Teaching Using Simulation

Normal experiential learning that leads to an expert professional in clinical practice is associated with prolonged exposure to that practice. The over-riding idea is that by simulating clinical scenarios, learning is accelerated by the debriefing/feedback session. The expert knowledge is made explicit to the trainee and reinforced with video and verbal feedback.

Definition

Simulate: Latin simulare
- Produce a convincing re-creation of real-life event or set of conditions.

Simulation training can:
- Prepare students to cope with future roles.
- Provide practice in a safe environment with no risk to patient or student.
- Test/challenge trainee’s technical and decision-making skills during realistic patient care situations.
- Be an assessment tool.
- Lead to standardized teaching.

Skills that can be assessed/practiced using simulation:
- Interpersonal and communication skills.
- Critical thinking and decision-making skills.
- Practical skills.
- The use of equipment.

The Best evidence medical education (BEME) collaboration is an international group of individuals, Universities and organisations committed to the promotion of best evidence medical education. They formed a topic group in 2002 that addressed the question: “What are the features/aspects of high fidelity simulators that lead to most effective learning?”

1. Feedback
The absence of learner feedback was the greatest single factor for ineffective simulation training. The lack of feedback could lead to:
   a. Learning of the wrong learning objective.
   b. Not realising what the desired behaviours should be by not focusing on them.
   c. Not transferring skills to clinical practice.
   d. Spending increasing time on only one aspect of training.

2. Practice
A lack of opportunity for practice is also associated with a poor educational outcome. This could often be attributed to insufficient access to the simulator,
as training sessions are usually time dependent, and the simulator is often a hotly contested resource. In addition, each learner is different, and some learners inevitably need longer or more frequent sessions with the simulator to achieve the same educational results as their co-learners.

3. Validity
Poor validity is associated with a lack of realism. In some simulators novices can out-perform an expert, which questions the validity of that simulation. Typically, this would also lead to a lack of correlation with other outcome measures.

4. Fidelity
A common belief is that low fidelity simulation is better than high fidelity. However the group concluded that all levels of fidelity should be used based on the required outcomes. This is discussed by Maran and Glavin (2003), where the progression from low to high fidelity simulation is compared to the progression through medical education. Their conclusion is that the range of fidelity available is almost all potentially useful, but that many simulators are underused due simply to a lack of clear educational goals.

5. ‘Simulator’ learning
Students learn to master the simulator rather than the task. The solution to this is to have multiple outcome measures for the task.

**Assessment**
There is current controversy about the use of simulators in high stakes examinations. Issues of domain specificity and itemised versus global scoring systems have bee raised. There is ongoing research into all of these factors though, and it seems certain that simulation will be included as part of high stakes assessment, along with other outcome measures.

**In summary**
If you are thinking of using simulation in teaching you have to think:
- Who am I teaching?
- What am I teaching them?
- What are they expected to learn?

The simulation scenarios should:
- Be as realistic an environment as possible.
- Should involve feedback/debriefing/video sessions.
- Well prepared with a back up plan for equipment failure.
- Involve the observers by getting to make notes on teamwork, situation awareness, communication etc.

Remember to create a relaxed teaching environment, as simulation can be a stressful experience for students.

There follows a brief description of the reasons why simulation has become more popular as a teaching and assessment tool.
Medical Simulation

The first recorded use of a medical simulator is that of a manikin created in the 17th Century by a Dr Gregoire of Paris (Buck, 1991). He used a pelvis with skin stretched across it to simulate an abdomen, and with the help of a dead fetus explained assisted and complicated deliveries to midwives.

In spite of this early start, medical simulators had not really gained widespread use in the following centuries, principally for reasons of cost, reluctance to adopting new teaching methods, and scepticism that what was learned from a simulator could not be transferred to actual practice.

All of these reasons are still relevant today, however the combination of improved technology and increased pressures on educators have promoted simulation as one option to address the following problems with traditional clinical skills teaching.

An alternative to “see one, do one”

In the past, health care professionals learnt on the job, which some still believe is the best way to gain experience. However, there are a number of barriers to this type of traditional clinical teaching. These include:

- **Humanitarian issues** - practicing on patients is not ethical. We have moved into an age of where learning on patients is not acceptable if there is an alternative.
- **There has been a decrease in the number of inpatients. In part due to an increasing number of day case patients and also the fact that chronic conditions are being cared for in the community. This has led to a decrease in exposure and access of the trainees to ward patients.**
- **The training time for postgraduate medical education has decreased and will decrease further.** (Unfinished business, 2002). With the implementation of new training schemes, experience cannot be built upon over time as before.
- **Some situations are so rare that to gain experience would take many lifetimes.**
- **Legal/litigation issues.** The possibility of educational establishments being sued by patients and ex-students for not teaching and assessing clinical skills as laid down by the regulatory bodies could arise.
- **Record keeping, reproducibility, assessment and validity are issues all brought to the forefront with clinical governance and revalidation. Simulation is seen as away of addressing some of these issues.**
- **Students learn more effectively in a non-threatening environment.**
- **There is increasing emphasis on multidisciplinary learning, and clinical skills’ teaching is an ideal forum for this.**
• The increase in workload for health care staff means there is less time to spend on traditional clinical teaching, which is compounded by the increase in student numbers. (DoH, The NHS plan 2000)

**Recent Recommendations**

Simulation training extends from part task trainers, procedural training to the experience of full clinical situations. For example cannulation, basic and advanced life support to high fidelity simulators. However, they also include communication skills, how to take consent, bereavement counseling and IT skills.

In ‘Tomorrow’s doctors: Recommendations on undergraduate medical education.’ GMC July 2002, there are lists of clinical skills that medical students have to be competent in before graduation.

> “The essential skill that graduates need must be gained under supervision. Medical schools must assess students’ competence in these skills. The curriculum must stress the importance of communication skills and the other essential skills of medical practice.”

In ‘Unfinished Business: Proposals for reform of the Senior House Officer grade.’ A report by Sir Liam Donaldson, Chief Medical Officer for England, proposed changes in junior doctor training which were considerable. With a shortened training period and the probable division of service commitment from effective training time, the provision of effective skills training and competency-based assessment will have to be addressed.

> “An objective of the foundation programme would be to develop and enhance core or generic clinical skills essential for all doctors (e.g. team-working, communication, ability to produce high standards of clinical governance and patient safety, expertise in accessing, appraising and using evidence as well as time management skills.)”

**Multidisciplinary Teaching**

As well as increased emphasis on clinical skill teaching, there is increased emphasis on the multidisciplinary approach to learning. Of interest during multidisciplinary teaching are human factors such as decision-making and behavioural interaction, which is thought to be of major importance in the occurrence of critical incidents.

“We are taking forward work to develop more pre-registration inter professional education programs which incorporate common learning in core skills and knowledge. As a minimum we intend to ensure that all health professionals should expect their education and training to include common learning with other professions.”

This emphasises that predetermined healthcare groups deliver many of the skills required by patients during their care, however in the future who delivers these skills may well change. It is envisaged that simulation teaching could provide packages that any group could access and interact with other groups for relevant multidisciplinary situations.

References

BEME collaboration. http://www.bemecollaboration.org Accessed 05/05/04


Tomorrow’s doctors: Recommendations on undergraduate medical education. General Medical Council 2002
