Problem-based learning in tiny tots and mothers-to-be

Ricardo Ronco, Gabriel Munoz & Priscila Prado

Context and setting Medicine in Chile has traditionally been taught using lectures and seminars, with little innovation in teaching methods. Teaching has not been interactive and memorising has been emphasised.

Why the idea was necessary Two important competencies required by all doctors are:

1 the ability to remain up-to-date on developments that occur during a doctor’s professional life, and
2 the ability to critically evaluate and interpret new medical information.

The purpose of this project was to introduce problem-based learning (PBL), a methodology that can theoretically enhance active learning as well as critical problem-solving skills. A pilot project, using PBL in addition to lectures, was introduced in Year 5 courses in paediatrics and obstetrics at our institution.

What was done External faculty who were knowledgeable about PBL conducted a 2-day workshop in PBL for the purposes of tutor training. None of the 10 clinical faculty participants had worked with PBL methodology before. After the workshop, faculty established the learning objectives and wrote 3 cases for paediatrics and 3 for obstetrics. The 49 students were divided into 2 groups. In the first semester, 1 group used the paediatrics cases and the other the obstetrics cases in small tutorial groups of 5–6 students with 1 tutor. The groups switched over in the second semester. Each case was designed to be completed in 3 3-hour sessions. At the end of the 3 cases, the tutors evaluated the performance of each student in the group on 5 domains: interpersonal skills; learning skills; knowledge development; objectives achievement, and clinical reasoning skills. Scores ranged from 4 to 7 on a 7-point scale, with an average of 6.2. The total score comprised 10% of the total grade of the course.

Evaluation of results and impact Evaluation of the learning intervention was performed using a student self-report questionnaire with 16 questions answered on a 5-point Likert scale and an open comments section. Three aspects were measured: the application of the method; learning preferences, and the development and analysis of critical thinking. More than 90% of the students reported that PBL increased their ability to think critically, and 98% said that the method made them review more literature than did conventional teaching. Students also reported differences in their perceptions of the different tutors.

The present study documents the potential advantages offered by PBL in a poorly resourced school. As assessed by tutors, students achieved the standard of performance required in paediatrics and obstetrics on the 5 domains measured. The students also preferred this method and reported increased self-learning and critical thinking skills. The intervention had a positive impact on the attitude of faculty, who are sustaining the new teaching methodology.

Structured clinical case PowerPoint™ presentations for distributed learning

Kim Blake, Ada Poranek & Kate MacCulloch

Context and setting Clinical case presentations were introduced as a core component of the paediatrics rotation. Presentations took place in a multimedia conference room on the medical school campus. Bridgit™ conferencing software allowed students at other sites to participate in the presentations in real time. The presented cases offered an opportunity to ensure the objectives of the rotation were met, allowed students in smaller centres to be involved with larger groups and provided potentially more variation in case content. Presentations were subsequently edited by faculty staff and students and posted on the university intranet (Dalmedix) for asynchronous learning.

Why the idea was necessary Students are exposed to unique patients and conditions, including disorders that are seasonal. The structured clinical cases offered an opportunity to ensure a variety of diagnoses were covered. Students in smaller centres can be actively involved with larger groups and offer variation in case content. The posted cases also represented a valuable resource for students in all years who are preparing for elective work in paediatrics, clinical rotations and examinations.

What was done At the end of the paediatrics rotation, student pairs presented a patient who met Year 3 paediatrics curriculum objectives. Templates for PowerPoint™ presentations were provided in order to maintain consistency in case style. Presentations were required to be 10 minutes in duration, visual, interactive, to include question and answer sessions, a basic science slide and a multiple-choice question.

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doi: 10.1111/j.1365-2929.2007.02737.x

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with relevance to the case. Paper copies of the cases were distributed to faculty for checking of content. These were then edited by elective students, who subsequently posted them on Dalmedix. Students were asked to complete questionnaires regarding their learning experience, with 9 items to be answered on a Likert scale of 1–5 (1 = strongly disagree, 5 = strongly agree) and 2 open-ended questions. Currently, more questionnaire data are being collected. A total of 65 PowerPoint™ case presentations have been posted on the Dalhousie intranet, available to medical students for learning.

**Evaluation of results and impact** Over the past 3 years, 328 students have participated. One clerk was unable to obtain consent to make a presentation from the patient and family. Case-based PowerPoint™ presentations shared using Bridgit™ conferencing software have been an invaluable learning tool for medical students. Pilot questionnaires administered in 2004–05 and 2005–06 have indicated that 87% of clerks found creating and presenting a case presentation a useful learning experience. In addition, 85% of students thought cases available on the university’s intranet would be a useful learning tool and 83% of clerks found it useful to watch other groups present (mean Likert score 4.2 ± 0.6). The clerks identified 3 main strengths in the case presentation learning process: learning about specific cases; practising presentations, and patient contact. Students found writing a multiple-choice question the most challenging aspect of the presentation (mean Likert score 3.9 ± 0.8).

Due to the success of the case-based presentation learning component in paediatrics, a similar format has been launched in obstetrics and gynaecology. Discussion about involving an overseas medical school is underway and the cases are to be implemented as a distributed education component in a new medical school.

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**Early introduction to critical care medicine: a student curriculum**

**Paula Carvalho**

**Context and setting** An 8-week programme in critical care medicine for Year 3 and 4 medical students at the University of Washington, Seattle was implemented to review concepts in physiology and critical care medicine. Although many of these topics had previously been covered in the first 2 years of medical school, they were re-introduced and applied in a critical care setting, where a clear understanding is imperative for patient management.

**Why the idea was necessary** Patients are admitted to intensive care units (ICUs) with increasing frequency due to the technological advances available to manage a higher severity of illness. Students are taught the fundamental concepts of acid-base balance, respiratory physiology, cardiovascular haemodynamics and mechanical ventilation during Years 1 and 2 of medical school, but may lack a clear understanding of these concepts by the time they enter clinical clerkships. For this reason, topics in pulmonary and critical care medicine ordinarily taught at fellowship level were presented much earlier, to Year 3 and 4 medical students, to evaluate whether a firm grasp of this information would be of benefit earlier in their careers.

**What was done** A course syllabus and objectives were provided, and the following topics were reviewed:

- acid-base balance: acid-base disorders and the concept of the anion gap;
- gas exchange: the alveolar gas equation, oxygen content, oxygen delivery, the respiratory quotient and shunt fraction;
- airway management: airway anatomy and management techniques with various airway adjuncts;
- mechanical ventilation: a review of standard and newer ventilator modes, and a simulated ventilator experience;
- arrhythmia review: arrhythmia recognition and treatment;
- chest tubes: indications, function and troubleshooting, and
- critical care cases and ‘pearls’: including massive pulmonary embolism, septic shock, meningococcaemia, hypothermia, venous air embolism, flail chest, fat embolism syndrome, pericardial tamponade, and drug overdose.

**Evaluation of results and impact** The students were given a pre-course test with problems derived from the course objectives and a number of patients previously followed in a medical/surgical ICU, and a self-assessment of their knowledge. On completion of the course, students were given a test on topics from the course objectives, as well as a questionnaire about their subjective level of knowledge using values of 0 (low) to 10 (high). During their internship year (1–2 years after the course), the same students were given another survey using values of 0 (low) to 10 (high), regarding the utility of the course and their