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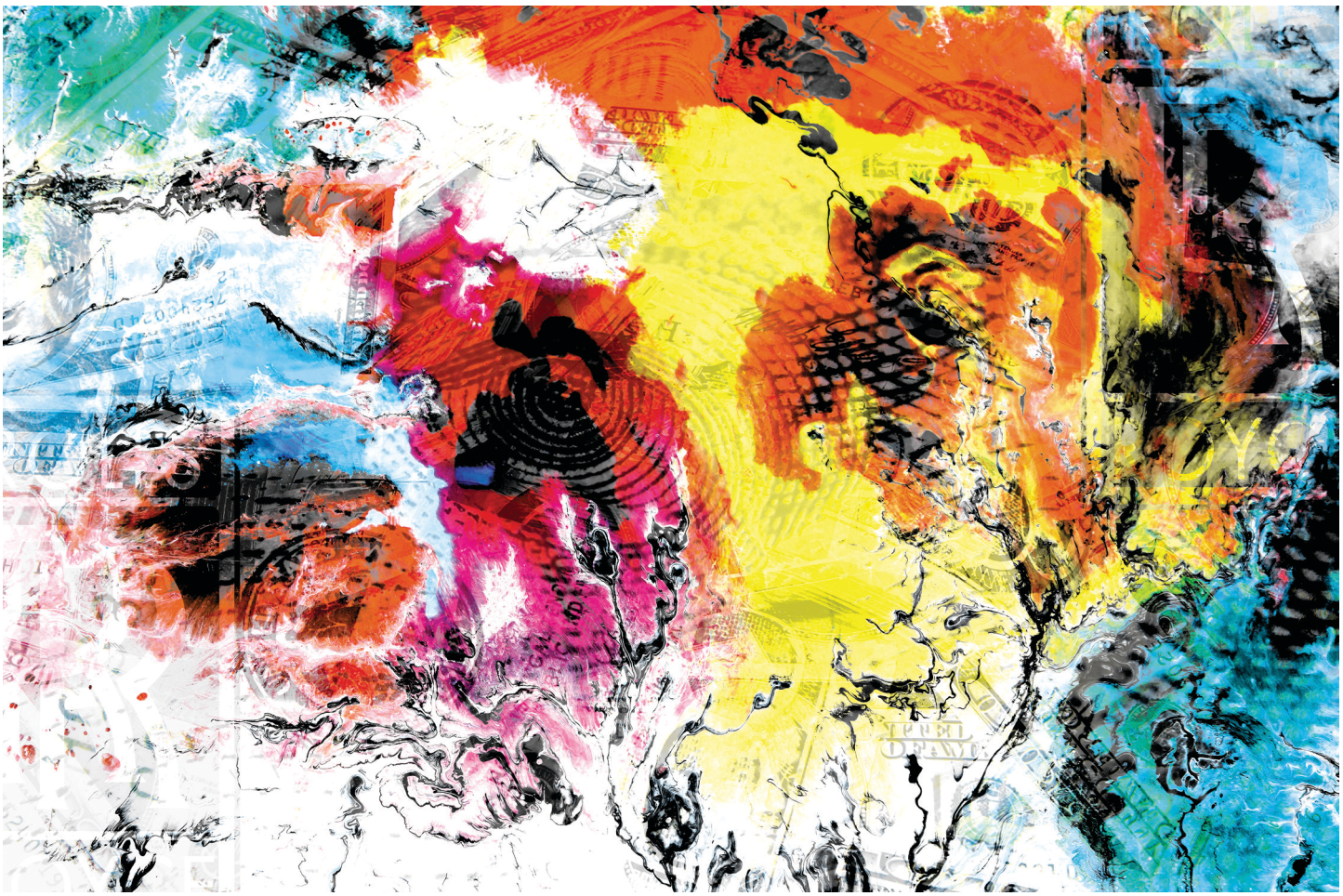
Digital simulation in healthcare



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Contents

Introduction

Simulation provides a safe space for learning and improvement, leading to better-prepared healthcare professionals and safer patient care environments.

This resource will help you develop an understanding of digital simulation and how it can enhance learning and clinical practice, not only through simulation but also through debriefing. As such, this resource is designed to explore the principles behind digital simulation, identify who benefits from participating in digital simulation, and evaluate the potential impact digital simulation has on patients and healthcare professionals. Additionally, it aims to develop an understanding of the principles of debriefing, in accordance with the **All Wales Simulation-Based Education and Training Strategy** for simulation.

Participation expectations:

The learner is expected to take time to read and explore the resources embedded within this material.

Throughout the course, learners will complete reflection tasks designed to explore their thoughts, feelings, and experiences with digital simulation. These activities will also help learners consider how they might incorporate digital simulation into their work area.

CPD Hours: 4

Learning outcomes

After studying this course, you should be able to:

1. Understand the principles behind digital simulation.
2. Identify the benefits of digital simulation for participants.
3. Evaluate the potential impact of digital simulation on patients and healthcare professionals.
4. Develop an understanding of the principles of debriefing.

1 What is Digital Simulation?

Digital simulation in healthcare involves using advanced technologies to create realistic scenarios for training, evaluation, and improvement of medical practices. Here are some key applications:

1. **Medical/Healthcare Professional Training**: Simulation-based training allows healthcare professionals to practice procedures and decision-making in a risk-free environment. This includes using mannequins, virtual reality (VR), and augmented reality (AR) to simulate surgeries, emergency responses, and routine medical procedures.
2. **Clinical Simulation**: This involves placing end-users in simulated real-life scenarios to evaluate digital health technologies.
   It helps generate high-quality, cost-effective evidence to support the use of these technologies, such as Software as a Medical Device (SaMD).
3. **Patient Care Improvement**: Simulations can be used to model patient care processes and identify potential improvements. Simulations can be developed from incident reporting to increase awareness and understanding of how to manage situations accordingly.
4. **Regulatory Frameworks**: Simulation is also used to evaluate digital health technologies from a regulatory perspective. For example, the Simulation for Regulation of SaMD (SIROS) framework helps assess clinical simulation methods to ensure they meet regulatory standards. ASPiH Standards 2023 – ASPiH

These applications highlight how digital simulation is transforming healthcare by enhancing education, improving patient care, and supporting the evaluation of innovative technologies.

2 Benefits of digital simulation.

Digital simulation in healthcare offers numerous benefits that enhance both medical training and patient care. Here are some key advantages:

1. **Enhanced Patient Safety:** By allowing healthcare professionals to practice complex procedures in a simulated environment, the risk of errors during real patient care is significantly reduced.
2. **Improved Skill Acquisition**: Repeated practice in a safe, controlled setting helps learners refine their techniques, develop muscle memory, and build confidence.
3. **Cost-Effectiveness**: Simulation-based training can be more cost-effective than traditional methods, as it reduces the need for consumable materials and allows for the reuse of simulation equipment.
4. **Teamwork and Communication**: Simulations often involve team-based scenarios, which help improve communication and collaboration among healthcare professionals.
5. **Standardised Training**: Digital simulations provide a consistent training experience for all learners, ensuring that everyone meets the same high standards of competency.
6. **Immediate Feedback**: Learners receive instant feedback on their performance, allowing them to quickly identify and correct mistakes.
7. **Accessibility**: Digital simulations can be accessed remotely, making training more accessible to healthcare professionals regardless of their location.

These benefits highlight how digital simulation is transforming healthcare by improving the quality of training and enhancing patient outcomes.

3 Limitations of digital simulation in healthcare education.

Digital simulation in healthcare education offers many benefits, but it also has some limitations:

1. **Lack of Real-World Experience**: Simulations cannot fully replicate the unpredictability and complexity of real-life clinical situations. This can limit students' ability to develop critical thinking and decision-making skills in a real-world context.
2. **Technical Issues**: Simulations rely heavily on technology, which can sometimes fail or be difficult to use. Technical glitches can disrupt learning and cause frustration.
3. **High Costs**: Developing and maintaining high-quality simulation programs can be expensive. This includes the cost of software, hardware, and training for educators.
4. **Limited Interpersonal Skills Training**: While simulations can teach procedural skills, they may not effectively teach interpersonal skills such as communication, empathy, and teamwork, which are crucial in healthcare.
5. **Accessibility**: Not all students may have access to the necessary technology or high-speed internet required for effective digital simulation, leading to disparities in learning opportunities.
6. **Over-Reliance on Simulation**: There is a risk that students may become too reliant on simulations and not gain enough hands-on experience with actual patients.

Despite these limitations, digital simulations remain a valuable tool in healthcare education, especially when used in conjunction with other teaching methods.

Reflection Pod:

How do you feel about the use of digital simulations in healthcare education?

Provide your answer...

4 How does digital simulation help to increase awareness?

Digital simulation in healthcare significantly increases awareness in several ways:

1. **Realistic Scenarios**: By creating lifelike medical scenarios, digital simulations help healthcare professionals understand the complexities of real-world situations. This heightened awareness can lead to better preparedness and response in actual clinical settings.
2. **Highlighting Systemic Issues**: Simulations can reveal systemic issues within healthcare processes, such as bottlenecks in patient flow or communication breakdowns. Identifying these issues helps in developing strategies to address them, thereby improving overall healthcare delivery.
3. **Patient Education**: Digital simulations can also be used to educate patients about their conditions and treatments. By visualizing their medical scenarios, patients gain a better understanding of their health, which can lead to more informed decisions and better adherence to treatment plans.
4. **Training and Competency**: For healthcare professionals, simulations provide a platform to practice and refine their skills. This continuous practice increases their awareness of best practices and potential pitfalls, leading to higher competency levels.
5. **Interdisciplinary Collaboration**: Simulations often involve multiple healthcare disciplines working together. This fosters better communication and collaboration, increasing awareness of each team member’s role and responsibilities.

By leveraging digital simulations, healthcare systems can enhance the awareness and preparedness of both professionals and patients, leading to improved outcomes and patient safety.

5 How does digital simulation reduce risk to patient care?

Digital simulation reduces risk to patient care in several impactful ways:

1. **Identification of Latent Safety Threats**: Simulations can uncover hidden risks within healthcare systems, such as design flaws or procedural inefficiencies before they cause harm. By conducting simulations in real clinical environments (in situ simulation), healthcare teams can identify and address these latent safety threats.
2. **Enhanced Training and Skill Development**: Healthcare professionals can practice complex procedures and emergency responses in a controlled, risk-free environment. This repeated practice helps build proficiency and confidence, reducing the likelihood of errors during actual patient care.
3. **Improved Teamwork, Leadership skills and Communication Skills**: Simulations often involve interdisciplinary teams, promoting better communication and collaboration. This teamwork is crucial in high-stress situations, ensuring that all team members are aware of their roles and can work together effectively.
4. **Human Factors Consideration**: Simulations account for human factors, such as stress and fatigue, which can impact performance. By training in realistic scenarios, healthcare professionals can develop strategies to manage these factors and maintain high standards of care.
5. **Standardised Training**: Digital simulations provide a consistent training experience for all learners, ensuring that everyone meets the same standards of practice. This standardisation helps reduce variability in care and improves overall patient safety.

By integrating digital simulation into healthcare training and practice, the risk to patient care can be significantly minimised, leading to safer and more effective healthcare delivery.

Reflection Pod:

What value could digital simulation bring to you and your area of work?

Provide your answer...

6 Guidance for digital simulation in healthcare.

Guidance for implementing digital simulation in healthcare can be found in several comprehensive frameworks and toolkits. Here are some key points from notable sources:

1. **National Strategic Vision for Simulation in Health and Care**: This document outlines a vision for integrating simulation and immersive learning technologies into healthcare education and practice. It emphasises the importance of strategic leadership, collaboration among stakeholders, and the use of technology to enhance patient care and staff wellbeing.
   National Strategic Vision of Sim in Health and Care
2. **National Framework for Simulation-Based Education (SBE)**: Developed by Health Education England, this framework provides guiding principles for the development, delivery, and commissioning of simulation-based education. It focuses on quality outcomes, leadership and governance, strategic resource allocation, multi-professional faculty development, and quality assurance.
   National framework for simulation based education.pdf
   ASPiH Standards 2023 – ASPiH
   Healthcare Simulation Standards of Best Practice®
   Standards for organisations that deliver simulation.pdf
3. **National Toolkit for Simulation in Health and Care**: This toolkit supports the implementation of simulation-based education by providing practical guidance on faculty development, resource allocation, and quality assurance. It aims to ensure high standards in the development and delivery of simulation training.
   Faculty Development Guidance FINAL.pdf
4. **The Nursing and Midwifery Council (NMC) defines simulation in education** as:
   "An educational method which uses a variety of modalities to support students in developing their knowledge, behaviours, and skills, with the opportunity for repetition, feedback, evaluation, and reflection to achieve their program outcomes and be confirmed as capable of safe and effective practice".
   Simulated practice learning - The Nursing and Midwifery Council

This definition emphasises the use of diverse simulation techniques to enhance learning, ensuring that students can practice and refine their skills in a controlled environment before applying them in real-world settings.

These resources collectively offer a robust foundation for integrating digital simulation into healthcare, ensuring that it is used effectively to improve training, patient safety, and overall care quality.

All Wales Simulation-Based Education and Training Strategy

The **All Wales Simulation-Based Education and Training Strategy** is a comprehensive plan developed to enhance simulation-based education and training (SBET) across the healthcare workforce in Wales. Here are some key points:

1. **Collaborative and Coordinated Approach**: The strategy emphasises a collaborative and coordinated approach to ensure high-quality, interprofessional, and accessible SBET. This involves engaging various stakeholders, including healthcare professionals, educators, and lay representatives.
2. **Strategic Aims and Objectives**: The strategy outlines several strategic aims, including improving patient and service user safety, enhancing learning experiences, and ensuring cost-effectiveness. It also focuses on promoting quality, faculty development, and the use of digital platforms.

3. **Implementation and Evaluation**: The strategy includes detailed plans for implementation and evaluation, ensuring that the initiatives are effectively integrated into the healthcare system. This involves continuous professional development, performance reviews, and the use of immersive technologies.
4. **Supporting Simulation Delivery**: The strategy provides guidance on supporting simulation delivery, including accessibility, interprofessional development, and research. It aims to create a sustainable and high-quality simulation-based education framework.

The **All Wales Simulation-Based Education and Training Strategy** supports simulation in several key ways:

1. **Collaborative Learning**: The strategy promotes a collaborative and coordinated approach to simulation-based education and training (SBET), engaging various stakeholders, including healthcare professionals, educators, and lay representatives.
2. **Quality and Safety**: It emphasises improving patient and service user safety, experiences, and outcomes through high-quality SBET. This includes implementing best practices and quality improvement principles.
3. **Accessibility and Inclusivity**: The strategy ensures that SBET is accessible and inclusive, providing opportunities for interprofessional development and continuous professional development.
4. **Digital Platforms and Immersive Technologies**: It encourages the use of digital platforms and immersive technologies to enhance learning experiences and make simulation more effective and engaging.
5. **Faculty Development**: The strategy supports the development of a skilled faculty to deliver high-quality simulation training. This includes providing resources and guidance for faculty development and performance reviews. Including Ongoing Learning: The strategy emphasises the importance of CPD to ensure healthcare professionals continuously update their skills and knowledge. This includes regular training sessions, workshops, and access to the latest simulation technologies and methodologies.
6. **Interprofessional (IP) Development:** The strategy promotes interprofessional development by encouraging collaborative training sessions where healthcare professionals from different disciplines can learn and practice together. This helps to improve teamwork and communication skills, which are crucial for patient care.
7. **Shared Learning Experiences:** It supports shared learning experiences through simulation scenarios that involve multiple healthcare roles, fostering a better understanding of each other's responsibilities and enhancing overall care coordination.
8. **Research and Evidence-Based Practice**: It promotes research and evidence-based practice to continuously improve SBET and ensure it meets the evolving needs of the healthcare workforce.

These elements collectively ensure that simulation is effectively integrated into healthcare education and training in Wales, ultimately benefiting both healthcare professionals and patients.

Reflection Pod:

How would / could you make digital simulation accessible for all?

Provide your answer...

7 Different modalities in simulation.

Digital simulation in healthcare uses various modalities to create realistic and effective training environments. Here are some of the key modalities:

1. **Standardised Patients (SPs)**: These are trained actors who simulate real patient cases, allowing healthcare professionals to practice clinical and communication skills in a realistic setting.
2. **Part-task Trainers**: These are physical models or devices that replicate specific parts of the human body or medical procedures. They are used to practice skills such as suturing, injections, or intubation.
3. **Virtual Reality (VR)**: VR creates immersive, computer-generated environments where learners can interact with 3D models and scenarios. This modality is particularly useful for complex procedures and surgical training.
4. **Augmented Reality (AR)**: AR overlays digital information onto the real world, enhancing the learning experience by providing additional context and guidance during procedures.
5. **Computer-based Simulations**: These are software programs that simulate clinical scenarios and decision-making processes. They often include interactive elements and feedback to help learners improve their skills.
6. **Simulated Clinical Immersion**: This involves creating a realistic clinical environment where learners can practice managing patient care in a controlled, risk-free setting. It often includes the use of high-fidelity mannequins that can mimic real patient responses.
7. **Hybrid Simulations**: These combine different modalities, such as using part-task trainers with standardised patients, to create more comprehensive and realistic training scenarios.

These modalities offer diverse and effective ways to enhance learning and improve patient care outcomes.

Reflection Pod:

Which modalities would work in you are of practive the best and why?

Provide your answer...

8 Debriefing to support simulated learning.

What is the significance of debriefing to support simulated learning?

Debriefing is a crucial part of the learning process for several reasons:

1. **Reflection and Insight**: Debriefing allows learners to reflect on their experiences, analyse their actions, and understand the outcomes. This reflection helps identify what went well and what could be improved.
2. **Reinforcement of Learning**: By discussing and reviewing what was learned, debriefing reinforces key concepts and skills, making them more likely to be retained.
3. **Identification of Gaps**: It helps in identifying gaps in knowledge or skills, providing an opportunity to address these areas before moving on to new material.
4. **Encouragement of Critical Thinking**: Debriefing encourages critical thinking and problem-solving as learners evaluate their performance and consider alternative approaches.
5. **Emotional Processing**: It provides a space for learners to process their emotions, especially after challenging or stressful experiences, which can enhance their overall well-being and readiness to learn.
6. **Continuous Improvement**: Regular debriefing fosters a culture of continuous improvement, where learners are constantly seeking ways to enhance their performance and outcomes

By incorporating debriefing into the learning process, individuals and teams can achieve a deeper understanding and more effective application of their knowledge and skills.

Principles of Debriefing

Debriefing offers several significant benefits, including:

1. **Learning and Development:** It facilitates knowledge acquisition and skill development by reflecting on what went well and what could be improved
2. **Enhanced Performance:** By identifying strengths and weaknesses, debriefing helps enhance future performance
3. **Teamwork and Communication:** It promotes collaboration, communication, and teamwork, fostering a supportive environment
4. **Emotional Support:** Debriefing provides an avenue for individuals to process and share their emotions, which can be crucial for mental well-being
5. **Continuous Improvement:** Encouraging a culture of reflection and continuous improvement, debriefing helps organizations and individuals to evolve and adapt

Overall, debriefing is a valuable tool for both personal and professional growth, helping to ensure that experiences are used constructively to improve future outcomes.

Reflection Pod:

What are your thoughts on being or facilitating a debriefing session?

Provide your answer...

9 Modalities of debriefing.

In healthcare simulation, various debriefing modalities are used to enhance learning and improve clinical practice. Here are some key modalities:

1. **Self-Reflection**: This involves individuals reflecting on their own performance and experiences after a simulation. It encourages personal insight and self-assessment, helping learners identify their strengths and areas for improvement.
2. **Self-Debriefing**: Similar to self-reflection, self-debriefing involves a more structured approach where individuals use guided questions or frameworks to analyse their performance. This can be done through written reflections or recorded video reviews.
3. **Facilitated Debriefing**: This is a structured debriefing led by a facilitator, often an experienced educator or clinician. The facilitator guides the discussion, helping participants reflect on their actions, understand the rationale behind decisions, and identify learning points. Facilitated debriefing can be done in groups or one-on-one.
4. **Tele-Debriefing**: With advancements in technology, tele-debriefing allows for remote debriefing sessions. Participants and facilitators can connect via video conferencing tools to conduct debriefings, making it accessible even when in-person sessions are not possible.

Each modality has its own benefits and can be chosen based on the specific needs and context of the simulation. Combining different modalities can also provide a comprehensive debriefing experience.

Debriefing approaches

There are many different approaches and styles to debriefing, below are the most common debriefing styles used.

Triangular approach to debriefing

Health Education Improvement Wales's Simulation team have proposed a triangular approach to debriefing which includes Principles, Structure and Strategies.

A66 Standardizing debriefing in Wales: the Triangular Approach

Debriefing approach - HEIW

Diamond Debriefing Method

Diamond debrief method is based on the debrief framework technique which is made up of: description, analysis and application. Diamond debrief also consists of aspects of the advocacy-inquiry approach and of debrief with good judgment

'The Diamond': a structure for simulation debrief - Jaye - 2015 - The Clinical Teacher - Wiley Online Library

SHARP

SHARP contains the absolute basic principles of what to cover when conducting a debriefing. SHARP is an acronym that comprises five 'prompts' to guide trainers and trainees in providing/receiving a structured debrief. SHARP stands for Set learning objectives, How did it go, Address concerns, Review learning points, and Plan ahead.

Objective Structured Assessment of Debriefing

OSAD is a tool which can be used to facilitate debriefings in both real clinical and simulated settings. It identifies eight core components/categories of effective debriefing i.e. best practice guidelines. These include the approach of the trainer, establishing a learning environment, learner engagement, gauging learner reaction, descriptive reflection, analysis of performance, diagnosis of performance gaps and application to future clinical practice. Each category describes poor, average and good practices. If desirable, each category may also be rated on a scale of 1 (minimum) to 5 (maximum)

regarding how well that element of the debriefing is conducted by the trainer. Descriptive anchors at the lowest point, mid-point, and highest point of the scale are used to guide ratings. The global score for OSAD, therefore, ranges from a minimum of 8 to a maximum of 40 with higher scores indicating higher quality

Briefing and debriefing during simulation-based training and beyond: Content, structure, attitude and setting - ScienceDirect

SHARE

The SHARE debrief tool supports health and social care teams to engage teams and staff who may be affected by the outcome (ie safety actions) of a learning response. Consists of 5 stages:

1. Scene
2. Hear
3. Articulate
4. Response
5. Embed

B1465-SHARE-Debrief-v1-FINAL.pdf

TALK (NHS tool)

TALK has four steps - Target, Analysis, Learning points, Key actions and promotes guided reflection within teams as a way to improve and maintain patient safety, increase efficiency and contribute to a supportive culture of dialogue and learning in any clinical environment.

https://www.talkdebrief.org/startingtotalk

Reflection Pod:

Is there a debriefing tool you prefer? Explain your rationale.

Provide your answer...

Conclusion

Resources

1. **Resources.**

Resource
Conference recordings
Event recordings - HEIW
CADFEM Ansys Simulation Conference 2022 digital
NES Annual Virtual Conference 2024 - Post Event Recordings & Pos
NHS Summer Conference 2022 !Warning! Poppins not supportedCatalogue
The best podcasts on healthcare simulation - SIMZINE
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References

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