Learning opportunities in simulation for trainees

This article discusses and reflects on the use of simulation in postgraduate medical education and provides trainees with tips on what they could expect to learn and how they might improve their capacity to learn by participating in simulation training. The article defines simulation, and introduces the various types of simulation before drawing on theories of learning to support the ways in which learners can enhance the effectiveness of their simulation experiences.

Definitions

What is simulation?

Simulation covers numerous modalities, from task trainers such as cannulation arms (*Figure 1*), to cadavers, to acute care training using interactive manikins, real equipment, actors and role players. Some forms of simulation take place within the workplace – in-situ simulation – to create a fully immersive experience. What these modalities have in common is a representation of the workplace environment and activities with the primary purpose of learning.

Simulation improves knowledge, skills and patient outcomes (Cook et al, 2012) and its use is increasing. It is a well-established teaching modality in specialties such as anaesthetics and surgery, and is being integrated into medical training, forming a major part of the new internal medicine curriculum commencing in 2019 (Joint Royal College of Physicians Training Board, 2017).

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What is knowledge and what is learning?

Consider what you know and can do now compared to when you first graduated. People often report that they never felt more knowledgeable than when they passed finals, but that they certainly feel more able to do their jobs now than they could then. How can it be that you knew more then but are more capable now?

Knowledge can be thought of more broadly than we sometimes appreciate. Eraut (1994) asserts that professional knowledge (the knowledge you need to practice medicine) can broadly be categorized into declarative knowledge (the type found in textbooks, and most likely the type that got you through finals), and personal knowledge. Personal knowledge is a combination of facts, practical skills and other less well-described areas such as the knowledge of people (knowing which consultant is most approachable for certain queries), of yourself and your strengths and limitations, and of the culture of your organization. An important feature of personal knowledge is that much is acquired non-formally, and often it is hard to describe what you know and how you learned it.

Figure 1. Task trainer – cannulation arm.

Your personal knowledge is probably gained through experience, by participating in the activities of the workplace and by becoming part of the team. This method of learning is quite different to 'bookwork' and classroom learning, an important distinction made by Brown et al (1989) in their theory of situated cognition, crudely summarized as 'you learn how to do what you do by doing it'.

Lave and Wenger (1991) put forward a similar theory asserting that learning occurs through participation in work activities (akin to service provision) which they called situated learning, facilitated through interaction and collaboration with other professionals in a community of practice.

Theories of experiential learning from Kolb (1984) and Schön (1995) suggest that learning occurs when you go through a process of reflection on actual events, and your practice changes based on these reflections. Repeated cycles of experience, reflection and change lead to incremental increases in understanding and skill.

One final theory to introduce is adult learning theory. Knowles (2014) describes the characteristics of adult learners which need to be taken into consideration when designing learning activities. A key characteristic is that adults are generally self-motivated and need to understand the relevance of a learning activity to their everyday lives in order to benefit from it. This article illustrates the relevance of simulation practice to doctors' daily work.

Learning in simulation

As you may have experienced, there can be problems with on the job learning:

- Some events are rare but important (e.g. anaphylaxis)(*Figure 2*)
- It could be unsafe for you or for your patient if you were to perform a procedure or encounter a clinical situation on a real person for the first time
- Often you are practicing alone without anyone else to observe you and provide feedback
- Usually when you are in the midst of a busy clinical situation there is little or no time for reflection and learning from it.

Simulation affords the opportunity to be exposed to rare or risky situations and gain some experience before they actually happen. It is usually carried out as a group activity, allowing sharing of the experience to the benefit of the group. It also allows time for structured reflection and learning immediately after the event, when it is still clear in your mind and you have faculty and peer observers to contribute.

Top tips for maximizing learning from simulation

Drawing on the educational theories discussed above, this article now gives some tips on how to maximize your learning in simulation:

1. Try to negotiate the learning outcomes you would like to address ahead of time
2. Get into it, and play it for real
3. Watch and appraise what others are doing when you are observing but not participating in the scenario
4. Engage in the debrief
5. Try to take at least one point from each scenario that you will change in your own clinical practice.

Figure 2. An example of a rare but important event: a group of learners participating in simulation of a birthing mother requiring resuscitation.

> “Simulation affords the opportunity to be exposed to rare or risky situations and gain some experience before they actually happen.”

Try to negotiate the learning outcomes you would like to address ahead of time

There will be situations you worry about being unable to handle or believe you have handled suboptimally previously. These are exactly the topics where you are likely to learn most from simulated scenarios as they will be most relevant to you. If there is flexibility in the topics that can be covered, then you can maximize the value of these sessions by contacting the simulation team in advance and telling them what you would like to address. Given the complexity of setting up sessions, waiting until the day may be too late. Most simulation teams would truly value advanced dialogue with you.

Example

A colleague was discussing a case where a patient who had been admitted for medical management of a non-ST-elevation myocardial infarction developed melaena and became unstable out of hours. The patient had a do not attempt cardiopulmonary resuscitation order and your colleague was unsure at the time if she should organize transfer to the acute hospital for endoscopy. You worried that in a similar situation you would not be sure what you should do. You asked the simulation team to design a scenario based on this. This gave you and all of your colleagues the opportunity to discuss the available options, outcomes, hospital guidelines and protocols. After the session you felt much more able to deal with such a situation if it was to arise.

Get into it, and play it for real

If, as suggested above, learning comes from doing things in real clinical practice, then it would follow that for the simulation to be effective it would have to reproduce the important features that would be encountered in real clinical practice. This would include the emotions and stress that we might feel and the actions we would normally perform. Sometimes this requires some work from you as a learner to accept the ‘unreal’ as it is clearly impossible to precisely replicate every aspect of a real clinical situation.

Example

You find that simulation manikins are unrealistic, putting you off communicating with them in the way that you would a real patient. However, buying in to the simulation and making the best effort to engage with it is much more beneficial for your own learning and also that of your peers.

Example

There are some things learners feel they have to do just because they are in a simulation. One example is ‘calling for help’. You might feel that you have to escalate to the medical registrar just because it is simulation, whereas if you were in a similar situation on the wards you might ask another colleague of the same grade or an allied health professional. It is worth playing it for real and doing what you would do in real life. This gives you, your colleagues and the facilitators the chance to see if what you do in real life works, and if it does not, a chance to figure out why this might be. It might be that there are organizational or interpersonal barriers that occur in the workplace that simulation could help to highlight and address.

Watch and appraise what others are doing when you are observing but not participating in the scenario

Most simulation sessions will have one or more scenarios where you are actively involved, and others where you are observing your colleagues. These can be as valuable as the scenarios where you are a direct participant. In clinical practice we rarely get the opportunity to watch each other in action. There will undoubtedly be thoughts or actions in your colleagues’ performance that you can take to your own practice, or it may highlight errors that you share that you could avoid.

Example

During a role play of an end of life scenario you notice that your colleague has a very nice way of describing the dying process to a relative. You find these types of discussions tricky because you cannot find the right words to say. You feed this back to your

KEY POINTS

- Try to negotiate the learning outcomes you would like to address ahead of time. In doing this you will ensure that the session is meaningful and relevant to you and your colleagues.
- By fully engaging with the simulation and playing it for real you will maximize the learning opportunity and may uncover workplace problems that can then be resolved.
- Watch and appraise what others are doing when you are observing but not participating in the scenario as you can learn a lot by observing aspects that you could incorporate to your own practice or highlight errors you share that you can avoid.
- Engage in the debrief openly and honestly as it is a chance to reflect on the events.
- Try to take at least one point from each scenario that you will change in your own clinical practice – this is the final important step in reflective practice.

Figure 3. Post-simulation debrief with video playback.

colleague and consider how you might say something similar the next time you find yourself managing this type of case.

Engage in the debrief

Most simulations are set up so there is an equal amount of time given to discussion or debrief after the scenario as to the scenario itself (*Figure 3*). This is effectively a group reflection on a clinical encounter. It is your opportunity to analyse what has happened and why, and to think about how that would affect your practice. The proximity of this reflection to the activity, and the fact that it is a group activity shared with colleagues, makes this particularly effective as a way of learning – but only if you engage in it honestly and openly. It also enables you to develop your own skills in feedback.

Example

While participating in a simulation scenario which involved the treatment of anaphylaxis, you did not pick up on an error where the nurse administered the incorrect dose of adrenaline. During the debrief your facilitator asks your opinion about why this happened and if you double checked the dose. You stated that you did not check the dose and did not realize that you should have as nurses normally would do this. It would be quite possible to approach this defensively and apportion blame to the nursing staff. However, in a simulated learning environment there is an opportunity to be more open. You might think more broadly about the ways in which normal processes can break down in emergency situations, and ways you can help to mitigate that.

Try to take at least one point from each scenario that you will change in your own clinical practice

In a reflective cycle the final step is always taking action to apply the learning to actual practice. The ultimate point of the simulation is to generate this change. A good debrief will facilitate this process. Try to imagine your own clinical practice and your own patients, and to identify a way in which you can change positively with a learning point from each scenario.

Example

To continue the above example, you concluded that you, or others, could use techniques to improve communication that would reduce the possibility of the same misunderstanding occurring in real practice. You also recognized the role of doctors in checking drugs in emergency situations. Because you are part of the cardiac arrest team you decided that your learning point would be to ensure that you actively check emergency drugs with the administering nurse.

Conclusions

There are many ways by which you can shape and maximize your learning through simulation. This article has added some learning theory to evidence these suggestions and it is hoped that these tips will encourage you to be proactive in your approach to simulation opportunities. The authors would also wish that any simulation designers reading this will encourage their groups of learners to actively engage in simulation in this way. **BJHM**

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