

MEETING REPORT

Report on ‘Novel Thinking and New Technology in Healthcare and Education’: Seventh Annual Simulation Conference, Homerton University Hospital NHS Foundation Trust, 7 December 2017

K. Jamieson,* J. Driscoll and K. Killicoat

Homerton University Hospital NHS Foundation Trust, London, UK

*Corresponding author at: Department of Medical Education, Homerton University Hospital NHS Foundation Trust, London, E9 6SR, UK. Email: katharine.jamieson@nhs.net

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Abstract

This report provides an overview of the Homerton University Hospital NHS Foundation Trust’s 7th Annual Simulation Conference: Novel Thinking and New Technology in Healthcare and Education, 7 December 2017

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Introduction

The Homerton Simulation Conference (#homsim) was initiated in 2011, in recognition of the important role of simulation within the trust. Since then, it has become a national forum for the sharing and promotion of innovations in simulation, technology, human factors and patient safety. Each year has attracted a fantastic speaker programme and increasing numbers of delegates, and this year was no exception.

The conference focused on novel approaches to simulation, including some exciting technological advances, but underpinned by a common theme of realism, resilience and the power of collaboration in delivering effective and safe patient care.

Session 1: technology

Will Niven, Consultant in Emergency Medicine, Homerton University Hospital

Use of Google Glass for trauma induction¹

Will Niven opened the conference in dramatic style with ‘Code Red – the Movie’, a captivating multi-perspective simulation scenario of the management of a traumatic major haemorrhage event conducted at the Royal London Hospital and captured in full with the help of Google Glass technology.

He explained that the management of major haemorrhage in trauma is a complex and often daunting process. It requires a systematic, focused and multi-disciplinary approach. The Code Red protocol was consequently developed in 2008 at the Royal London, a world-leading institution in the management of coagulopathy, and a centre with a considerable research involvement. Given the high turnover of staff, it can be challenging to teach new staff all the technical and human factor skills needed to effectively execute Code Red. In particular, it is challenging for everybody to understand the roles that they themselves do not inhabit but are key for the smooth running of the Code. Niven presented a simulation scenario developed on an agreed Code Red protocol, and designed to facilitate an expedited learning experience for doctors and nurses.

Google Glass is an optical head-mounted display designed in the shape of a pair of eyeglasses. It allows display of information on a screen, including in a smartphone-like hands-free format and looks set to transform accessibility/deliverability of healthcare and medical teaching, including simulation.

Niven described how he and his team used GoPro cameras and Google Glass in a scenario carried out in real time, with actors and in the designated ‘code red bay’, to run and record a simulation Code Red scenario of a road traffic victim with a pelvic fracture who destabilised in the computed tomography scanner. The resultant video was shown

at the conference and offered a fascinating, multi-perspective, absorbing experience and integrated education tool. The video captures each team member's perspective and aims to facilitate expedited learning of one's own role in the code in addition to a renewed appreciation for the complexity of all other team members' roles. The group has yet to formally demonstrate the effectiveness/validity of the tool but informal feedback has been highly positive and they hope to expand to other speciality-specific virtual models.

William English, Medical Realities

Delivering realism and immersion for surgical training and patient education²

The next talk was delivered by William English, a general surgery academic trainee who has been working together with the company Medical Realities to deliver virtual reality to surgical training.

Worldwide there is a shortage of surgeons, with recent figures from *The Lancet* suggesting that 5 billion people³ worldwide do not have access to safe or affordable surgery. This startling figure highlights the need for additional surgeons with adequate experience and skills to deliver safe care and minimise patient risk. However, in a speciality that relies on an apprenticeship model, and in which training opportunities are becoming constrained by working patterns and limited theatre availability, training time still exceeds 10 years. Current supplements to 'hands-on' experience, such as textbooks and apps are criticised for their expense, limited educational value and non-immersive nature, in particular. Simulation offers a potential solution but similar criticisms can be levied regarding expense, the unrealistic haptic feedback and the immovability of equipment between sites. English presented another alternative offering a balance between quality and scalability.

He discussed the concept, background, current use and future plans of Medical Realities' current venture. Starting from the relatively simple concept of airing the first 360° view live operation, they have now moved on to develop a virtual reality surgical training platform that allows trainees to experience and explore the operating theatre and different clinical scenarios in a safe environment, and in which time pressures are relieved and errors allowed. The platform offers a number of modules, based around the Royal College of Surgeons England (RCS) and the Joint Committee on Surgical Training/Intercollegiate Surgical Curriculum Programme (JCST/ISCP) training curricula with scenarios and accompanying teaching materials and assessment tools.

The talk triggered animated discussion and questions regarding the translation of such technology to other specialities, as well as to other areas of medicine, including human factors teaching, patient liaison, patient journey/information platforms and live supervision of juniors. Undoubtedly, we are set to see expanding and exciting use of this technology in the future as an addition to the ever-expanding modalities by which training is delivered.

Session 2: resilience

Ernie Reid, NHS Elect

Resilience – and are productivity and happiness mutually compatible?⁴

The Oxford English Dictionary defines resilience as 'the capacity to recover quickly from difficulties; toughness'. Ernie Reid works for NHS Elect, a not-for-profit alternative to traditional models of management consultancy, with a considerable research interest in resilience. Reid suggested that resilience in medicine is a process of adapting to adversity to minimise psychological and physical risk. He acknowledged the importance of learning from mistakes, but also balancing this with positive reflection, empathy and encouragement.

He presented evidence to show that increased resilience results in increased functioning/learning,⁵ improved physical and mental well-being,⁶ increased willingness to engage in action⁷ and a better ability to turn adversity into growth and new ways of working/living.⁸

He made us challenge the pessimist's view of adverse events as permanent, pervasive and persistent – and suggested instead to view these as temporary, localised and impersonal. He provided an ABCDE^{9,10} model for this: Adversity, Beliefs, Consequences, Dispute, Energised. He discussed how one can dispute traditional assumptions/conclusions arising from certain situations and how we can become energised to improve situations. He suggested this requires motivation, reflection, optimism, active coping skills and a supportive social network.

Traditional views of happiness within work places are based on the concept that the harder one works, the more successful one is, and therefore the 'happier'.

Reid challenges this in arguing that success simply results in the goal posts being changed, and pushing happiness over the cognitive horizon. In addition, research has shown that the brain performs better when in a happy state compared with a neutral or stressed state: learning increases, productivity increases, creativity increases. He presented Martin Seligman's sum of happiness¹¹: happiness = the sum of

our genetic capacity for happiness added to circumstances added to voluntary control.

Seligman suggests that there are four aspects of happiness:

- (1) Pleasures: sensory, immediate and things we can potentially become numbed to, e.g. eating chocolate!
- (2) Gratifications: these are absorbing and may not be pleasurable at the time, but create a positive memory or strengthen our social networks and so take us towards something worthwhile, e.g. holidays
- (3) Meaning: using our strengths in service of something greater than ourselves (family, community, justice), e.g. recycling
- (4) Flow: the feeling we may get from a task that fully engages our abilities but does not test them to breaking point, e.g. mindfulness.

Building a balance of these is crucial and, given their individual nature, requires insight into what works for different people.

He advocated leading by example and did exactly this in a rousing and engaging manner through a number of audience participation exercises that punctuated his talk. In doing so, he modelled what he was propagating and gave the conference delegates some simple practical exercises that could be easily replicated when people returned to work. A key example of this was asking everyone to recall a recent event when they were proud of a team that they were part of. Having prompted everyone to share these achievements, he encouraged reflection about why we lead with negativity at handovers instead of positivity as just demonstrated. He demonstrated how seemingly simple things can make a big difference (sending positive emails, maintaining self-care to facilitate caring for others) yet how challenging this can be and how much emphasis we place on positive end results rather than processes and experiences. Given the current difficulties of the NHS with regard to public domain/perception, burnout rates and staff retention, resilience is becoming a more prominent theme in the working of the NHS; while every individual must accept some responsibility for this, a collective approach will be essential to change the culture and working of the medical profession in this regard. These small but powerful exercises could be felt rippling through the room as the session concluded and people left to attend workshops in high spirits.

Session 3: engagement science and patient safety

Roger Kneebone, Professor of Surgical Education and Engagement Science, Imperial College Centre for Engagement and Simulation Science (ICCESS)
Tamzin Cuming, Consultant Surgeon, Homerton University Hospital

Engagement science: advancing human health through collaboration and simulation¹²

Roger Kneebone has pursued a varied career route, with significant experience in surgery, education and numerous unconventional collaborations with arts and music organisations. He challenged our classic contextualisation of simulation, making us think of it as a process of selection, abstraction and representation, with the overall effect of intensification. He argues that what is extracted from such an approach is the thought process, leading to novel presentations and methods, and suggests that bringing together different people from different backgrounds can lead to improved engagement, collaboration, and development of ideas.

He described the operating theatre as an area of science, craftsmanship and performance. Dexterity, teamwork and communication are all fundamental to surgery, and crucial aspects to incorporate in the development of successful simulation teaching. Most of us would make the assumption that relevant associations would be with other doctors or health professionals, but he pushed us to consider the comparability with craftsmanship in which many of the skills and attributes essential to being an effective surgeon overlap. Through the less conventionally thought of concept of combining science and art he demonstrated novel 'simulation techniques', for example, using yoghurt pots to train inserting grommets, and use of textiles on the verge of breaking as a metaphor for fragile tissue handling.

The latter approach was used by himself and Tamzin Cuming as a real-time practical demonstration for the audience. They explored a layered model that had been constructed using different materials (lace, paper, yellow knitting) to represent different layers of human tissue descending to a cavity: a metaphor for surgical practice that allows the practice of important skills rather than a traditional anatomic replication, but one that certainly proved highly effective.

Barriers to the effectiveness and use of medical simulation have included high cost (particularly of equipment), poor engagement and lack of fidelity related to limited realism.

The concept of thinking more laterally about what we want to achieve rather than trying to replicate exactly what is there is certainly an interesting prospect, and one that could overcome these barriers to some extent and make simulation more accessible and applicable.

Kelsey Flott, Interim Centre Manager, Patient Safety Translational Research Centre

The patient experience, patient safety and staff morale¹³

Kelsey Flott is a research fellow at the Centre for Health Policy within the Institute of Global Health Innovation (IGHI). She works on a broad portfolio of research relating to patient experiences of care and patient safety, both within the NHS and internationally.

She described the importance of being able to recognise domains related to delivery of effective, high-quality and safe health care. Patient experience is increasingly recognised as one of these domains, and more recently the importance of staff experience has also come to the fore.

International discourse on patient safety has emphasised that while large-scale infrastructure investments are a part of ensuring safety, they are often untenable and not always sufficient to ensure change in practice or safe behaviour. She explained that staff experience predicts patient experience and emphasised the importance of adequate support to clinical staff, staff satisfaction with their work place and a cultivation of a safe culture for staff and patients alike. A 'safe' culture, characterised by clear communication, freedom from blame, and effective mechanisms for learning, is central to ensuring safe care delivery.¹⁴

Despite a seeming lack of exact definition, safety culture can be broken down, measured and improved using low-cost, freely available tools such as the internationally validated Safety Attitudes Questionnaire (SAQ¹⁵).

Flott presented her research (supervised by Erik Mayer and Ara Darzi) in which they implemented the SAQ as a low-cost intervention baseline measure of safety culture in a six-centre acute hospital trust. Over a 12-week period, 8353 staff members received an adapted version of the SAQ with 33 statements relating to safety culture. The response rate was 19%, with areas of communication and leadership highlighted as key strategic priorities for improving safety culture. Future work will focus on scaling the project up to the wider London area, and using the results to design a targeted safety culture action plan.

Workshops

Derek Stewart, Director for Patient Involvement, Nottingham Biomedical Research Centre

Meaningful patient and public involvement (PPI)

As a cancer survivor and former teacher, Derek Stewart has become very involved in numerous aspects of patient involvement and advocacy at local, regional and national levels. His workshop provided a personal, insightful, interactive and stimulating discussion of patient and public involvement.

Although at first glance it might appear difficult to involve patients in technology, medical devices, translational science, or surgical procedures, he helped us to see how valuable, innovative and transformational patient insight from personal experience can be. In addition, he told us first-hand how much benefit patients can derive from such involvement, both in enhancing knowledge and understanding of their illness and the sense of purpose that comes from contributing to a field that has been integral in their own health and illness journey.

Through small group work, he urged us to consider how patients could be involved in preparation, practicalities, and ongoing review of research. He urged us to ensure that we are using patient input for the right reasons – not because we feel we 'should' or because it has become an automatic response, but because we have thought about how and why their input will make a difference. By using the patient experience, patient voice and presence as a valuable resource and willing partnership, we can work together to enrich research, improve people's health and well-being, and undoubtedly add positively to our experience as health professionals.

Emily Middag, Anne Bisset-Smith and Lesley Rogers (Homerton Improving Quality) and Emma Mordaunt (UCLPartners, Life QI)

Quality improvement: when and how to use it

During this reflective workshop, the experienced facilitators explored the role of technology in quality improvement (QI). We began with an overview of this relatively new but rapidly expanding arm of clinical governance. In contrast to audit, which requires a comparable standard, and research which stems from an open question, QI needs only an idea for change. From there, a simple repeatable method for improvement should be developed using common language and ways of working. However, a recognised challenge is how to measure improvement. Ideally, we should

be able to use existing sources of data to demonstrate a change in process or outcome.

We discussed how QI is often born out of failures in the NHS, and it is necessary to learn from these events to create a strategy for better patient care and service delivery. This requires a fundamental shift in culture towards openness and optimism with the first step towards change being the provision of evidence to make a case for action. Enter, technology.

As an example, we considered the case of Steve Bolsin, an anaesthetist who was labelled a whistle-blower in the 1990s for reporting the unacceptably high mortality rates of children undergoing heart surgery at Bristol Royal Infirmary. He collected data over a number of years to confirm his claim and identify areas for improvement. The Kennedy report subsequently acknowledged that the data provided by Bolsin was the catalyst for change in the service and dramatically improved clinical outcomes. Today, technology and information systems are abundant in the NHS with many patient records being electronic. This often makes the task of data collection and analysis quicker and easier than in the days when trawling through individual paper records was the only option. Conversely, technology can be used as a tool to help disseminate the results of a QI project and/or educate staff and patients on implemented changes.

During the workshop, we were introduced to 'Life QI', an international online platform designed to unite the clinical community in pursuit of improvement through QI projects. Based on the Institute for Health Improvement's cyclical model: 'Plan-Do-Study-Act', it provides supportive tools and step by step guides to help organisations and individuals develop and share projects from inception to outcome. It also allows for discussion and collaboration on a large scale, providing the potential to cross organisational and regional boundaries, an exciting opportunity to learn from one another and aggregate data.

William English, Medical Realities

Medical Realities: VR workshop

William English and the team from Medical Realities offered a highly interactive, hands-on opportunity to try out and explore the virtual reality surgical training platform described in the second lecture of the day. User feedback was overwhelmingly positive, with particular commendation about the level of reality and ease of use. In addition, the session stimulated further discussion about transferability to other specialties and areas of medicine, as well as networking and sharing of ideas and experience.

Closing remarks

Simulation education has brought about significant change in the approach to and way of thinking about medical and surgical education, and increasingly the patient journey and patient involvement. Technology in this area and across medical education continues to advance, offering devices capable of improving fidelity and increasingly sophisticated procedural practice. We are increasingly thinking about novel approaches and uses of simulation, and the benefits of 'thinking outside the box' to enhance innovation, accessibility and applicability. The NHS and healthcare are continually evolving and changing, and the role of simulation will have to adapt and evolve in response to this. Our vision of what constitutes simulation is likely to continue to change and expand, from the well-defined in time and space, high technology to broader, less defined but potentially equally effective methods. What all of these will undoubtedly share is a common theme of realism, resilience and support to deliver effective and safe patient care.

Conflicts of interest

None declared.

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