USE OF SIMULATION TECHNIQUES IN MRI TRAINING

InHealth

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Background

What is simulation?

Simulation can be described as *"the technique of imitating the behaviour of some situation or process by means of a suitably analogous situation or apparatus, especially for the purpose of study or personal training"* (Oxford English Dictionary, 2019). Zorn, et al (2018) also cite it as *'an active-teaching method involving active participation of students in their learning'.*

The use of simulation techniques in education and healthcare has become more prevalent over the past 50 years and translates into multiple learning objectives being taught in realistic clinical environments without any harm to patients (Wilford & Doyle, 2005, and Gibbs, 2015). Various studies have found that students report simulation exercises to have benefit to clinical practice as they have the time to practice and repeat tasks without time pressures of a busy clinical environment (Gibbs, 2015).

Simulation models and techniques align with all four learning opportunities for adults identified in Kolb's Learning Cycle (Shiner, 2018), and also with the 4 tiers of Miller's pyramid resulting in consolidation back in to clinical practice (Wilford & Doyle 2005).

Simulation based learning has been shown to promote patient safety, communication and teamwork amongst healthcare professionals. (Aura, et al, 2016). This leads to better operational readiness and expedites competencies for learners, resulting in increased confidence. Simulation better prepares students for the clinical environment through **'Active Participation'** which enables students to progress along a spectrum from passive observation through to performance (practice) (Dornan, et al, 2007). Practice through simulation ultimately benefits patients as learners can practice skills required to do their job through trial and error in a safe, non-threatening environment closely representing reality (Linder & Pulsipher, 2008).

Context

Due to a national shortage of diagnostic radiographers within the UK, there is a lack of experienced MRI staff available to fill vacant posts and support service delivery of increasing clinical complexity. In response, an internal demand for development of less experienced staff within MRI at InHealth was identified.

This has led to the redesigned Emerging Talent Preceptorship programme which aims to provide structured training and support to both graduate and band 5 radiographers wishing to specialise in MRI.

Through the redesign of the programme, simulation was considered an important aspect to incorporate in order to help expedite development of competence, and in turn operational usefulness to fill the vacancy demand. Based on research, literature and personal experiences of training it was felt that this would be a useful way to induct trainees in to their new roles. **Three different methods of simulation were introduced**. As debriefing is a central step of the simulation process (Zorn, et al 2018), feedback was gathered both on trainees and from trainees throughout.

Simulated Safety Screening Scenarios

The concept behind these sessions was to provide trainees with the opportunity to practice and build confidence in preparing patients for MRI. Actors were briefed and used to portray a mixture of patient presentations with trainees tasked at screening and preparing them for scan. This was conducted in small groups of 4-5 with a facilitator. The group then observed and fed back on each other based on the principles of ALOBA (Agenda Led Outcome Based Analysis) with constructive feedback driven by each participant as to what they felt they may struggle with or wanted specific feedback on (Silverman, et al, 1997).

In particular it was around **communication skills to support rapid rapport, ask appropriate questioning and manage potentially challenging behaviours** which could inhibit eliciting reliable histories to ensure safety. **Engaging and effective screening to be able to obtain a reliable and sufficient medical history is essential** (Hudson & Jones, 2018). The challenge is often the short period of time in which to do this (5-10mins) and is therefore something that improves with experience. In addition, trainees will be used to using "medical language" which may or may not be meaningful to the patient.

Feedback from the group was mixed, with the expected fear of role play and 'performing' in front of others they have just met. This has been acknowledged in previous studies concerning role play (Zorn, et al, 2018).
Together with the findings of their study, we also found that giving trainees a clear understanding of what was expected of them helped.
Despite feedback from our groups being mixed, **89% felt the session content, relevance and usefulness was either good or excellent.**

> " Really enjoyed the screening sim. Gave me positive reassurance about how to deal with an array of patient types.

Online MRI Scan Simulator

Access to an online virtual scanning interface was purchased which allows learners to practice scanning techniques such as slice placement and parameter changes. The tool came preloaded with cases and there were some issues with being able to upload further bespoke cases and so the quality and usefulness was limited.

Trainees worked in pairs, working through worksheets which guided them through the process of performing a scan, getting them to critically appraise parameters and resultant images whilst also practicing slice and sat band placement etc.

The intention of the simulator, which is also accessible from home, was to encourage trainees to practice the simple steps of **hand-eye co-ordination** around a generic scanner platform to **support muscle memory and to gain confidence** in this part of their role.

However, the level to which the simulator reflects real life scanning is significantly limited and this resulted in feedback from trainees being extremely mixed.

Only 65% of responses agreed or strongly agreed use of the simulator helped support their understanding and application of clinical knowledge (mean score 3.8 on a 5-point Likert scale, n=35) which reflects their indifference to the use of this piece of technology.

> " More consequence from adjusting parameters/ positioning to enable us to learn from mistakes

> " Not great when I've been scanning. Very restrictive compared to real life. Maybe nice to see how the different sequences affect the image.
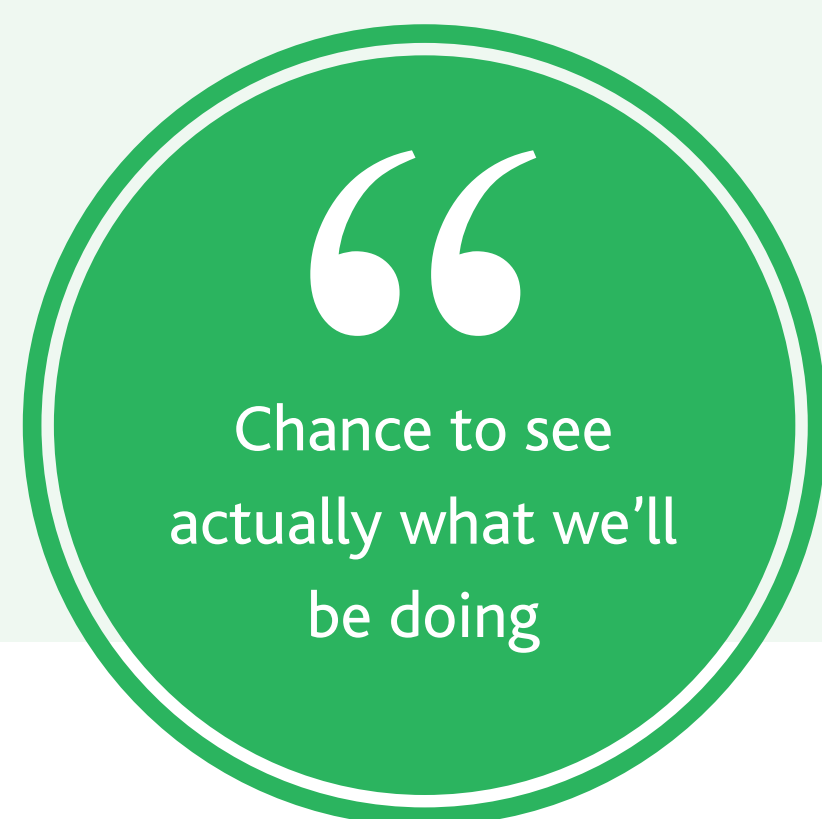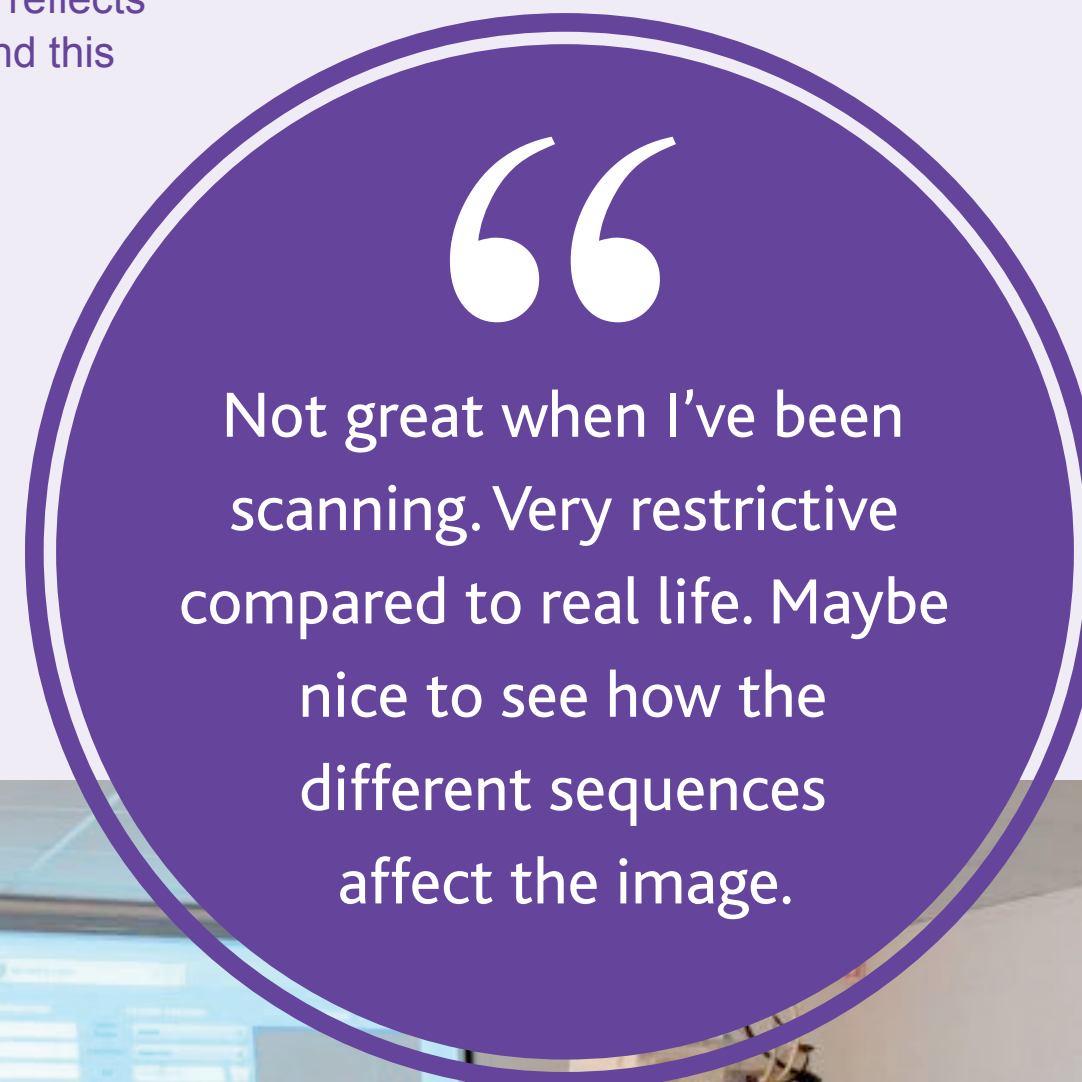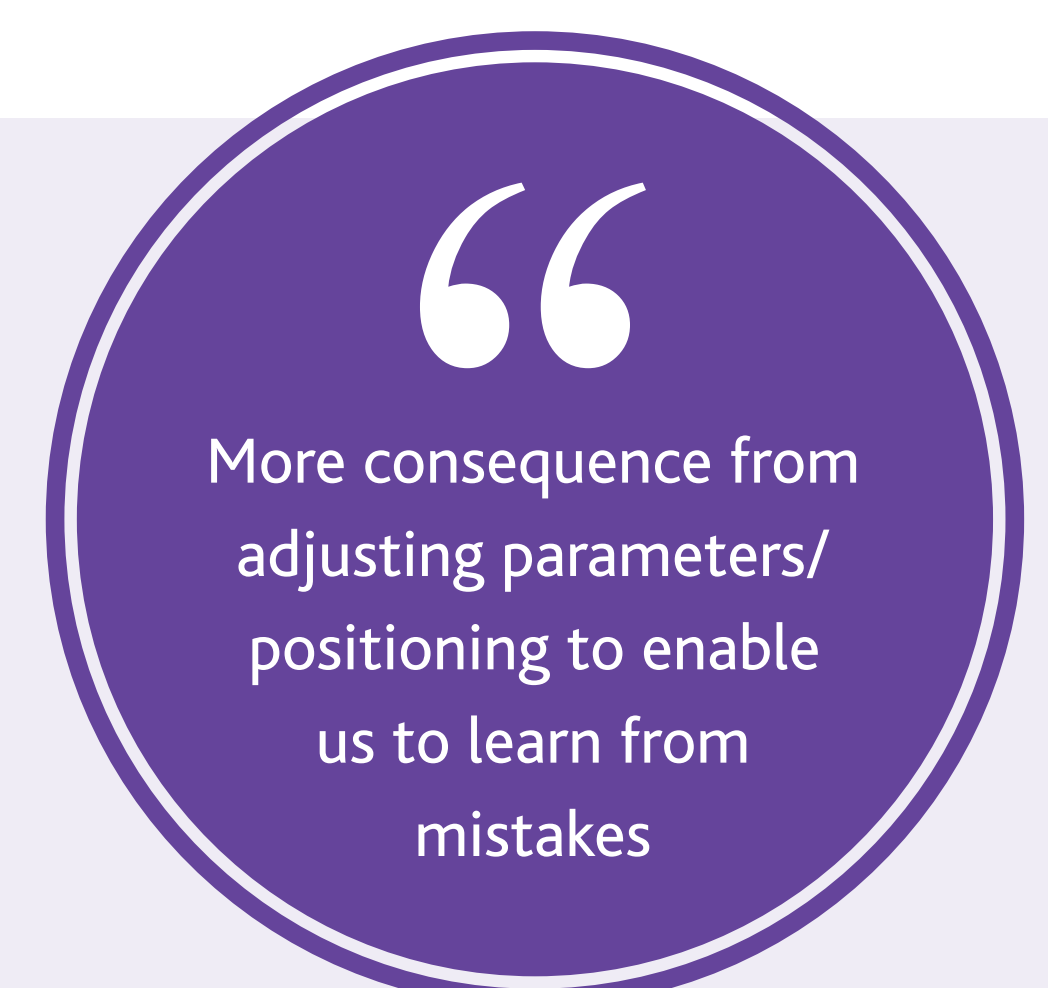
> " Sims were not very useful to me.

Coils and Positioning

To familiarise trainees with the scanning environment which may be new to many, a mobile MRI scanner trailer was brought into the hotel car park. This was in part used for equipment orientation and to show trainees where certain key pieces of equipment were, but also an opportunity to **interact with the scanner, handle coils and position each other** for various routine examinations in preparation for the clinical environment.

In small groups with a facilitator, trainees were shown coils and the gantry controls and then each given an examination to talk through set up and position for.

96% rated the session contents and relevance as either good or excellent, with 93% rating it useful.

> " Positioning sim was covered well – experience of how it feels for a patient

> " Chance to see actually what we'll be doing

Some of the minor issues with the software have now been resolved and the approach next time is to be more prescriptive in its use and guide learners through the task of a scan step by step. It was felt that the sessions were too self-directed which meant learners did not fully engage and therefore didn't get as much as was expected out of the sessions.

Interestingly, feedback from session facilitators was all extremely positive and how such a tool would have been great when they underwent training.

> " A fantastic opportunity for trainees to be able to get to grips with the technique of scanning, having the time and chance to ask questions each step of the way.

Conclusion

The aim of introducing more simulation based teaching into the preceptorship programme was to help **expedite required clinical skills** to support gaining competence sooner through **building confidence to more actively participate back in the clinical environment**.

Dornan, et al (2005) suggested that the clinical environment is much more threatening than the seminar room and that uncertainty is more of a demotivator than a motivator. By trainees acquiring skills in a simulated clinical environment it was hoped that it would equip them better to perform back in the clinical environment; feeling more confident, motivated and prepared.

After each teaching block (10 days in total) trainees were asked how much they agreed with the following statement – *'I feel more confident and prepared to more actively participate in the clinical environment'* – on average 94.2% agreed or strongly agreed (mean score 4.5 on 5-point Likert scale, n=101). This positive feedback has ensured that we will continue to include and develop this particular component of the training programme.

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