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- 'docendo ac discendo' - 'by teaching and learning'

In this issue:

Executive Board

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The International Journal of Clinical Skills looks forward to contributing positively towards the training of all members of the healthcare profession.

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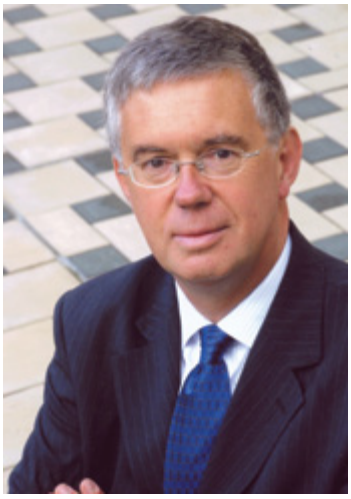

As we head into the New Year of 2010, the International Journal of Clinical Skills (IJOCS) can feel justifiable pride that it has fulfilled its ambition to provide the international healthcare community with an arena for clinical skills education and research. For almost all the healthcare professions, clinical skills form the basic foundations and therefore a combined approach is absolutely what is needed for the future provision of a high quality health service.

The role of the ePortfolio in both education and continuing professional development of healthcare professionals continues to evolve as training and revalidation become increasingly important. Clinical skills are an essential element of this process and in 2010 the IJOCS will be proud to publish abstracts and papers from the 8th international ePortfolio conference hosted by ElfEL London Learning Forum 2010. Further information can be found at www.ijocs.org/eportfolio

This year will also see the launch of the new and exciting 'CliniTube' website – a free resource providing a single portal for accessing and sharing an array of information. It should be a valuable resource for students and should give teachers of numerous disciplines the opportunity to share educational materials. I'm certainly looking forward to seeing the 'Clinical Skills Lab' which should become an integral component of CliniTube and will comprise information on a variety of clinical skills.

The International Journal of Clinical Skills is a unique publication in its devotion to clinical skills. I encourage professionals all over the world to continue contributing to its on-going success. After all, our patients deserve nothing less than the best.

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Simulation education in undergraduate medical education: Implications for development of a rural graduate-entry programme

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Abstract

Introduction: Simulation as an adjunct to real clinical experience is growing in importance in undergraduate medical education. In 2007 we investigated current use of simulation for teaching clinical skills to predict future applications in our rural graduate-entry medical programme.

Methods: Our interview-based study investigation focussed on the use of simulation in undergraduate (school-leaver) programmes at the two medical schools existing in the State of Victoria, Australia. The focus of the investigation was on staff, facilities and equipment with emphasis on the procedural skills taught and assessed using simulation. Respondents (faculty and students) were selected purposively. Interviews were conducted using a topic guide. Interviews were transcribed and analysed thematically.

Results: Faculty and students supported the use of simulation and made recommendations for optimal use and increased applications. Simulation was most commonly used for patient interactions (simulated patients) and for technical aspects of procedural skills. However, experiences of faculty and students were highly variable and opportunistic. Examples of excellent practice included the use of simulation for raising awareness of patient safety. Faculty sought professional development to make better use of existing applications and consider new ways of working with simulation.

Conclusion: Simulation as an educational method will expand in medical curricula. This study has identified issues relevant to existing and developing programmes that use simulation. We make recommendations for medical schools developing simulation based education in regional locations.

Introduction

Globally, medical schools are challenged by the provision of adequate clinical training opportunities to support the increasing numbers of medical students, who are necessary to meet future workforce demands. Health sector changes, including increased patient throughput, reduced length of hospital stay and changing patient expectations create additional challenges to ensure that students develop and maintain clinical skills through direct patient contact [1-5]. Some of these challenges may be met through simulation.

In the context of healthcare, simulation is defined as *"an educational technique that allows interactive, and at times, immersive activity, by recreating all or part of a clinical experience without exposing patients to the associated risks"* [6]. Simulation is reported to approximate reality and recreate a "real clinical scenario or encounter" [7]. Simulated experiences can enable student performance to be assessed in a safe and structured environment [8, 9].

There is a surge of interest in simulation as an educational method in undergraduate medical education [8, 10-18]. There is

a parallel wave of physical infrastructure developments, especially in the United States [19].

In 2007, the State of Victoria Government (Australia) commissioned our group to identify the current state of simulation based education in undergraduate medical curricula. As faculty in a new regional and rural medical school in Victoria, we wanted to improve our understanding of what and how simulation is currently used to support medical student learning. Furthermore, we wanted to explore the potential of simulation in undergraduate medical education so that we and other medical schools can optimise its use.

Gippsland Medical School
Gippsland Medical School (GMS) in the Faculty of Medicine, Nursing and Health Sciences, Monash University Australia has a graduate-entry curriculum and is based in rural Victoria. Its cohort size is approximately 60 students annually for the 4-year Bachelor of Medicine and Bachelor of Surgery (MB BS) programme. GMS is building on pre-existing undergraduate medical student placement capacity and developing new links, especially in community-based settings throughout the region.

Gippsland has a population of approximately 240,000, and covers over 41,000 square kilometres (km^2) [Australian Bureau of Statistics 2007]. It is approximately half the size of Scotland, United Kingdom (78,772 km^2) and approximately twice the size of Dublin, United Kingdom (27,135 km^2) and New Jersey, United States (19,210 km^2) [Office for National Statistics 2008; U.S. Census Bureau 2008]. Gippsland also includes areas classified as rural and remote [20, 21, 22].

GMS has new simulation facilities consisting of a suite of simulated consultation rooms, a six-bed ward and an emergency room. Funding was prioritised to support the purchase of a range of simulators relevant for undergraduate medical education. The simulation facilities have an audiovisual infrastructure enabling capture and replay of learning activities. Within the region, and associated with GMS, there are three clinical sites with access to procedural skills simulators, but with limited capacity for audiovisual capture. GMS admitted its first cohort of students in January 2008.

At the time of the study in 2007, there were two medical schools in Victoria, at the University of Melbourne and Monash University. Medical students from both universities undertake clinical placements in public, and some private, hospitals in metropolitan and rural settings.

The Australian Curriculum Framework for Junior Doctors (2006) [23] articulates the range of clinical competencies that a junior doctor needs to develop during training. This framework was used as a critical reference for this project and is increasingly used to underpin the content of clinical skills curricula.

The key research questions were:

1. In what ways is simulation being used in undergraduate medical education?
2. In what ways do faculty and students think that simulation might be used?
3. What skills and competencies do faculty and students think can be taught using simulation?
4. What resources are available to teach and assess in a simulated environment?

Methods

We use the term simulation to refer to activity-based simulation (as opposed to written simulations such as in problem based learning). 'Simulated patient' (SP) refers to a volunteer or actor playing the role of patient and 'simulation centre' describes a clinical skills lab with bench top models and / or high-fidelity mannequins.

The research questions were most suited to a qualitative design. Topic guides facilitated a systematic approach to interviews, with each being observed and recorded. Although adherence to the topic guide was encouraged, flexibility was exercised to establish rapport and pursue topics that the respondent(s) valued.

Broad topics explored with faculty included the role of simulation in their current and planned clinical skills programmes. Topics pursued with students overlapped with faculty, with emphasis placed on experience of simulation and its potential for future training. The questions are available from the corresponding author of this paper.

Interviews took place in medical schools or hospitals and were conducted in person as individual or small groups, depending on respondent(s) availability.

Respondents were sampled purposively. Faculty respondents were identified through our academic network within the two established medical schools. Although there were two other Victorian medical schools at the time of study (GMS and Deakin University), they did not yet have their first cohorts of students and so were excluded.

Faculty respondents were contacted by telephone or e-mailed with a follow-up letter setting out the purpose of the project and the content of interviews. Student respondents were recruited by faculty members at the site.

Interviews were transcribed verbatim and checked for accuracy. Key themes were independently identified while each transcript and the initial thematic extraction were read for the purpose of checking for complete thematic extraction.

Ethics approval was granted by the Monash University Standing Committee on Ethics for Research involving Humans.

Results

Twenty-three academics and nine medical students from sixteen clinical placement sites were interviewed in ten telephone and six face-to-face interviews. The interviews lasted on average for 50 minutes. Notes made by the interviewers suggested positive and constructive discussions with a willingness to share information.

Overall perceptions of simulation

While the structures of the programmes differ, each is aligned with the Australian Medical Council (AMC) curriculum outcomes. Although it was evident from the interviews that the definitions and experience of simulation varied, faculty and student attitudes were very positive. There was a strongly held view that simulation is an excellent means of creating a safe, realistic environment in which students can learn. Value was also placed on the use of SPs to recreate authentic learning opportunities that focussed on patient assessment skills (e.g. history taking). Simulation was thought to enable students to work beyond what they can ethically do in real clinical practice. Learning in real clinical environments was also highly valued but the relationship between the two could be better aligned.

Experiences of urban and rural simulation based education

Faculty and student respondents reported that rural sites offered the advantage of working in small groups. Activities were closely aligned to clinical practice and the faculty were well known to students enabling close collaborative relationships. Simulation facilities were located at the clinical practice site and there were few access restrictions.

There was wide variation within urban centres. Hospital sites offered limited access to simulator facilities. This was often shared with other professions (principally nursing) and unless there was a dedicated educator, the quality of simulation, and access to it, was suboptimal. There were two specialised simulation facilities that offered high quality simulation based education, particularly in advanced life support and management of emergencies.

Simulation based education and activities

Respondents shared many examples of current, planned and desired uses of simulation (Table 1).

Table 1: Respondents examples of current, planned and desired uses of simulation based education in undergraduate curricula

Themes	Simulation activity
Communicating with patients	History-taking Patient assessment (General, Psychological)
Communicating with colleagues	Telephone communication e.g. ISBAR (Introduction, Situation, Background, Assessment and Recommendations [24])
Basic and advanced life support	Vital signs
Procedures	Urinary catheterisation Intravenous cannulation Plastering Suturing Venepuncture Insertion of chest tubes Lumbar puncture Injections Wound management Lung function testing
Examinations	Prostate Rectal Eye Ear Breast Vaginal

Several elements of medical care were taught using simulation (for example, psychomotor, dexterity, communication, professionalism, patient safety and decision-making) with emphasis on history-taking and procedural skills respectively. There was minimal use of simulation to support interprofessional or other teamwork activities. Participants' responses focussed on two central themes: infrastructure and education.

Table 2 sets out the key infrastructure themes that focussed on access and availability of facilities, equipment, human resources and co-ordination between clinical sites and universities.

Table 2: Themes on infrastructure

All university and clinical sites need at least some simulation facilities to enable alignment of student learning with real clinical practice
Students required regular access to simulated and real patient experiences in a range of settings; however, faculty reported considerable challenges in achieving this
Use of simulation facilities are constrained by restricted access
There is a lack of equipment, although recognition that this was not a critical problem, since better use could be made of existing resources
There is a lack of infrastructure, particularly human resources such as dedicated staff to manage simulation facilities and simulation teaching
Faculty and students reported a lack of coordination between universities and clinical sites. This was cited in relation to content of teaching, supervision of students and responsibility for simulation facilities

The educational themes are highlighted below:

- Simulation was used in all Objective Structured Clinical Examinations (OSCEs).
- Few faculty members were able to articulate relevant theoretical underpinnings for the use of simulation in teaching. When theories were identified they referred to "constructivism" and "experiential learning".
- The opportunity to provide multiple learning opportunities in a simulated environment prior to and then in parallel with real clinical experiences was an important goal.
- Stepwise progression of learning skills was considered ideal; especially those skills that are difficult to learn in a real clinical environment (e.g. intimate procedures).
- Faculty and students reported that structured time spent in a simulation facility improved the quality of learning on return to real clinical settings.
- "Unstructured" teaching time, in simulated (or real) clinical settings was not valued.
- Although faculty wanted to introduce more simulation activities into the early years of the curriculum, there was uncertainty about what to teach and when.
- Almost all skills in which new graduates were expected to be competent were in part, taught through simulation, although this was highly variable between sites.
- It appeared that all medical students have at least some contact with SPs for developing communication and history-taking skills although there was minimal experience for other clinical challenges for example, explaining procedures, risk information and breaking bad news.
- All medical students at one university undertook a simulation based programme on patient safety.
- One university had developed a clinical teaching associate programme for intimate gynaecological examinations.

Future use of simulation

Future use of simulation to support student learning was reported to be dependent on access to funds for replacement and maintenance of simulator kit and for dedicated qualified faculty trained to understand simulation methodology. Hybrid simulations were thought to be an exciting new direction in which SPs were linked with simulator models enabling the essential skills (e.g. doing and talking) to be taught synchronously. Access to other technology based simulations was considered, such as virtual reality. Improved SP training was also an area for development. The potential for inter-professional simulation based learning was valued.

Discussion

Simulation was highly valued as an educational method especially when aligned with learning in real clinical settings. As an adjunct to clinical placements, simulation also had much potential, but faculty and students did not think it should replace clinical placements. The use of simulation was reported by students to be sporadic, and not well integrated with their curriculum. Students further reported the experiences to be of variable quality. Few faculty members had extensive experience in simulation based teaching. There was an overwhelming view that much could be done to improve the current state to maximise the value of simulation as an educational method.

The researchers noted disconnection between the formal written curriculum maps provided by each university and what faculty and students reported they had experienced. We posit that simulation can provide a link between the written curriculum and learning in clinical practice. The latter is obviously valuable, but highly variable too, as unlike simulation clinical practice cannot be easily controlled. There is also a significant challenge for clinical educators in finding protected teaching time in real clinical settings, as teaching is "grafted" onto patient care encounters.

Simulation based education in Gippsland Medical School

Drawing on the findings described in this paper and the existing strategic development plan for GMS, we see several features and challenges of simulation based education. These features include:

- The small cohort size
- Minimal restriction on access to simulation facilities
- Close relationships between students and faculty
- The ease of aligning simulation based education and clinical practice

The challenges include:

- Provision of simulation based education to students on clinical placements away from rural hubs
- A limited pool of qualified faculty
- Acute doctor shortages in rural areas
- The generalist nature of rural practice
- The logistics of managing the Federal Government's requirement that a proportion of all medical students complete twelve months of clinical placement in a rural setting

Based on the themes, we have incorporated six factors to improve the way in which simulation can be used to support student learning at GMS. We have expanded dedicated simulation facilities at clinical teaching sites and developed the following:

1. Structured approaches to simulation based clinical skills teaching
2. The human resources infrastructure for simulation facilities at university and clinical teaching sites
3. Effective communication strategies between the university and clinical sites
4. A coordinated approach to support sharing resources (e.g. SPs, clinical educators, administrative support, technicians and managers) both within medicine and with other health professional groups
5. A rational and coordinated approach to the purchasing of equipment
6. A consistent approach to evaluation

The interview data provides some evidence of the relatively 'ad hoc' manner in which simulation is used as an educational method in the State of Victoria medical schools, but the recommendations have wide reaching implications for all educational facilities.

Limitations of the study

There are several limitations of the study. Faculty and students may not have represented the views of the broader populations. However, when asked, faculty thought they were the most suitable person in their setting to participate. Students were selected by faculty at the site and so may have been biased towards simulation as a valuable educational method. The number of students interviewed was relatively small. We did not interview SPs or others who support simulation based education. Faculty worked in schools with relatively large student cohorts and so may not be relevant to our relatively small school, although the data includes two clinical rural sites where there are small cohorts of students.

Conclusion

This paper provides empirical data demonstrating the 'ad hoc' means in which simulation based education is often delivered in undergraduate medical education. Faculty development is critical to success of simulation based education. That is, the provision of educational programmes to support faculty in teaching effectively with simulation. Furthermore, it appears that students in rural areas may experience specific benefits in simulation based education associated with the relatively small numbers of students and the alignment of simulation facilities and clinical teachers at the same site.

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