

Developing professional clinical skills for practice – the results of a feasibility study using a reflective approach to intimate examination

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Objectives To develop a student-selected component (SSC) for junior medical students, to evaluate the feasibility of incorporating the development of skills in carrying out an intimate examination, whilst developing professional thinking skills using a reflective approach.

Subjects The student selected component was designed for a maximum of 6 students over a 4-week period in Phase 2 (year 2 and 3) of the undergraduate medical curriculum.

Setting The Clinical Skills Centre, the Faculty of Medicine Nursing and Dentistry, University of Dundee, Scotland, UK.

Methods The SSC consisted of a weekly patient clerking from the ward, an analysis of the clinical and communication skills for any intimate examinations the patient would require, and practice using simulators and simulated patients. Students were supported by timed periods of structured reflection, which enabled them to discuss ethical issues and their own professional conduct related to carrying out an intimate examination. The SSC was evaluated on 3 levels; student satisfaction, learning professional thinking using a reflective approach, and observing behaviour

change in relation to skill development, using a ward simulation exercise.

Results The evaluation at the levels of student satisfaction, learning professional thinking and changes in behaviour associated with intimate examination demonstrated that the SSC had been well received by the students, who felt they had improved their skills in intimate examinations in the context of a ward simulation exercise, in parallel with their professional thinking skills.

Conclusion It is possible to develop the professional thinking of junior medical students at the same time as developing their technical competence in relation to intimate examinations. It may be advantageous to introduce students early to this reflective approach, using simulation to promote the integration of theory with practice.

Keywords education, medical, undergraduate/*methods; curriculum; *patient simulation; *physical examination; *clinical competence; students, medical; reproducibility of results; Scotland.

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Introduction

There is a concern that intimate examinations are not carried out, even when they are clinically indicated.¹ Identifying opportunities for students to develop the appropriate skills and a standard of competence in being able to carry out an intimate examination

according to guidelines and policies is therefore a challenge for educators.² In addition, with changing ethical values, balancing the learning needs of students with the protection of individual patients creates professional conflicts.² In a recent survey of women's attitudes to the sex of medical students in a gynaecology clinic, significantly more women gave their consent to intimate examination by female students than male.³ Students are often reluctant to perform breast, rectal and urogenital examinations due to embarrassment, lack of a chaperone or finding it culturally challenging.⁴ As a result, their experience of intimate examination in terms of both confidence and competence is limited at qualification.¹

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Key learning points

It is possible to combine learning technical, communication and professional skills for junior medical students in the context of carrying out an intimate examination.

A ward simulation exercise using static models and simulated patients can be used to evaluate behaviour changes in intimate examination.

Providing structured reflective periods enable students to develop their professional thinking skills.

Medical schools have a duty to ensure that students have the appropriate ethical skills training⁵ in the context of intimate examinations. There is still some worrying evidence that suggests that intimate examinations are being learnt by junior medical students on anaesthetised patients who have not given adequate consent.^{2,6} However, observation alone is insufficient to develop the skills required.^{7,8}

One of the central recommendations of the Department of Health (DOH) following the Kennedy report on the Bristol Heart surgery was that the patient should be at the centre of the National Health Service (NHS), entitled to the trust and respect which is essential to the development of the doctor–patient relationship. The General Medical Council¹⁰ have recognised the need to re-emphasise both quality in skills training and ethical issues in their call for a new approach to professionalism in *Good Medical Practice* to provide:

‘A culture that promotes quality improvement, recognises the inevitability of error in a judgement based discipline and encourages in the interests of patients an openness and honesty about performance.’

Intimate examinations can provide a wide scope for learning and professional development for medical students¹¹ in relation to performance, confidentiality and consent.

Use of simulation and simulators in learning intimate examination

There is evidence of simulated experience being able to improve performance in practice.¹² Using models and simulated patients has been shown to improve students’ technical skills in relation to intimate examinations.^{13,14} In relation to breast examination, studies have shown that standardised teaching using silicone breast teach-

ing models improves accuracy of diagnosis.^{15,16} Simulators, both static and high fidelity,¹⁷ can be useful in developing the technical sequence of a skill. Reality cues, which can be created in a virtual environment, seem to correlate with the ability to carry out the technical skill.¹⁸

Simulators and simulated patients can provide realistic yet safe learning opportunities for students to practise intimate examinations¹⁹ and are increasingly being used in combination to create an integrated clinical education model.^{20,21} In the Netherlands and the USA, simulated patients act as trainers of pelvic and speculum examinations.²²

The great advantage of a simulated experience over real practice is being able to focus solely on the needs of the student. In terms of learning how to carry out an intimate examination, the capability to repeatedly practice both technical skills and communication skills and the capacity to identify errors in performance without compromising patients, gives the student opportunities to evaluate their own competence and confidence.¹⁶ Simulated patients can be trained to give structured constructive feedback on patient satisfaction measures.^{23–25}

Learning to carry out an intimate examination using a reflective approach

Learning the professional skills of intimate examinations is different to any other examination, not because of any high risk in the technical procedure but because of the cultural perceptions of their highly personal and invasive nature.

Professional learning, according to Schön,^{26,27} can best be described as the ability to reflect. In the medical context there is evidence that reflective practitioners make better clinicians, although this is limited.²⁸ The development of reflective practice (recommendation 57 from the Bristol inquiry⁹) was highlighted as requiring greater priority in ensuring the continuing professional development of health care professionals to provide high quality care. Reflective thinking enables both scientific knowledge and humanitarian perspectives (altruism, honesty, respect, patient-centredness and ethical decision making) to be accessed and critically evaluated in the different contexts of patient care.^{29–32}

In developing any simulated experience in the learning and teaching of intimate examinations it is essential to incorporate a reflective approach, both for the benefit and protection of the patient and the professional conduct of the student. In relation to life-long learning, the ability to reflect has become of increasing interest to medical educators.³³ Al Sheri,³⁴ at

postgraduate level and studies by McManus *et al.*³⁵ and Neimi³⁶ with undergraduate students have shown that reflection promoted learning. Writing promotes reflection, enabling experiences to be separated from personal interpretation and therefore providing an opportunity for the learner to realistically grow from the experience.³⁷ Writing also facilitates the integration of new and prior knowledge.³⁸

At undergraduate level, learning to carry out an intimate examination can be organised in stages, moving from discrete procedural skills to communication skills to the complexity of integrating professional thinking skills into patient practice, in order to be able appreciate the influence of contextual factors on delivering care to patients.

This paper shares the design and delivery of a student selected component (SSC) on how simulators and simulated patients contributed to the development of both clinical and communication skills in intimate examination for junior medical students. Staged structured reflective periods were integral to the programme, to enable the development of an ethical professional thinking approach. The feasibility of this approach was shared through the evaluative evidence at 3 levels: satisfaction, learning to be reflective and an evaluation of behaviour improvement.³⁹

Methods

Background

The undergraduate medical curriculum at the University of Dundee uses an outcome-based approach, which focuses on the development of a competent and reflective practitioner through 12 identified learning outcomes.⁴⁰ The Student Selected Components (SSC) are integral to the 5-year programme. The SSCs can be selected from a menu or self-proposed. They are offered in blocks of 2, 4 or 8 weeks in years 2, 3 and 5. In years 1 and 4, SSCs are organised longitudinally in parallel with the core programme. Learning the technical skills of intimate examinations are introduced in Phase 2 during the relevant systems based programme. The development of skills in relation to intimate examinations are shown in Table 1.

The Clinical Skills Centre is a purpose built facility which supports the development of clinical procedural and communication skills using simulators and simulated patients. The simulated patient bank supports the SSCs developed for junior medical students. Simulated patients participate in the teaching of discrete technical skills as well as contextually focused simulations such as the ward simulation exercise.⁴¹

Table 1 Intimate Examinations Phase 2

System	Intimate examination
Cardiovascular	Examination of chest – involving lifting the breast
Respiratory	Examination of chest – involving lifting the breast
Gastroenterology	Rectal examination
Reproduction and women's health	Vaginal examination Breast examination
Renal and urology system	Examination of prostate Bladder catheterisation Examination of male genitalia

The development of the ability to reflect is supported throughout the curriculum with structured reflective periods. The students' ability to reflect is formally assessed at the end of each Phase.

Subjects

All 150 students in each of the 2 years of Phase 2 learn intimate examinations on static models in clinical skills during their systems-based structured programme. In preparation for their Phase 3 clinical attachments a 4-week student selected component (SSC) was developed concerning the use of simulation in developing professional clinical skills, using structured episodes for reflection.

The SSC was structured to have a maximum number of 6 students. Six second- and third-year students, 3 male and 3 female, participated in the 4-week SSC. Four were from second year and 2 from the third. The 6 students had registered for the SSC as their first or second choice on the computerised SSC choices programme MESMIS (Medical School Staff/Student Management Information System). Sixteen students registered for the 2 clinical skills SSCs. These were placed on MESMIS at the end of the choices period, and only those who had specifically chosen simulation were allocated to this SSC. The SSC focused on outcomes of professionalism, clinical skills and communication skills and was established to enable students to:

- identify the different methods of simulation used for learning professional clinical and communication skills;
- develop a clinical skills learning exercise using simulation, which reflected the patient clerking each week;
- develop competence and confidence in relation to intimate examinations; and
- develop skills of independent learning.

Description of programme

Students were introduced to the SSC by being sent a study guide with information on expected outcomes and a number of papers on the use of simulation in developing professional clinical skills. These included the GMC guidelines on intimate examination the AMEE guide on the use of standardised and simulated patients, as well as papers on breast examination and digital rectal examination.

Teaching the skills of intimate examination

The students undertook a patient clerking and analysed their learning needs in relation to clinical examination. The patient clerking became the focus of their learning for the week, in relation to both clinical and communication skills. The process of learning the skills of intimate examination were followed by 6 key steps with an inter-professional group of teaching staff contributing to the skills training:

Step 1 Development of technical skill using a 4-step approach and static model.

Step 2 Development of a checklist for each technical skill.

Step 3 Practice using standard video support in a self-revision area.

Step 4 Development of communication skills in relation to giving an explanation of the procedure by developing patient scripts.

Step 5 Simulated practice with a model and simulated patient.

Steps 1–5 Repeated for each skill identified from the patient clerking.

Step 6 A ward simulation exercise.

In the ward simulation exercise, e.g. in breast examination, a simulated patient would wear the strap-on breasts and, following the student's history-taking, would be asked for her consent to the examination and be given an explanation prior to the student carrying out the examination. For rectal examination, the covered models were placed beside the relevant patient.

Structured reflective periods during SSC for professional thinking

Four structured periods were identified each week for reflection (timetable available from the author on request). These 1-hour sessions were structured in relation to the process of reflection and involved the whole group. They followed the same format each week and were scheduled around their other activities.

Both the facilitator and the students attended the reflective sessions. The students were encouraged to raise issues about how they felt in relation to both their competence and confidence. By providing allocated times, the students were able to re-evaluate their opinions and ethical approach in relation to carrying out intimate examinations and through discussion increase self-awareness of their own learning needs and feelings.

As the group formed over the 4 weeks, the role of the facilitator became less important in promoting discussion. Students agreed with a facilitator after the first session each week what they would like to cover in the remaining sessions.

Session 1 The facilitator ran the first session with the group using a semi-structured approach to identify strengths and weaknesses in relation to skills development and to explore through discussion any professional concerns.

Session 2 The second reflective session each week involved analysing the patient clerking they had done on the ward to identify the key technical skills they needed to learn or revisit. In addition, in week 1 students were given reading material on the use of simulators and these were the focus of discussion. In weeks 2 and 3 following the discussion in session one, students prepared their own SP scripts to discuss for use in the ward simulation exercise.

Session 3 The third reflective session followed a training session with simulated patients and enabled the student to re-evaluate their communication skills performance and any ethical concerns or dilemmas they had. On two occasions, the simulated patient was able to remain to participate in this reflective session.

Session 4 The fourth reflective session followed a session of integrating their skills with a simulated patient and addressed any unresolved issues from their progress report on their clerked patient.

Data collection

Structured reflective sessions

Data was collected on 3 levels: student satisfaction, learning and performance.

The reflective written report

The students were asked to compile a written report at the end of the 4 weeks, based on their own written reflections from each of the sessions. Guidance on the areas to be covered in the final report were agreed with the students during the final reflective session, how they felt they had

integrated their skills into practice using simulation, how simulators and the articles had helped them to understand and develop their skills and how simulated patients had contributed to their learning of skills.

Semi-structured questionnaire

Each student completed a semi-structured questionnaire at the end of the 4 weeks, which addressed how the SSC had extended his or her professional and personal development.

The Ward Simulation Exercise

The students were evaluated in relation to their learning, to be reflective in practice during the ward simulation exercise by evaluating their professional behaviour (patient-centredness, decision making and responsibility) and given a grade.

Teaching the skill of intimate examination

Data was collected in relation to learning the skills of intimate examination on 2 levels: student satisfaction and student performance.

Student satisfaction

Standard semi-structured questionnaires for SSCs were provided by the medical school office for the students. These asked students to identify what they had most and least enjoyed about the SSC.

The ward simulation exercise

On the last Friday of the 4-week programme each student participated in a ward simulation exercise adapted from that described by Ker *et al.*⁴¹ The patients all required either an intimate examination or an emergency procedure carried out as part of the clerking-in process. This had to be done over a limited period of time. All 6 students were given the responsibility of the simulated ward for a shift period and had to work together to organise their time, prioritising patient care and making decisions. Patients who required intimate examinations as part of their clerking included

- patient with altered bowel habit (rectal model);
- patient with a breast lump (strap-on breasts); and
- patient with urinary problems (prostate/rectal model).

The simulated patients had all received training in relation to their script, developed by the student, as well as in the physical examination and the correct positioning for an intimate examination to be performed. Three students were observed by a faculty member who was familiar with the original ward simulation exercise, in 2 simulated patient bays. The

students were evaluated using global rating scales from A to E where A represented excellent evidence observed and E represented no evidence observed. The evaluation of their change in behaviour in relation to intimate examination was carried out using the following parameters:

- communication (incorporating written, telephone and verbal communication with colleagues and patients);
- competence in clinical skills examination (rectal and breast examination); and
- professionalism (responsibility, patient-centredness, and decision making).

Patient-centredness included showing respect for privacy by pulling around the curtains to examine the patient, ensuring the patient was comfortable and minimising any potential hazards in relation to their safety.

At the end of the exercise, the students were given 20 minutes to prepare a report to hand back to their ward. The feedback session relating to the simulated ward exercise took place in this context, with the students being given the opportunity to evaluate their change in behaviour.

Results

Structured reflective sessions

Semi-structured questionnaire

All students completed the semi-structured questionnaire where they were asked to comment on how the module had extended their professional and personal development. Comments from the students included:

‘Made me reflect on my own skills and abilities.’

‘Have explored the use of simulation in depth in developing new skills – found it really helpful and enlightening.’

‘Learning skills together really well.’

From the written reflective reports

Students submitted a 2-page paper. The reports were read twice and categorised into the 3 agreed areas. The comments included here are representative of the group and are confined to the areas agreed.

Integrating skills. In relation to integrating skills, the students’ comments included ‘Learning to blend both my clinical and communication skills’ and ‘I feel I am able to interact with patients in a more confident and

professional manner' and 'I still feel a bit awkward in putting it all together – it's still difficult.'

Use of simulators. In relation to their reflections on the use of simulators, students identified that 'simulators enable you to make mistakes without causing discomfort to patients', and 'the plastic models enable you to get confidence without feeling embarrassed'.

Role of simulated patients. In reflecting on the role of simulated patients, the students identified 'simulated patients opened a whole new learning experience for us all.' Students also reflected that simulated patients made it possible for students 'to practise the transition from history taking to clinical examination'.

From the ward simulation exercise

Students' professionalism in relation to the exercise, which incorporated descriptors such as responsibility, respect, altruism, patient-centredness and ethical decision making was evaluated as a component of the ward simulation exercise. Students were marked with grades from A to E where A represented excellent evidence of professionalism and E represented no evidence.

Four participants were marked as grade B and 2 as grade C.

Learning the skill of intimate examination

Satisfaction. All 6 students completed the semi-structured questionnaire. Five of the 6 students recorded 'learning how to carry out intimate examinations' as an aspect of the SSC they particularly liked. No comments were received in the section on what the students least liked.

Ward simulation exercise performance of intimate examinations. During the feedback session the students' self-evaluation of the ward simulation exercise in relation to a change in behaviour in intimate examination included the following:

'The integrated simulated patients-plastic model is as a useful way of practising.'

'Working out what were the right words to say to the patient undergoing an intimate examination was much harder than I thought.'

'I was confronted with the task of keeping a focus on the examination and maintaining my own composure.'

In relation to communication skills, 4 participants received a grade C (satisfactory evidence in relation to written, verbal and telephone communication skills)

and 2 received a grade D, borderline evidence. With regard to competence to carry out intimate examinations; 2 students were given grade D (borderline), 2 students a grade C and 2 students a grade B.

Discussion

Evaluative evidence in relation to learning intimate examination skills using a reflective approach to develop professional thinking in junior medical students does not appear to exist in the literature. This is why a feasibility study such as this was essential in identifying whether evaluations at different levels can be carried out in this context. This feasibility study showed that satisfaction with the SSC was highly rated by the participants. The evaluation of learning about professional thinking using a reflective approach was determined from the relevant results of the ward simulation exercise, the evaluation questionnaires and the written reflective reports, and showed that the students were able to both describe and analyse their learning in relation to intimate examinations. This is essential for the development of professional thinking using a reflective approach.²⁹⁻³² Evaluating behaviour change and performance has always been a challenge, but the results of this feasibility study suggest that the ward simulation exercise and the students self-evaluation show that it can be discriminatory in the short term.

The use of simulation with models and patients in the simulated ward exercise was, in this pilot group of 6 students, able to demonstrate the potential for evaluating not just their satisfaction with the exercise but also the learning of professional thinking skills and their performance in carrying out an intimate examination. The structured staged reflective periods which enabled them to consider some of the humanitarian perspectives of their professionalism, such as respect and dignity, patient-centredness and ethical decision-making. The reflective process is not new to health care practice and provides a theoretical base for defining professionalism.⁴² Although this study suggests that this may be the way forward in addressing both the development of competence in intimate examinations in students, as well as the learning required in relation to associated professional ethical issues,² there are still major issues to consider in the light of the Caldicott² findings in relation to staff development to ensure that students are not placed in compromising learning situations. Ensuring that they have the necessary experience for practice should not compromise their needs for chaperoning, adequate supervision and opportunities for safe practice at a junior level.

However, there were a number of unanswered questions from this study which need to be addressed during the next SSC on intimate examination. Firstly, on 2 occasions the presence of the simulated patients in the written reflective sessions was not formally evaluated, particularly in relation to the impact it had on the students. The 2 students who received a borderline grade for their performance of intimate examinations were descriptive but not evaluative in their written reports, but these were not formally assessed and required further investigation. The daily written reflections of the students were not reviewed, and this would perhaps have been more helpful in identifying these students earlier. Moreover, the study did not formally review the students' assessment of their own skill development, which would have lent credibility to their reports. However this feasibility study provided encouragement for the development of this reflective approach to learning skills, and given the complexity of professional medical practice it may be advantageous to introduce students early to this approach as a way of using simulation to promote the safe integration of theory with practice.

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References

- Turner KJ, Brewster SF. Rectal examination and urethral catheterisation by medical students and house officers: taught but not used. *BJU Int* 2000;**86**:422–6.
- Coldicott Y, Pope C, Roberts C. The ethics of intimate examinations – teaching tomorrow's doctors. *BMJ* 2003;**326**:97–101.
- O'Flynn N, Rymer J. Women's attitudes to the sex of medical students in a gynaecology clinic: cross sectional survey. *BMJ* 2002;**325**:683–4.
- Hennigan TW, Franks PJ, Hocken DB, Allen-Mersh TG. Influence of undergraduate teaching on medical students' attitudes to rectal examination. *BMJ* 1991;**302**:829.
- Goldie J, Schwartz L, Mcconnachie A, Morrison J. Impact of 3 years ethics teaching in an integrated medical curriculum on students proposed behaviour on meeting ethical dilemmas. *Med Educ* 2002;**36**:489–97.
- Scott H. Intimate examinations are carried out without consent. *Br J Nursing* 2003;**12**:72.
- Baraitser P, Elliot L, Bigrigg A. How to talk about sex and do it well – a course for medical students. *Med Teacher* 1998;**20**:237–40.
- Kripeke CC, Vaias L. The importance of taking a sensitive sexual history. *JAMA* 1994;**271**:713.
- Kennedy I. *Learning from Bristol: The Department of Health's response to the report of the public inquiry into children's heart surgery at the Bristol Royal Infirmary 1984–95* <http://www.doh.gov.uk/brstolinquiryresponse/>.
- General Medical Council. *Good Medical Practice. Guidance from the GMC*. UK: General Medical Council; 1995.
- Singer P. Intimate examinations and other ethical challenges in medical education. *BMJ* 2003;**326**:62–3.
- Seymour NE, Gallagher AG, Roman SA, O'Brien MK, Bansal VK, Andersen DK, Satava RM. Virtual reality training improves operating room performance. *Ann Surg* 2002;**236**:458–64.
- Leserman J, Luke CS. An evaluation of an innovative approach to teaching the pelvic examination to medical students. *Women Health* 1982;**7**:31–42.
- Behrens A, Barnes HV, Gerber WL, Albanese M, Matthes S. A model for teaching sophomore medical students the essentials of the male genital rectal examination. *Med Educ* 1979;**54**:587–7.
- Campbell HS, McBean M, Mandin H, Bryant H. Teaching medical students how to perform a clinical breast examination. *Acad Med* 1994;**69**:993–5.
- Robins LS, Zweifler AJ, Alexander GL, Hengstebeck LL, White CA, McQuillan M, Barclay ML. Using standardised patients to ensure the clinical learning objectives for the breast examination are met. *Acad Med* 1997;**72**:91–3.
- Murray WB, Good ML, Gravenstein JS, van Oostrom JH, Brasfield WG. Learning about new anesthetics using a model driven, full human simulator. *J Clin Monit Comput* 2002;**17**:293–300.
- Kneebone R. Simulation in surgical training: educational issues and practical implications. *Med Educ* 2003;**37**:267–77.
- Popadiuk C, Pottle M, Curran V. Teaching digital and rectal examinations to medical students: An evaluation study of teaching methods. *Acad Med* 2002;**77**:1140–5.
- Kneebone R, Kidd J, Nestel D, Asvall S, Paraskeva P, Darzi A. An innovative model for teaching and learning clinical procedures. *Med Educ* 2002;**36**:628–34.
- Greenberg R, Loyd G, Wesley G. Integrated simulation experiences to enhance clinical education. *Med Educ* 2002;**36**:1109–10.
- Kleinman DE, Hage ML, Hoole AJ, Kowlowitz V. Pelvic examination instruction and experience: a comparison of laywoman-trained and physician-trained students. *Acad Med* 1996;**71**:1239–43.
- McGraw RC, O'Connor HM. Standardized patients in the early acquisition of clinical skills. *Med Educ* 1999;**33**:572–8.
- Hasle JL, Anderson DS, Szerlip HM. Analysis of the costs and benefits of using Standardized Patients to help teach physical diagnosis. *Acad Med* 1994;**69**:567–70.

- 25 Cooper C, Mira M. Who should assess medical students' communication skills: their academic teachers or their patients? *Med Educ* 1998, 1974;32:419–21.
- 26 Arygris C, Schön D. *Theory in Practice, Increasing Professional Effectiveness*, 1st edn. San Francisco, CA: Jossey Bass.
- 27 Schön D. *The Reflective Practitioner – How Professionals Think in Action*. Basic books: Harper Collins; 1983.
- 28 Klemola U-M, Norros L. Analysis of the clinical behaviour of anaesthetists: recognition of uncertainty as a basis for practice. *Med Educ* 1997;31:449–56.
- 29 Schön D. *Educating the Reflective Practitioner*. San Francisco, CA: Jossey-Bass; 1987.
- 30 Boud D, Keogh R, Walker D. *Reflections Turning Experience into Learning*. London, UK: Kogan Page; 1985.
- 31 Boud D, Cohen R, Walker D. *Using Experience for Learning*. Buckingham/Oxford: SRHE/Oxford University Press; 1993.
- 32 Greenwood J. The role of reflection in single and double loop learning. *J Adv Nursing* 1998;27:1048–53.
- 33 Feins A, Waterman MA, Peters AS, Kim M. The teaching matrix: a tool for organising teaching and promoting professional growth. *Acad Med* 1996;71:1200–3.
- 34 Al-Sheri A. Learning by reflection in general practice: a study report. *Educ General Pract* 1995;7:237–48.
- 35 McManus IC, Richards P, Winder BC, Sproston KA. Clinical experience, performance in final examinations and learning styles in medical students: a prospective study. *BMJ* 1998;316:345–50.
- 36 Niemi PM. Medical students professional identity: self-reflection during the pre-clinical years. *Med Educ* 1997;31:408–15.
- 37 Walker D. Writing and reflection. In: Keogh R, Walker D, eds. *Reflection: Turning Experience into Learning*. London, UK: Kogan Page; 1985.
- 38 Eisner E. Forms of understanding and the future of education. *Educational Res* 1991;22:5–11.
- 39 Kirkpatrick D. *Evaluating Training Programmes: the Four Levels*. San Francisco, CA: Berrett-Koehler; 1994.
- 40 Harden RM, Davis MH, Crosby JR, Friedman M. *AMEE Medical Education Guide: From Competency to Metacompetency, a Model for the Specification of Learning Outcomes*. Dundee, UK: AMEE; 1999.
- 41 Ker J, Mole L, Bradley P. Early introduction to interprofessional learning: a simulated ward environment. 2003;37: 248–55.
- 42 Parboosingh J. Learning portfolios: potential to assist health professionals with self directed learning. *J Cont Educ Health Prof* 1996;16:75–81.

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