, and the learner will be encouraged to ask their peers to help them. This is a way of encouraging small group learning in the workplace.
- ▶ There will be a "time-out" of 12 hours, following which the questions with wrong answers can be re-attempted. This encourages reflection and allows time for the learner to discuss with peers.
- ▶ When all the questions have been answered correctly, the learner will receive a credit for that tutorial.

The answers to the MCQs will be recorded to establish:

- ▶ Time and location of the computer used to access the system - where and when is learning occurring?
- ▶ Number of initial wrong answers. Many wrong answers implies that the text/question may need revision.
- ▶ Feedback will be sent to the clinician responsible for the junior doctor about their **use** of the system, but not their performance.

An integrated instant feedback form enables evaluation and continuous improvement of the tutorials.

Development of tutorials

As most of the system development is already done, the funding applied for will be used for:

- ▶ development of high-quality tutorials.
- ▶ pilot study and validation of content.
- ▶ introduction and support.
- ▶ evaluation of effectiveness.

A part-time nurse will be employed to co-ordinate and supervise these activities, with a nurse experience in education helping for the initial planning phase of the project.

Careful design will enable much of the evaluation data to be collected by the system, however it will still need to be collated and analysed.

Project Methodology - Curriculum

The aim would be for the learner to complete a minimum of 12 tutorials per 12 week clinical attachment.

The tutorials will aim to teach some of the 'implicit knowledge' which is embedded in day to day medical practice, but which is not well covered in text book - "the way we do things round here".

Tutorials to be generated will depend on the number of learners, but an estimate is:

20 ea General Medicine, General Surgery, Emergency Medicine.

10 ea Geriatrics, Psychiatry, Paediatrics, Obstetrics & Gynaecology, Anaesthetics/ ICU.

5 ea Urology, Ophthalmology, ENT, Oncology.

20+ Non-clinical (available during all rotations) e.g. filling in a death certificate, the role of the coroner, writing medical notes, writing prescriptions, preparing a CV, dealing with the press, preparing medico-legal reports.

Tutorial Generation Process

The first step is to define the knowledge gap:

Conduct a structured interview of current junior medical staff e.g.

- what do you wish you had known when you started the job?
- what knowledge/skills would you most like to have developed in this job?

Conduct a structured interview of senior medical staff e.g.

- what specific knowledge/skills do you think junior staff have gained by doing this job?

Once the knowledge gap is defined, specific learning points for each tutorial can be drawn up.

An Editorial Team will define the base list of tutorials, and teach registrars how to prepare the tutorials. The unit Registrars will write the bulk of the tutorials, with support from the research nurse, who will co-ordinate the process. There are several good reasons for using registrars. Registrars:

- ▶ have been a resident medical officer recently, and are aware of important day-to-day knowledge/ skill gaps.
- ▶ have a vested interest in the junior doctor acquiring competency in their subject area.
- ▶ are likely to respond to realistic and suitable rewards (medical book tokens) which are affordable.

Validation

The tutorials will be validated by peer review and the Editorial Team. The tutorials will then go into the curriculum. The tutorials will also be put onto the internet, with the aim of encouraging further peer review.

Project Methodology - Other Factors

Choice of site

Ballarat represents an ideal site to pilot this project, as it is small enough to be able to know all the junior doctors, yet has a relatively high number (27) of doctor in PGY1/PGY2/not in training programs. The Registrars generally have less work pressure than when they are in a central teaching hospital.

Applicability to other institutions.

This is a key requirement, as if the proposed system is expensive, unreliable, difficult to use or difficult to maintain, it will not be taken up by other institutions.

Cost.

A suitable computer system has been bought, at a cost of \$250. The operating software is Linux based, is freely available at no cost, and is commonly used in hospitals in Victoria.

As mentioned above, all the software and content developed as part of this project ***will be freely available to use without cost.***

Ease of use

Web browser interfaces have the advantage of being familiar and easy to navigate, even to people who would consider not themselves computer literate.

Reliability and ease of maintenance

Linux is well known for its stability and reliability. A prototype system delivering guidelines and protocols has been operating at Ballarat for over nine months without crashing or requiring any maintenance.

The aim is for the system to be able to be administered by a non-expert following a half-day of training. The aim would be for a Medical Education Officer or equivalent to be able to administer the system. IT support would be limited to backing up data.

Target Outcomes and Indicators of Success

Assessment

Assessment is the measurement of the learner's performance by the education system.

The primary purpose of the system is education, not assessment, and therefore while the performance of the learner will be recorded, it will not be available for the clinical tutor, only a summary of the *number* of tutorials that the learner completed/ attempted.

Evaluation

Evaluation is the measurement of the quality of the education system.

Ongoing evaluation is built-in, in the form of the feedback form, which is part of every page – a form of Continuous Improvement.

Evaluation – Subjective

- ▶ Comments from feedback forms.
- ▶ Anonymous questionnaire sent to learners at 3 months and 6 months.
- ▶ Named questionnaire sent to consultants and registrars at 6 months.

Evaluation – Objective

- ▶ Number of learners who achieve minimum recommended targets (average 1/week).
- ▶ Number of 'extra' (non-compulsory) sessions completed – this is likely to be the most sensitive indicator of perceived value.
- ▶ Number of learners attempting each tutorial.
- ▶ Ratio of right/wrong responses to the MCQs.
- ▶ Number of learners finishing each tutorial.
- ▶ Quantity and quality of feedback submitted.
- ▶ Sentinel events – clinical events that could be used for monitoring whether the education is changing practice. The goal will be to find five robust measures that could be used, and to monitor these before and after implementation of the system. A limited random sample of notes (e.g. 20 per condition) would be used.

Examples might be:

- sprained ankles managed according to the Ottawa Protocol.
- Osteoporosis advice to patients older female patients presenting with a fracture.
- Standard of completion of Death Certificates.

Budget and Accountability

Funding for the development and commissioning of the pilot system

2 months	Research nurse educator (0.5 EFT)	5,000
	Define tutorial list, set learning objectives	
9 months	Research nurse (0.5 EFT)	25,000
	Tutorial development,	
	Data collection	
200 hrs	Medical supervision	10,000
	Tutorial development (50 hrs)	
	Editing/ validation of tutorials (100 hrs)	
	Data interpretation, writing up (30 hrs)	
	Equipment, overheads	6,000
	Total	46,000

Short Tutorials over an intranet – Project Schedule

