Aim: The aim of the study was to identify the mechanisms used in simulation-based education that support development of collaborative practice skills of undergraduate students.
Method: The simulation-based learning scenario was iteratively developed, delivered and evaluated over 3 years. Staff reflection and content analysis of 3 years of feedback from anonymous evaluation questionnaires, and a sample of student assignments, were used to identify aspects of simulation delivery that supported students' development of collaborative practice.
Results: Although students consistently report anxiety about participating in the simulation, they also identify it as one of the most intense but helpful learning experiences of their on-campus degree programme. The use of trained, experienced actors, indistinguishable from service users maximizes student engagement. Effective pre-briefing reduces student anxiety and provides an opportunity to add complexity via the written brief. The student roles as observers and/or participants (in a familiar role) improve students' experience and support students with diverse needs. Assigning clear staff roles improves delivery and cost-effectiveness. Combining the two approaches to debriefing students was necessary to allow reflection-in-action and -on-action. Thorough debriefing is essential, challenging and requires planning and practice.
Implications for practice: Simulation is an effective pre-qualifying education tool. Adequate pre-briefing, effective debriefing styles, and clear assignment of staff roles aid in effective delivery. Simulation scenarios need to be carefully constructed and delivered to ensure that all students remain within their optimal learning zone and to support students with diverse needs.

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41 INTRODUCTION OF EMERGENCY DEPARTMENT *IN SITU* SIMULATION

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10.54531/AEUM3397

Background: *In situ* simulation (ISS) is an effective way to deliver inter-professional education in the Emergency Department (ED) [1]. Since October 2020, we have been running regular inter-professional ISS in both EDs in Mid-Yorkshire NHS Trust. We used personal experience, systems and processes from other EDs in West Yorkshire [2] and the literature to assist with initiating this.
Aim: The aim of this study was to describe the process to set up an ED ISS programme and share our challenges and successes.
Method: We run a variety of cases including paediatric and adult on a broad topic range (anything that can be seen in the ED), e.g. medical, surgical, trauma, psychiatric and maternity emergencies. We prepare the case beforehand and ensure that we have the appropriate staff and equipment. A vital aspect to ISS is ensuring the ED is safe. Embedding the attitude that this is 'just another patient' has been key. We use a low-fidelity manikin and a simulated monitor app. All participants are briefed, everything is in real-time to closely simulate real life. After the simulation, a debrief takes place. Feedback is sought from all and a certificate is provided. From 14 October 2020 to 5 May 2021, we have run 39 ISS with 138 inter-professional ED participants.
Results: Figure 1 demonstrates feedback given by these participants (largely positive).

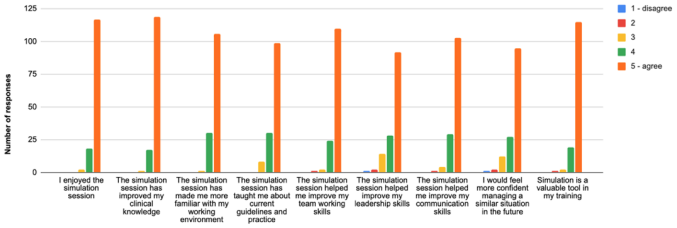

Figure 1: Participant feedback

Implication for practice: Although challenges exist, it is achievable and effective to run an ISS programme in a busy ED. While this was set up with the education of staff as the primary objective, it has become clear that ISS is also important in identifying system problems, testing new pathways and providing an educational response to incidents in the department.

Aspects of our programme that have worked for us include:

- Picking a regular day weekly (early morning best for ED).
- Having an inter-professional debriefing team helps to engage all professions.
- Ensuring senior departmental support.
- Build slowly to more complex simulations.

Challenges we have found are:

- Changing culture/attitudes – most support simulation once they have taken part/seen it happen regularly – persevere with it!
- The ED is busy – we cannot change this but can be flexible.
- Too many observers put the learners off and reduce learning. We have reduced observer numbers and have a sim 'uniform'.
- Some participants have difficulty engaging with the manikin/low-grade technology – a good briefing can help.

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32 USING A SIMULATION ENVIRONMENT TO ASSESS THE USABILITY OF A NOVEL MEDICAL DEVICE DURING THE COVID-19 PANDEMIC

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10.54531/VQTW1346

Background: It was a recognized challenge of lack of ventilators needed to face COVID-19 worldwide. Although ventilators are sparse, self-inflating manual resuscitators are widely available in-hospital services, providing a rapid response to respiratory depression. Based on this, a device (PNEUMA) [1] was designed to be a temporary solution for emergency use, allowing positive pressure ventilation through a standard self-inflating manual resuscitator, without the need for healthcare

personal manually operating the resuscitator. In the first stage, the device underwent functionality and performance testing, using a calibrated lung tester. In the second stage, the usability of the device was assessed, using a clinical simulation environment, an effective method to test usability [2].

Aim: This work describes the use of a simulation environment to test the usability of a novel device to automate self-inflating manual resuscitators.

Method: The usability study was divided into two parts: (1) participants followed a protocol with instructions for assembling and using the system in a non-clinical context (Figure 1, left panel) and (2) participants used the system in an immersive simulation environment with a clinical case scenario (Figure 1, right panel). Participants received information on how to assemble/use the system through a 4-page user manual. To monitor participants' interaction with the system, both parts were video-recorded and questionnaires on key aspects of usability were filled out.

Figure 1: Usability testing. Left panel – assembly of the system (part I); right panel – use of the system in an immersive clinical simulation environment (part II).

Results: A convenience sample (two MDs and six RNs) from an intensive care unit of a tertiary Portuguese hospital participated in the test. Usability testing showed that the system was easy and timely assembled, with low complexity of use (e.g. not requiring external help). The clinical scenario tested the transition between spontaneous and mechanical ventilation, and ventilatory parameters' control, using PNEUMA. All participants reported that the controllable parameters (I:E, RR, Vol, PIP, Plat, and PEEP) were relevant and easy to change. Participants suggested the inclusion of patient parameters such as the tidal volume and lung compliance. Participants also suggested improvements, such as the inclusion of pressure alarms and a more user-friendly interface. All participants reported that they would be willing to use the device for emergency use.

Implications for practice: The reported study resulted in recommendations and ameliorations of the device, before its use in real settings, in the context of the COVID-19 pandemic. The use of simulation environments for device/systems' testing provides a timely and standardized approach, enabling a safer clinical practice.

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51 PREPARING WARD STAFF FOR COVID-19: CAN REMOTE SIMULATION REPLACE FACE-TO-FACE LEARNING?

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10.54531/MLHJ3772

Background: Human factors are essential to patient and staff safety, particularly during the COVID-19 pandemic with redeployment of staff to different roles in unfamiliar environments [1]. With concerns that the second pandemic wave would engender greater pressures on general medical wards, the simulation team at a London teaching hospital set out to create a multi-disciplinary educational programme for ward staff caring for COVID-19 patients. The course, planned for face-to-face delivery, was rapidly converted to online simulation at the height of the pandemic.

Aim: The aim of the study was to ascertain the efficacy of converting face-to-face simulation and debriefing into online asynchronous video-based scenarios and debriefing, to enhance understanding of human factors skills.

Method: In October 2020, a half-day simulation course commenced. Due to suspension of face-to-face teaching in December 2020 with COVID-19 cases rising, this was converted into a half-day online format through filming faculty participating in the existing scenarios. These films were shown to participants, followed by asynchronous online debriefing via Microsoft Teams. Both formats had e-learning as a pre-requisite. Data were collected using pre- and post-session questionnaires containing the Human Factors Skills for Healthcare Instrument (HuFSHI) [2]. Learners who attended both formats were excluded from quantitative analysis.

Results: Post-training, staff demonstrated improvement in self-efficacy of human factors skills for healthcare. There was no statistical significance between mean improvements for both formats; the greatest improvement was split equally (Table 1). 100% found the face-to-face (N = 24) useful, versus 98% online (N = 54). Communication was the skill most learnt (face-to-face 58%, online 65%), with teamwork (face-to-face 50%, online 48%), escalation (face-to-face 42%, online 57%) and self-care (face-to-face 38%, online 19%) also frequently mentioned. Aspect's learners' thought were good included the discussion-based element (face-to-face 50%, online 37%), interactivity (face-to-face 13%, online 31%), multi-disciplinary team involvement (face-to-face 13%, online 20%) and videos for the online format (19%). 21% wanted the face-to-face longer, 15% wanted the online shorter. 9% would rather the online was face-to-face.

Implications for practice: Online asynchronous debriefing produced similar outcomes to face-to-face for teaching human factors. We posit that this was because the videos were not 'best practice' – thus stimulating learning conversations, which accessed learners' frames and past experiences. Challenges for faculty included: pace and volume of sessions, managing psychological safety, emotive discussions, screen fatigue, and technical aspects. A 6-month follow-up survey is planned and will be included in the presentation. Further work is required to understand why the results were similar.