SIMULATION-BASED EDUCATION IN HEALTHCARE

STANDARDS FRAMEWORK AND GUIDANCE

ASPiH
ASSOCIATION FOR SIMULATED
PRACTICE IN HEALTHCARE

NHS
Health Education England

Acknowledgements

Many people and organisations have contributed to the development of these Standards.

We would like to record our appreciation of the time and effort spent by all those who provided feedback, advice and guidance over the two years it has taken to develop this framework. The engagement and contribution by such a breadth of organisations and individuals has exceeded all expectations'.

We will continue to need your support, engagement and willingness to share experiences to keep the quality process moving forward and we will continue to seek open engagement with all parties to make sure the standards work for the simulation community as 'providers', as well as others such as regulators, professional bodies and commissioners.

The partnership between ASPiH and HEE will ensure the most effective delivery and adoption during 2017 and beyond.

The ASPiH Standards Project Team

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Executive Summary

This document is the result of a 2-year programme to develop a National Standards Framework for Simulation-based Education (SBE). Following the earlier National Simulation Development Project [1], Health Education England (HEE) recognised the need for standards in this field and part-funded the Association for Simulated Practice in Healthcare (ASPiH) to produce an initial draft document that has been further developed into this final framework through consultation, research and expert input. The ASPiH Standards Project Team has consulted with over 40 pilot sites, received feedback from over 80 individual practitioners and engaged with experts from key stakeholder organisations to ensure the document is relevant and applicable across the widest possible range of SBE applications.

The Framework describes the attributes required to design and deliver effective simulation-based education. It is defined by shared values, beliefs and principles from across the healthcare simulation domain and reflects best practice in SBE. A key objective was to produce a document that drives improvements in SBE practice, providing advice and information as well as a first step towards an agreed quality assurance process for SBE. The underpinning aim was to develop a generic framework that would be applicable to as many areas of practice as possible but not so bland as to be ineffective.

The Framework document comprises two parts: a set of **Standards** and supporting **Guidance**. This information has been grouped under four main headings or 'themes': **Faculty, Technical Personnel, Activity and Resources**. The Standards in each theme are written as statements identifying best practice in SBE while the Guidance section underpins the Standards, describing detailed evidence or practice that could support achievement of the standard together with suggested measures and references.

The Framework is intended to provide quality assurance for providers, regulators, professional bodies and commissioners and has the following wider benefits:

- Provides a common framework and defined standards that can be applied within educational and healthcare sectors
- Provides a clear focus on improving the quality of simulation-based education and practice
- Informs future policy and practice amongst regulatory and professional bodies
- Supports better informed and more consistent commissioning practices
- Strengthens opportunities and benefits of peer networking, collaboration and improvement
- Provides a more robust platform on which to develop the evidence base that will further define best practice

Introduction

About ASPIH

The Association for Simulated Practice in Healthcare (ASPiH) is the national learned body that focuses on the development and application of simulation-based education (SBE) and technology-enhanced learning (TEL) in the United Kingdom. It is a not-for-profit company bringing together a multi-professional membership drawn from higher education, clinical practice and academic disciplines allied to healthcare to improve safety and quality of care provided to patients.

Background

In 2012/13 ASPiH conducted a National Simulation Development Project [1], supported by Health Education England (HEE) and the Higher Education Academy (HEA) to map the resources and implementation of SBE and TEL across the United Kingdom. One of the key issues identified in the resultant report was the need for standards of practice and national guidance for SBE related to quality indicators. There was a desire for any standards to be relevant and of value to the increasing number and breadth of institutions, departments and individuals designing and delivering SBE.

ASPiH produced a draft Standards document in 2015 and conducted an initial consultation, feedback from which showed the document required further development. In early 2016, HEE funded an ASPiH Standards Project Team that has consulted widely on a revised document with the ASPiH community, educational professionals in the field of SBE, experts in undergraduate and postgraduate curricula and those with expertise in human factors and ergonomics. The resultant Framework incorporates best practice from published evidence and is extensively mapped to existing quality assurance processes currently in use across the UK and internationally, including the General Medical Council (GMC) [1], the Nursing and Midwifery Council (NMC) [2], the General Pharmaceutical Council (GPhC) [3] and the Health and Care Professions Council (HCPC) [4].

Intended Use and Scope

The multi-professional nature of the ASPiH community has enabled the Framework to be built around responses from the widest possible community of practice. It is intended for use by healthcare professionals involved in SBE at pre-and post-registration, in Trust and University environments or other facilities and should be applicable to both novice and experienced simulation faculty. In this context, SBE refers to a spectrum of activity extending from simple role playing, through to simulated patients, part-task trainers, hybrid models, full body manikins and complex simulated environments.

ASPiH is aware that some UK networks involved in SBE have developed and are using regional standards/guidelines to aid the design and delivery of high quality SBE. ASPiH has reviewed these initiatives and, where relevant, incorporated similar structures and elements into the final Standards Framework. Our key aim has been to complement these initiatives and produce a National Framework into which local practice standards and procedures could fit. Where data already exists on compliance with existing local standards, this could be used as evidence to support and comply with the National Framework.

The Standards incorporated into the Framework are not mandatory at this stage of development in the science of simulated practice. ASPIH hopes the standards will be used as a tool to improve

simulated practice and serve as an aspirational document for those developing and delivering SBE. The document should not be seen as prescriptive and the intention is not to stifle innovation or creativity. The use of the word 'Standards' in the context of this Framework is fundamentally different from that used by professional bodies in defining their requirements for education, training and patient safety. However, these Standards do provide a key step in developing a quality assurance process for SBE.

Accreditation and Further Development

It is intended that the Standards project should now move into an *adoption* phase. ASPiH plans to introduce a draft Accreditation process early in 2017 to facilitate self-evaluation against the Framework. This will enable all practitioners and their organisations to use the Standards Framework in a consistent way and identify how their practice benchmarks against both the Standards and Guidance. During the adoption phase, quality data will be gathered to measure progress and outcomes which in turn will inform the next steps in the process and, potentially, a further iteration of the Framework recognising areas of practice that are missing or where achievement of the Standard is shown to be very challenging. In parallel to this adoption of the Standards by the simulation community, HEE will be using the document to conduct consultation with other groups such as Deans, Commissioners and Regulators to discuss their potential utility by these groups in the future.

Theme 1: Faculty

Context

Simulation programme faculty members are recruited from a pool of educators who may be experienced in simulation-based education, content experts in the subject being delivered, or both.

It is widely accepted that the debriefing process is the most important component of SBE [7]. All scenario-based simulation learning should include a planned debriefing session to optimise learner reflection, enhance the learning experience and provide feedback on performance [8][9].

Faculty who are designing, delivering and debriefing SBE should be appropriately trained to undertake this role as they are key to its success [4][6][7][10]11].

STANDARDS
1. Faculty ensure that a safe learning environment is maintained for learners and encourages self-reflection on learning.
2. Faculty engage in continuing professional development with regular evaluation of performance by both learner and fellow faculty
3. Faculty are competent in the process of debriefing

This section provides standards of best practice for faculty who are engaged in the design and delivery of SBE.

Guidance

General

- ❖ Attracting, recruiting and retaining faculty is key to delivering courses effectively and in a sustainable fashion. A supportive environment for faculty with protected time to develop simulation activities should be key considerations for faculty retention and development [11].

- ❖ Engagement from management of healthcare organisations and educational institutions is vital to ensure continued support for faculty development. This should be through explicit time in job plans/contracts and linked to regular appraisal and evidence of professional development in the role [3][4].

- ❖ In designing SBE activities or courses, faculty should ensure content adheres to best practice standards in education where applicable [12] [13] [3] [4] [5].

- ❖ Simulated Patient (SP) involvement, as a specialist group of faculty, should be supported with the same considerations as other faculty members.

- ❖ Content should adhere to best practice when engaging with SPs, such that the four principles of biomedical ethics are adhered to: autonomy, beneficence, non-maleficence and justice [14].

Novice Faculty

- ❖ An introductory course (or courses) should expose and orientate novice simulation faculty to the principles of adult learning theory and explore underpinning educational theories/pedagogy relevant to the spectrum of simulation [15] [16].

- ❖ The introductory course (or courses) should provide a definition of simulation, clarify terminology used and describe the simulation process and how scenarios are developed. The course should also introduce the technical aspects of specific simulation equipment and how to engage with SPs if these are to be utilised [17] [16] [4].

- ❖ Specific training in debriefing should be provided to faculty as effective debriefing is recognised to be the most important element of learning in the simulated environment [6].

- ❖ Faculty delivering human factors training should have undergone bespoke training in systems engineering, human factors or other systematic approaches to tackling workplace error and patient safety concerns [18]

- ❖ New faculty should observe or co-facilitate existing courses alongside a more experienced faculty member and receive feedback using validated tools [19] [20].

❖ The faculty and, where appropriate, the SPs should acquire specific training provided by a formal course, a Continuing Professional Development (CPD) opportunity, or targeted work with an experienced faculty member

❖ The process of becoming faculty should be streamlined as much as possible, keeping faculty training to an effective minimum as a lengthy process requiring multiple days of study leave could deter potential new faculty.

Experienced Faculty

❖ Faculty development is a lifelong process and faculty should engage in CPD activities recognised by the individual's professional body [17] such as (but not restricted to) courses, conferences, e-learning, academic activities and regular appraisal of literature [4].

❖ A record of these CPD activities should be maintained for evaluation.

❖ Regular evaluation of faculty (of all levels of experience) performance by both learners and fellow faculty should be integral to the SBE exercise and could be achieved using a peer observation process [4] [21].

Debriefing

❖ The facilitator should be a faculty member competent in the process of debriefing [15] [16]. Evidence from research suggests that the perceived skills of the debriefer have the highest independent correlation to the perceived overall quality of the simulation experience [22].

❖ The facilitator must identify pertinent elements of the simulation to discuss and relate to the objectives [23].

❖ This should include relevant technical and non-technical aspects of performance as well as the human factors approach to patient safety.

❖ Facilitators should engage with the SPs (if present) to access, enable and incorporate their feedback.

❖ SPs should be competent in the process of debriefing and feedback from their perspective – as agreed on with the facilitator – in role, in neutral or out of role.

❖ Facilitators, SPs and technical personnel benefit from an additional debrief after the simulation session as and when required, without learner presence, to reflect and develop self-awareness.

❖ Debriefing should be conducted in an environment that is safe, positive and non-threatening. An environment of trust, respect and confidentiality is necessary for all participants to feel sufficiently comfortable to share experiences and feelings [24] [25].

❖ Duration and timing of debriefing is crucial but should be flexible enough to allow progression through phases of debriefing (e.g. reaction, analysis and summary) [26].

❖ Debriefing should occur immediately (less than 5 minutes) after simulation so that thoughts, feeling and actions are captured without degradation or distortion [24].

❖ There are several popular models of debriefing, which the facilitator may wish to use as a structure for the process such as the advocacy enquiry model, the 3D Model of debriefing, the Mayo clinic model or the Lederman model [26] [27] [28]. However, it is recognised that there is currently no standardised process or model of debriefing.

Theme 2: Technical Personnel

Context

In October 2016 ASPiH was accepted by the Science Council as a full member organisation and, as a direct result, ASPiH is now recognised as the professional body for simulation technicians and technologists [29]. As a member organisation, ASPiH has made a firm commitment to help raise the professional status of its technician members and facilitate training and CPD opportunities to support their professional registration and other career development opportunities.

The role of simulation technicians and technologists is rapidly evolving and the Gatsby review [30]

STANDARD
4. Simulation technicians and technologists, whose primary role is to support delivery of SBE, have gained or are working towards professional registration with the Science Council.

referred to a 'strategy to identify and support workforce sectors where technicians have particular requirements.' They are pivotal for the maintenance, preparation, operation and consultation on the successful delivery of SBE and TEL in clinical skills and/or simulation facilities [31].

This section provides standards of best practice for personnel whose **primary** role is to provide technical expertise and support.

It is recognised that not all facilities have dedicated technicians and that this role may be undertaken as a **secondary** or dual role by either a faculty member or one of the administration team.

Guidance

- ❖ Technical personnel should be competent and safe and understand the limitations and functionality of their SBE equipment; they should also be competent in equipment maintenance and troubleshooting [32]

- ❖ Technical personnel should be aware of the adult learning theories and be able to apply those principles when demonstrating/teaching faculty how to use SBE equipment [13][33]

- ❖ Technical personnel should maintain a safe learning environment for learners and faculty members

- ❖ Technical personnel should be encouraged to be involved in in the design of new scenarios and the ongoing evaluation of existing simulation. This may include, for those with relevant experience and knowledge, input into the decision-making process i.e. procurement and/or the practical aspect of equipment selection i.e. trialling, testing [32]

- ❖ Technical personnel should act as role models and promote professional and courteous behaviour and integrity at all times, adhering to the ASPiH Code of Professional Conduct specific to simulation technician and technologist members [34]

- ❖ All technical personnel should have a regular performance appraisal and be supported to attend training and engage in CPD activities required for their role [34]

- ❖ *'Innovation capability'* should be encouraged to increase the quality and realism of delivery of SBE and potentially contribute to return-on-investment [35]

Theme 3: Activity

Programme

Context

The design and planning of SBE programmes is vital to ensure learners obtain the optimal benefit. Specific attention should be paid to describing how the use of simulation enhances existing educational/training interventions, or provides learning opportunities to address current or anticipated gaps in curriculum and/or training [36][2] [3] [4].

STANDARDS
5. Simulation-based education programmes are developed in alignment with formal curriculum mapping or learning/training needs analysis undertaken in clinical or educational practice.
6. The patient perspective is considered and demonstrated within educational planning.
7. A faculty member with expertise in simulation-based education oversees the simulation programme design and ensures that it is regularly peer reviewed, kept up to date and relevant to the organisation goals, clinical needs and curriculum to which it is mapped.
8. Regular evaluation of programmes and faculty is undertaken to ensure that content and relevance is maintained

Guidance

Activity, Design and Planning

❖ Consultation with learners, managers and patient groups, as appropriate, should assist in identifying training needs. A learning needs assessment of all stakeholders should be used to develop the learning objectives. This is the best way to achieve reliable and valid coverage of the curriculum outcomes, goals of the organisations and clinical need [3] [4] [5].

❖ Learning objectives should be appropriate to the level of the learner and, at the same time, designed to be challenging but achievable [37]. Objectives will need to be linked where applicable to individual technical or procedural skills, team working, non-technical skills and to organisational goals and requirements [3] [4] [5].

❖ Domains (cognitive/affective/psychomotor) of learning involved in the activity should be described using educational theory (Bloom's taxonomy or higher). This encourages faculty to aim to provide holistic teaching of the skill or task set for learners [38].

❖ Consideration should be given to the incorporation of the human factors approach in SBE programmes to develop better healthcare practitioners with an improved understanding of the role of human factors. This will help build resilience in individual practice, increase team performance and produce systems improvement.

❖ Ensure that a pre-simulation brief takes place where learning objectives are set beforehand and discussed as part of the debriefing process which takes place after completing a simulated scenario, or in feedback on completing a practical skill [12].

❖ The pre-simulation brief should include elements such as expectations regarding professionalism, etiquette, confidentiality and roles, together with an introduction to the simulated environment.

❖ Incorporate up-to-date, evidence-based practice in course content [39][4]. Where appropriate, every effort should be made to incorporate inter-professional education into simulation programmes.

❖ Promote holistic care and appropriate values set out in regulatory body guidelines [40] [2] [3] [4] [5] and/or those of other relevant professional bodies.

❖ A manual should be maintained to ensure consistency between design and delivery of the programme and reproducibility between faculty.

❖ The expertise of faculty should be appropriate to the needs of the learners and content of the programme [18] [2] [3] [4] [5].

Evaluation of Activity

❖ A faculty member with expertise in SBE should oversee the simulation programme design [15] [16] and ensure that it is regularly peer reviewed and kept up to date and relevant to the organisational goals, clinical needs and curriculum to which it is mapped [41] [18].

❖ Regular evaluation of programmes [42] [3] [4] [5] should be undertaken to ensure that content and relevance is maintained [41]. This should be achieved at a minimum through feedback from learners and other simulation faculty [6].

❖ Higher levels of Kirkpatrick's evaluation, such as level 4, provide a guide to what is aimed to be achieved through assessment of skills, knowledge or behaviours in the clinical setting before and after an educational intervention using validated metrics [42]. This could also be achieved through surveying patient satisfaction and demonstrating improved patient safety through a review of critical incidents, complaints and serious untoward incidents in the workplace [43].

Procedural Skills

Context

The major advantage of acquiring procedural and clinical skills in a safe environment [44] has made SBE attractive across medical and surgical specialties. Research has shown that simulation improves learners' skills and knowledge [45] and that the skills acquired are retained substantially longer term,

even after a single simulation activity [46]. The use of a mastery learning model to develop skills among learners has been successfully implemented in routine and life-threatening procedures [47]. Activities intended to facilitate procedural skill acquisition should comply with the relevant features of best practice including feedback, deliberate practice, curriculum integration, outcome measurement, skill acquisition and maintenance, mastery learning and transfer to practice [48].

The Standards written under other Themes are also relevant but not specific to procedural skills. The guidance below aims to provide specific information where simulation is used to deliver procedural and clinical skills training.

Guidance

Fidelity

- ❖ The fidelity of the simulation should be chosen based on the objectives of the session taught [49].

- ❖ Where possible and relevant, the equipment used to perform the procedure should be identical to that used in real clinical practice, and the anatomy of the training equipment (part-task trainer, whole body trainer or virtual reality simulator) should be identical to the real body anatomy, given the freedom of real anatomical variations

- ❖ Deviations from clinical practice compared with the simulator experience should be explained to the learners in a pre-session briefing.

Equipment

- ❖ Equipment should provide the same experience to multiple learners, where required, within predefined limits of variance.

- ❖ Testing of all simulation equipment should be undertaken before and after every session to ensure that it is in good working order.

- ❖ Dedicated personnel should be responsible for the maintenance of equipment and associated records (available to healthcare professionals and faculty as required) to ensure and support the uninterrupted delivery of education.

Activity

- ❖ Clear and specific objectives for a procedural skills course or activity should be set prior to delivery.

- ❖ Pre-course material should be provided to learners. Suggested modalities include (but are not limited to) videos, hand-outs and slide presentations.

- ❖ When course material is distributed among learners, it should include: a description of the equipment needed for the procedure; pre-procedure preparation; possible complications and dealing with complications.

❖ A formal evaluation by learners at the end of each session should be undertaken and the results of this evaluation should be acted upon to continuously improve and optimise the course.

❖ Standards for achieving mastery learning should be agreed prior to the course delivery, if appropriate.

❖ Where Mastery learning has been agreed, an improvement in knowledge and skill acquisition should be documented after each course, or after a cycle of courses. Validated tools should be used to demonstrate achievement of mastery learning.[47]

❖ Mastery learning models used for a course or cycles of courses should clearly demonstrate the six features of baseline testing, clear objectives, engagement in educational activities, formative testing, advancement to consecutive educational units if necessary and continued practice [48].

❖ As a minimum, courses should aim for a statistically significant increase in learners' confidence level in performing each procedure being taught.

❖ Higher levels of Kirkpatrick evaluation should be undertaken, where possible, to demonstrate transfer to a clinical environment and impact on patient safety [42].

Faculty
❖ Faculty in procedural skills simulation should be experts in the procedure taught.

❖ Faculty involved with procedural skills simulation should have had specific simulation equipment training prior to independently facilitating a course in procedural simulation.

Learners
❖ The faculty to learner ratio should be designed to allow learners to practise each procedure with supervision, as well as taking formal consent and appropriate preparation for the procedure.

❖ Selection of learners into a group for a session or course should be based on the individual's previous exposure to simulation, level of clinical training, specialty and experience of performing the specific procedure in clinical practice. This could be achieved using a pre-course survey.

Assessment

Context

SBE is an effective tool for formative assessment to aid learning. Simulation is increasingly being used in summative, high-stakes assessment.

Formative assessments can be highly effective in simulation-based learning experiences. This can give learners ongoing feedback on their progress towards the development of knowledge, understanding, and skills. Feedback can be from assessors and Simulated Patients (SPs). The intended outcome of formative assessment is the improvement of learner performance.

Simulation environments are traditionally recognised as "safe" learning environments for the learner to make mistakes without negative consequences and learn from them. Hence SBE has focused primarily on formative assessment in healthcare. However, considerable interest in summative assessment has resulted in SBE being used as an evaluation tool of healthcare professionals [50][3] [4] [5].

Summative assessments, also known as high-stakes testing, can be used in SBE for assessing and measuring outcomes or achievement of objectives, with a view to determining competency, judging if progression to the next level of training is indicated and demonstrating readiness to practise independently [3] [4] [5]. However, it is important that SBE is used as part of a number of assessment tools rather than as a stand-alone tool.

STANDARDS

9. The assessment is based on the intended learning outcomes of the exercise, with clarity regarding the knowledge, skills and attitudes to be evaluated and is appropriately tailored to the professional curricula to be evaluated.

10. Psychological safety of the learner is considered and appropriately supported.

11. Faculty have a responsibility for patient safety and to raise concerns regarding learner performance within educational settings, including SBE interventions.

Guidance

Formative Assessment

❖ The choice of skills to be evaluated should be guided by curricular information, competency guidelines and the limitations of the chosen simulation methods [51] [52] [3] [4] [5]. These may relate to technical or procedural skills, and skills relating to communication.

❖ Specific skill sets such as teamwork, leadership, clinical decision making and communication should be assessed using simulation scenarios based on multidisciplinary teams or stand-alone simulation scenarios using SPs. Certain skills can be assessed using hybrid or bi/multi-modal simulation which can include SPs.

❖ To be effective, the assessment activities should be targeted at the level of experience and ability of the learner [53].

❖ The formative assessment should be specific to provide supplemental strategies for achieving learner outcomes [54].

❖ Feedback/debriefing should be carried out as above if not provided in another format.

Summative Assessment

❖ Summative minimum expected performance standards should be agreed and explicitly shared between learners and faculty, taking into consideration relevant curricula and regulatory body standards.

❖ The assessment activities should be targeted at the level of experience and ability of the learner.

❖ Summative assessment should be based on evaluation tools previously tested with similar populations for validity and reliability [54].

❖ Patient-based simulation can be used as a summative assessment modality to assess communication skills, professional behaviour and information gathering.

❖ Consideration should be given to the fact that several assessments will be required to make a valid judgement of a learner's competence in a particular area and therefore judgements should not be made on the basis of isolated simulation encounters.

Learners

❖ Learners should have experience of and be familiar with simulation prior to summative evaluation.

❖ Psychological safety of the learner should be taken into account. They may experience heightened anxiety at the prospect of making mistakes, potentially leading to negative consequences.

Assessors

❖ Facilitation of effective performance assessment within simulation should rely on robust, realistic and specific learning objectives appropriately tailored to professional curricula, taking into consideration the regulatory body standards from the outset [3] [4] [5]. These should reference the minimum expected standard which, should the learner fail to attain it, would be considered as under-performance [3] [4] [5].

❖ Assessors of the summative assessment should be appropriately trained to ensure that there is good inter-assessor reliability and accuracy of scoring.

❖ There should be recognition that learner underperformance is a 'symptom, not a diagnosis', which should be identified as early as possible to facilitate appropriate investigation and intervention to ensure that underperformers are managed effectively and successfully [3] [4] [40] [55] [56] [57].

❖ There should be recognition that patient safety is at the forefront of patient care and therefore faculty have a responsibility to highlight and potentially escalate concerns regarding learner performance within educational settings, including simulation [3] [4] [5] [41] [58] [59] [60].

In Situ Simulation (ISS)

Context

In situ simulation (ISS) occurs in the actual clinical environment [61]. Evidence suggests that this can lead to more natural responses to training interventions and improve team working and clinical performance [62]. Further ISS can lead to the identification and resolution of latent errors [61], which are potential hazards in the system that can lead to patient harm. ISS has also been successfully employed to test run a new facility [63] in a patient-safe environment.

STANDARDS
12. Every ISS exercise has clearly defined learning objectives that achieve individual, team, unit level and/or organisational competencies.
13. Local processes and procedures are carefully reviewed to deliver ISS activity authentically.
14. Faculty delivering the ISS activity are proficient in SBE and have the required expertise on a given topic (Refer to Standards on faculty development above).

Guidance

Planning

❖ A formal educational needs analysis should be conducted to identify the needs of the learners, the team, the department and the organisation within which the *in-situ* exercise will take place.

❖ Involvement of all stakeholders will ensure that the expertise of various specialties and teams are utilised at the inception phase of the ISS activity to generate a well-defined programme

with appropriate complexity that achieves the learning objectives of individuals, the team and the organisation [64]

❖ Every effort should be made to deliver training in an environment which closely resembles the intended clinical area.

❖ Consideration should be given to costs incurred during the delivery of ISS in the clinical area. This may be due to personnel, equipment and consumables costs [63].

❖ Close collaboration should be established between the ISS training team and the parent unit where the ISS activity is to take place. This will ensure maximum gain from the activity with minimal disruption to the day-to-day clinical work of the parent unit.

❖ There should be a clear decision-making process and final accountability for scheduling and implementing ISS in view of potential risk to patient care by drawing resources away for the purpose of ISS activity. Close liaison will also ensure that clinical staff are released from clinical duties to participate in the ISS.

Delivery

❖ Faculty should be able to adapt to changing demands of the ISS environment; utilise different resources and data capture methods; focus on individual and team learning; and integrate both for wider organisational learning. Ideally, faculty delivering ISS should undergo specific faculty development courses [17] [65].

❖ ISS activity could entail the use of a variety of equipment, the logistics of which should be carefully planned in order to avoid delays or even cancellations.

❖ Adequate time should be factored into the planning for the session to allow setup and dismantling of equipment and disbanding of personnel. This will avoid unnecessary delays when resuming clinical work.

❖ Equipment used during ISS activity should be replaced to ensure that the clinical environment and drug stocks, where relevant, are left in a safe condition for continued delivery of patient care.

❖ ISS activity will depend on the availability of the clinical area and team and could be prone to cancellation. Learners should be clearly informed that the session might not be delivered [64] if the space needs to be utilised for actual clinical activity.

Feedback and debriefing

❖ Sufficient time needs to be allocated to debriefing immediately following the simulation in the clinical setting to gain the maximum benefit. A multidisciplinary approach to evaluating team

interactions should be undertaken, with a focus on human factors approach to evaluate the impact of latent errors and to identify remedial steps to overcome such errors.

❖ Latent errors identified during ISS should be discussed in the debriefing after the session to capture learning and identify preventative strategies. Sharing personal and team experiences will help translate training experience into improved patient outcomes.

❖ Latent errors should be graded using appropriate systems such as the NPSA risk matrix [66] to quantify the threat to patient safety. The risks should be escalated and recommendations should be made to avert these errors in the future.

Evaluation

❖ Faculty should evaluate ISS activity by using appropriate measurement tools, which demonstrate not only improvement of knowledge but also transfer of learning to a clinical environment. Observational tools should be designed to capture system improvements through the identification of latent errors during ISS activity [63] [3] [4] [5].

❖ Constant re-evaluation of the ISS services should be employed in order to ensure smooth delivery.

Theme 4: Resources

Context

Learners should be taught in an educational environment with appropriately trained faculty using robust educational programmes and, where relevant, suitable equipment supported by appropriate expert feedback [67] [3] [5].

The Department of Health Technology Enhanced Learning (TEL) Framework document emphasises the need for investment in simulation equipment to 'deliver value for money' and 'ensure equity of access and quality of provision' across the health and social care workforce [30].

The aim of any technology used in SBE should be to enhance training, improve productivity and reduce duplication in a cost-effective manner; not simply to use technology as an end in itself [28]. Ultimately the aim of the SBE experience is to improve patient experience and safety [3] [5].

STANDARDS
15. A variety of simulation modalities, including Simulated Patients, is incorporated into simulation programmes to create appropriate realism of the learning environment and achieve the objectives of the session being taught.
16. The facility has a clear strategic plan which addresses wider organisational and stakeholders' needs.
17. A designated individual oversees the strategic delivery of SBE programmes and ensures that appropriate maintenance of simulation equipment is undertaken.
18. Training is provided to all faculty to engage with Simulated Patients, where there is an active Simulated Patient programme

Guidance

Where a simulation centre exists at an institution

❖ Training is provided to all faculty to ensure that they are competent to use simulation equipment [18] [15] [16] [3] [4] [5].

❖ A designated individual should ensure that ongoing simulation technology procurement continues to be appropriate to learning and clinical needs [18].

❖ An individual with technological expertise should provide guidance and instructional support for the simulation programme. [31].

Where a Simulated Patient programme exists

❖ A Simulated Patient (SP) programme, with robust infrastructure, should be accessible, with SPs engaging with learners as a stand-alone modality or as a bi-/multi- or hybrid modality.

❖ The aim of engaging with SPs should be to enhance training and assessment.

❖ A designated individual should ensure that appropriate and on-going training and review of SPs occurs. This individual should also oversee a regular review of all SBE programmes to ensure that on-going SP recruitment continues to be appropriate to learning and clinical needs.

Management, Leadership and Development

Context

The simulation lead cultivates a supportive environment for the delivery of multi-professional SBE programmes, oversees appropriate and responsive programme design, develops and retains faculty and sustains SBE programmes.

STANDARDS
19. A designated lead with organisational influence and accountability manages the simulation activity.
20. There is a clear vision and mission statement to demonstrate aims and objectives of the facility.
21. There is a clear alignment to the wider organisational and stakeholders' needs, acting as a quality and risk management resource for organisations to help achieve the goals of improved patient safety and care quality.

Guidance

Strategy

❖ The strategy should address how simulation is supported across the organisation. Furthermore, the strategy should identify standards for faculty development, programme creation and regular review of courses and programmes [43] [3] [4] [5].

❖ The facility should have well defined aims and objectives relevant for all healthcare groups and should be pertinent to the needs of the organisation within which the facility is situated or to which it is attached [3] [4] [5].

❖ Key stakeholders should be involved in centre management and governance [3] [4] [5].

❖ Ensure adequate emphasis is placed on recruitment and retention of simulation faculty.

❖ Appropriate recognition of faculty should be provided to maximise retention. This can take the of (but is not limited to) certificates, teaching observations for their e-portfolio and evidence that can be utilised for appraisal and revalidation where appropriate (e.g. CPD points).

❖ Ensure mentoring of novice SBE faculty. Please refer to the section on Faculty development above (Theme 1)[3] [4] [5].

❖ Consider establishing a Simulation Fellowship Programme [68]. Such programmes could contribute to the creation of a faculty base for the future and ensure a high quality of programme creation and faculty development.

❖ Recruitment of simulation champions should be considered to forward the cause of simulation within educational and healthcare institutions and be linked to strategic goals and objectives of the facility.

❖ Programmes should aspire to act as a Quality and Risk Management resource for organisations to help achieve the goals of improved patient safety and quality. *In situ* simulations can be used to identify latent errors in clinical environments and should be actively promoted as the future of SBE programmes [3] [4] [5].

❖ *In situ* simulations should complement SBE delivered in centres or other environments where possible.

❖ A realistic feasibility and resource analysis should be conducted prior to the commencement of new programmes to ensure that there is equitable access for all learners in the region/programme. Sharing of faculty can be arranged for long-term sustainability of programmes [3].

❖ Appropriate management and administrative staff should be available and trained to support the delivery of simulation activities.

Finance
❖ Support from clinical/academic deans and hospital leads is particularly important in terms of enabling dedicated time for development and financial support [69] [2] [3] [4].

❖ Funding streams for new simulation programmes can be challenging to arrange but can be identified through collaboration with local education providers, as well as both local education and training boards [3] [4] [5].

STANDARDS SUMMARY

1. Faculty

Faculty Development

1. Faculty ensure that a safe learning environment is maintained for learners and encourage self-reflection on learning.

2. Faculty engage in continuing professional development with regular evaluation of performance by both learner and fellow faculty.

3. Faculty are competent in the process of debriefing.

2. Technical Personnel

4. Simulation technicians and technologists, whose primary responsibility is to support delivery of SBE, have gained or are working towards professional registration with the Science Council.

3. Activity

Programme

5. Simulation-based education programmes are developed in alignment with formal curriculum mapping or learning/training needs analysis undertaken in clinical or educational practice.

6. The patient perspective is considered and demonstrated within educational planning.

7. A faculty member with expertise in simulation-based education oversees the simulation programme design and ensures that it is regularly peer reviewed, kept up to date and relevant to the organisation goals, clinical needs and curriculum to which it is mapped.

8. Regular evaluation of programmes and faculty is undertaken to ensure that content and relevance is maintained.

Assessment

9. The assessment is based on the intended learning outcomes of the exercise, with clarity regarding the knowledge, skills and attitudes and is appropriately tailored to the professional curricula to be evaluated.

10. Psychological safety of the learner is considered and appropriately supported.

11. Faculty have a responsibility for patient safety and to raise concerns regarding learner performance within educational settings, including SBE interventions.

In Situ Simulation

12. Every ISS exercise has clearly defined learning objectives that achieve individual, team, unit level and/or organisational competencies.

13. Local processes and procedures are carefully reviewed to deliver ISS activity authentically.

14. Faculty delivering the ISS activity are proficient in SBE and have the required expertise on a given topic (Refer to standards on faculty development above).

4. Resources

Simulation Facilities and Technology

15. A variety of simulation modalities, including simulated patients, are incorporated into simulation programmes to create appropriate realism of the learning environment and achieve the objectives of the session being taught.

16. The facility has a clear strategic plan which addresses wider organisational and stakeholders' needs.

17. A designated individual oversees the strategic delivery of SBE programmes and ensures that appropriate maintenance of simulation equipment is undertaken.

18. Training is provided to all faculty to engage with Simulated Patients, where there is an active Simulated Patient (SP) programme.

Management, Leadership and Development

19. A designated lead with organisational influence and accountability manages the simulation activity.

20. There is a clear vision and mission statement to demonstrate aims and objectives of the facility.

21. There is a clear alignment to the wider organisational and stakeholders' needs, acting as a quality and risk management resource for organisations to help achieve the goals of improved patient safety and care quality.

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Glossary

Assessment refers to the process that provides feedback about performance to a learner or group of learners. Assessment can be summative or formative.

Bloom's Taxonomy is a system for the classification of learning objectives.

Continuing Professional Development refers to the process of tracking and documenting experience, knowledge and skills gained beyond initial training.

Debriefing is a semi-structured process in which the learner is encouraged to reflect on the events of the simulation with the aim of improving future performance.

Faculty refers to those responsible for planning and delivery of simulation-based education.

Formative Assessment is assessment *for* learning rather than *of* learning. The focus is the attainment of goals set by the learner in consultation with the trainer.

Fidelity refers to the degree to which a simulated experience approaches reality. It is also referred to as authenticity and is influenced by the environment, equipment and resources used to develop the simulation-based education programme.

Facilitator is the individual who provides guidance and support during simulation-based learning experiences.

Functionality (of equipment) refers to the range of operations for which the system can be used.

Hybrid Simulation is the term used when two or more simulation modalities are used within the same scenario. It is an example of multimodal simulation.

Human Factors is the discipline or science of studying the interaction between humans and, systems and technology.

Innovation Capability is the ability to come up with novel ideas and/or new products that may enhance the realism of a scenario and be seen as more cost-effective.

In-Situ Simulation refers to simulation activities which take place in the actual clinical environment.

Inter-assessor reliability is the degree of agreement between assessors; the likelihood that two assessors observing the same practice would give the same mark.

Inter-professional education refers to educational activities that involve learners from more than one professional field.

Latent errors are potential hazards in the workplace which can lead to patient harm if left unidentified.

Mastery learning is the process whereby learners are required to achieve a minimum level of performance before moving to the next stage. The aim is to have all learners achieve an equivalent, high level of performance, rather than be normally distributed around a mean.

Modalities refers to the different ways of using simulation for education (e.g. Simulated patient, manikin, part-task trainer).

Multimodal refers to the use of multiple simulation modalities within one learning event.

Non-technical Skills are behavioural skills such as decision making (e.g. anticipation and planning, use of cognitive aids, avoiding fixation errors), teamwork and team management (workload distribution, communication and/or role clarity) [70].

Objective is a statement of a specific result that the learner of a simulation activity is expected to achieve by the end of the activity.

Part-task trainer refers to a simulator that allows one procedure or one aspect of a procedure to be practised in isolation.

Pedagogy is the discipline that deals with the theory and practice of education.

Procedural Skills refers to the technical skills required to perform a specific procedure (e.g. chest drain)

Psychological safety - Is a feeling (explicit or implicit) within a simulation-based activity that learners are comfortable participating, speaking up, sharing thoughts and asking for help as needed without fear of retribution or embarrassment [71].

Reliability is reproducibility of a measure across repeated tests.

Resilience is the ability of an individual or system to respond positively to setbacks.

'Safe' learning environment – Is a learning environment where learners feel physically and psychologically safe to make decisions, take actions and interact in the simulation [71].

Scenario is the recreation of a clinical situation using a set of events and timelines to achieve programme objectives. Scenarios can be run 'ad hoc' or are programmed into the simulator and/or supporting devices.

Simulation Facility is the physical space where the simulation-based education event takes place.

Simulated Patient is a live person playing the role of a patient, staff or family member in a healthcare simulation

Simulation programme is an educational activity which uses simulation as the predominant modality to teach learners.

Spectrum (of simulation) refers to the range of educational activities for which simulation can be appropriately used.

Summative Assessment is assessment *of* learning rather than *for* learning. Assessment in this context is used to pass or fail a learner and decides the future progress of a learner in their professional setting.

Technician – Is an individual who has mastered the basic skills and techniques to support SBE and TEL

Technologist - Is a specialist in their field, with greater depth of knowledge and expertise in SBE and TEL; may work with a specific technology or choose to focus on a skill set.

Validity is the degree to which a test or evaluation tool accurately measures the intended outcome of the test [70].

Virtual reality is the use of computer technology to experience (with a range of immersive display devices) an interactive three-dimensional world in which the objects have a sense of spatial presence.