Healthcare Work System Analysis using in-situ Simulation: Case Studies from a Regional Centre

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1. Introduction

Simulation is a well-recognised modality of healthcare education. The ability to imitate the healthcare system in a safe environment provides effective education with positive learning outcomes for individuals and teams¹.

Team training with simulation has shown translational improvements in patient outcomes², including reductions in mortality³. More recently healthcare simulation has been extended to consider individuals and teams in their own work systems. This insituation, or in-situ, simulation not only enhances learning through active experimentation in the "real-world," but also allows assessment to enhance system quality. In-situ simulation can identify inhibitory factors on processes and staff, and the positive factors that support resilience.

This poster outlines the experience of a regional simulation centre in using in-situ simulation in healthcare, including design, delivery and the tools used for system analysis.

2. Methods

TSCSC undertakes a four-stage approach to deliver an in-situ simulation:

- Stage 1: Design
 - Locations for simulations are self-identified by groups with a specific learning need, or through a governance highlighted case of need e.g. testing a new unit.
 - An initial site visit is undertaken by a simulation lead and a technical team member to define the objectives of the simulation. A risk assessment is made considering the potential impact of the simulation on patient care and service delivery.
 - Design is mapped to Gaba's domains for effective simulation⁴ to ensure quality.
- Stage 2: Delivery
 - Simulations are undertaken only after an "on the day" risk assessment has ensured it is safe to proceed. Filmed simulations are performed with the interprofessional team and participants are debriefed by experienced faculty with a local clinical expert.
- Stage 3: Analysis
 - TSCSC uses a series of human factors and ergonomic (HFE) analysis tools. These include a locally designed framework based on multiple published models. This framework, known as TASHH (Trent Analysis System for Hazards in Healthcare), incorporates various HFE models (e.g. Yorkshire Framework⁵), Non-Technical Skill observation tools (e.g. NOTECHS⁶) and

HFE assessment tools (e.g. SOAM⁷).

- Stage 4: Evaluation and Follow-up
 - A report is written and provided with video and photographic evidence to support findings. This is shared with participants and management teams who can enact change where required.

3. Results

A variety of clinical systems have been subjected to an in-situ simulation exercise including an induction of labor suite (*figure*), Emergency Department resuscitation room, and interventional radiology suite. Examples of negative system factors identified include:

- Equipment:
 - Lack of availability of equipment for transfer of patients when departments are busy.
 - Access to locked equipment hinders response.
- Environment:
 - Ceiling clearance means equipment cannot be effectively moved in an emergency.
 - Equipment layout and location is not standardized.



- Protocols:
 - A number of protocols don't exist for new units, e.g. transfer of patients.
- Culture:
 - Resistance to new interventions and staff-led improvements.

Future work is planned in non-clinical areas (e.g. patient and public waiting rooms), psychiatry outpatients and acute medical receiving units. Areas where simulations have been undertaken will be followed-up to measure improvement and re-analyse.

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