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SUMMARY

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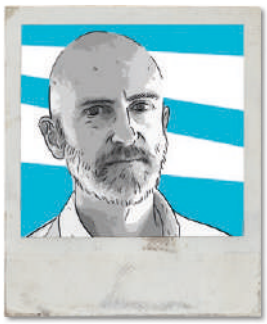
The first healthcare simulation podcast in French

Hosted by Fouad Marhar



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EDITORIAL

The Adaptability of Simulation

https://doi.org/10.69079/SIMZINE.R24.N16.00052

Very often we talk about the adaptability of simulation, but without perhaps understanding its true meaning. But this issue of SIMZINE I think exemplifies this concept, referring to its usefulness. Whether implemented in resource-limited rural hospitals or sophisticated academic institutions, simulation consistently proves its value by adapting to the unique challenges of each environment. And let me explain how simulation rises to meet diverse needs, as demonstrated in a number of thought-provoking articles. May Sissel Vadla's Implementation of Simulation When Time is Scarce, and Resources Are Limited highlights how adaptability in simulation can lead to profound improvements in clinical outcomes, even when faced with considerable resource constraints. Vadla recounts the journey of a rural hospital in Tanzania, where staff improved care for non-breathing newborns by embracing low-cost, high-impact simulation techniques. Over six years, despite having limited equipment and personnel, the hospital achieved remarkable success through repeated, carefully structured simulations. This case underscores that the true power of simulation lies not only in high-technology equipment but in its skillful application, allowing even resource-strapped facilities to achieve better outcomes through hands-on learning and iterative improvement.

On the opposite end of the spectrum, Richard Helyer's Virtual Patients to Teach Large Classes: The University of Bristol Experience showcases simulation's adaptability in a completely different context. Teaching physiology to large groups of students requires innovative methods to ensure engagement and retention. Helyer and his team leveraged virtual patient simulations to create an interactive learning environment for up to 250 students simultaneously. This approach allowed students to actively participate in the simulation, fostering deeper engagement and understanding, despite the large class size. The University of Bristol's success highlights how simulation can be scaled to meet the challenges of modern education, maintaining interactivity and active learning even when traditional methods might falter.

These contrasting stories, from a rural Tanzanian hospital to a large academic institution in the UK, emphasize simulation's remarkable ability to adapt to varying circumstances and demands. This adaptability is further illustrated by other articles in this issue, which examine simulation's integration into broader healthcare systems.

Take, for example, the insights shared by Luca Carenzo and colleagues in Clinical Governance: Hard Wiring Quality and Simulation. Their article delves into the underutilized potential of in-situ clinical simulations to improve patient safety by addressing real-world risks. In many healthcare settings, clinical governance structures exist to ensure accountability and continuous quality improvement. However, simulation often remains siloed as a training tool rather than being integrated into these systemic safety efforts. Carenzo argues that clinical simulation—particularly in-situ simulations that occur within real clinical environments—has untapped potential to proactively identify risks, enhance incident reporting, and drive structured debriefings that lead to meaningful, data-driven improvements in patient care. In this way, simulation can be a vital component of clinical governance, hard-wiring quality and safety into the fabric of healthcare delivery.

But if we talk about the adaptability of simulation, we also cannot fail to highlight its versatility in addressing a variety of healthcare disciplines. For instance, Francesca Innocenti and colleagues' article Simulation for Cardiopulmonary Resuscitation Training demonstrates how simulation can be tailored to highly specific clinical skills. Cardiopulmonary resuscitation is a critical, life-saving procedure, and the authors explore how simulation-based training can provide healthcare workers with hands-on practice. But simulation can transcend traditional clinical emergency boundaries. And gives us an example Marcela Stambullian in her article Escape game based on clinical simulation for teaching nutrition, where simulation is applied to a completely different discipline: nutrition. In this innovative approach, the team developed an escape-room-style simulation to teach clinical nutrition concepts. This playful yet educational format enabled students to engage with complex nutritional challenges in a highly immersive and interactive way.

This ability to move from one role to another, either as a training tool or as a mechanism for systemic improvement, or to embrace such diverse disciplines further underscores the adaptability of simulation. Simulation is a versatile tool that can meet a variety of needs. Then, we have to make the best use of it.

PLI

SIMZINE

Website
www.simzine.news
Contacts:
amministrazione@simedita.it
redazione@simzine.it
ads@simzine.it

Editor SIMedita srls
Pier Luigi Ingrassia, Presidente
Giacomo Gensini, Consigliere
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ASPiH 2024 Conference - Transformative Simulation

https://doi.org/10.69079/SIMZINE.L24.N15.00026

The annual conference of the Association for Simulation Practice in Healthcare (ASPiH) is set to take place from November 3rd to 5th, 2024, at the Edinburgh International Conference Centre. This year marks a significant milestone as ASPiH celebrates its 15th anniversary, bringing together healthcare professionals, educators, and innovators in the field of simulation. The overarching theme for this year's conference is "Transformative Simulation," a concept that emphasizes the need for innovative approaches in healthcare simulation practices

We are thrilled to announce the upcoming ASPiH 2024 Conference, celebrating its 15th anniversary under the theme of Transformative Simulation. This year's event promises to be the largest and most impactful yet, offering over 120 hours of educational content across three fully-packed days!

Key Highlights:

5
Renowned Keynotes
sharing insights on transformative simulation.

5
Pre-Conference Workshops
to dive deep into specialized topics.

10
Oral Presentation Sessions
showcasing the latest research and practices.

20
e-Poster Sessions
highlighting innovative projects and studies.

50
Workshops
designed to enhance practical skills and expand knowledge.

Dragon's Den,
where innovation meets opportunity in a competitive pitch session.

Innovation Space
offering a series of events under the subthemes:
Enhance, Share, and Improve.

Student-Sim Stars Competition
where student teams demonstrate their scenario development skills.

Exhibition Space
with over 50 exhibitors showcasing the latest products and services in healthcare simulation.

With over **300** abstracts accepted, this year's sessions will focus on the topics of transformation, education, and technovation, aligning with ASPiH's commitment to driving forward the future of health and care education through simulation.

Join us for ASPiH's biggest conference ever, a landmark event in the healthcare simulation community. Be part of this transformative journey and contribute to shaping the future of health and care simulation!

For more details and to register, visit *https://aspihconference.co.uk/*

Carla Sá Couto
Conference Director, on behalf of the Conference Committee

Why Transformative Simulation?

The 2024 ASPiH Conference theme, Transformative Simulation, celebrates the evolution of simulation in health and care, while highlighting its growing potential to drive transformation.

Traditionally valued as a powerful educational tool, simulation is now increasingly recognized as a catalyst—a "tool to transform health and care through collective understanding, insight, and learning"[1] This shift underscores the broader impact that simulation can have, not only in replicating real-world scenarios for training but also in promoting innovation and improving healthcare practices. As ASPiH celebrates its 15th anniversary, we acknowledge that this is only the beginning of what simulation can achieve. The future of health and care simulation holds endless possibilities, and we are excited to see how it will continue to transform practices, education, and health and care outcomes worldwide.

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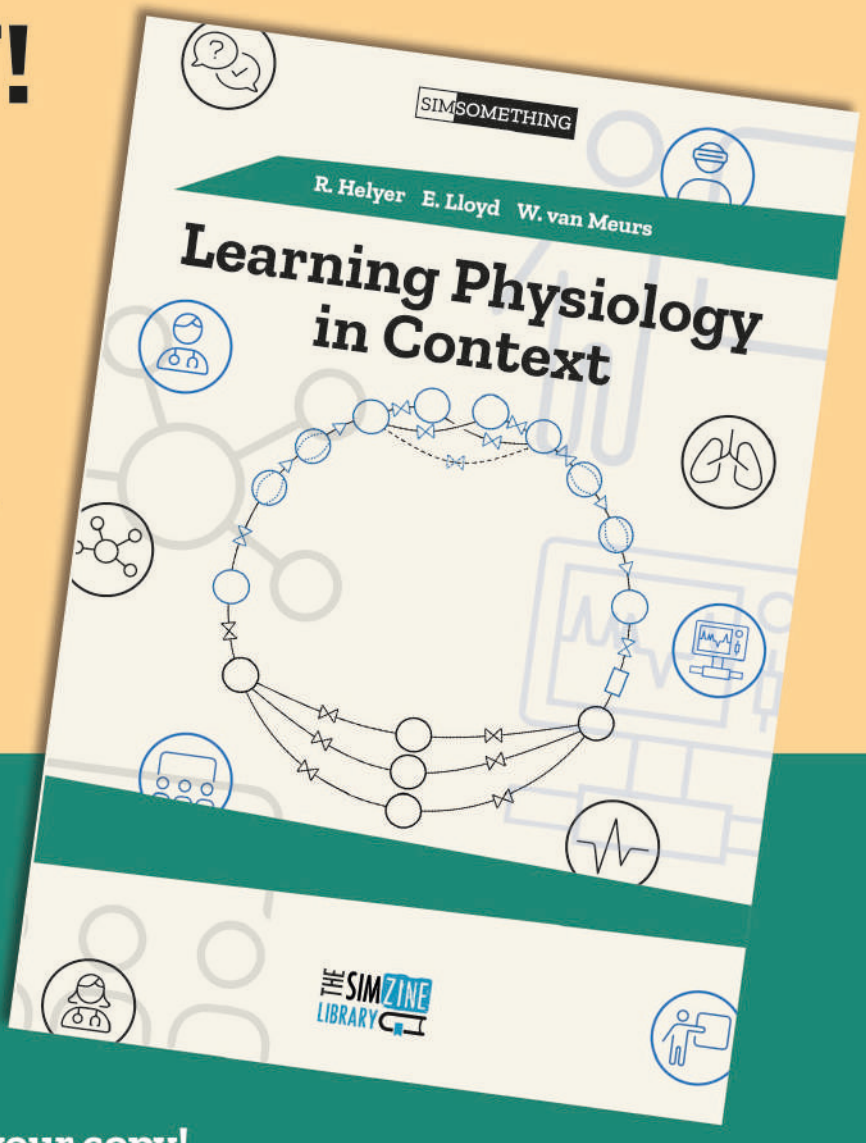

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SIM VOICES

May Sissel Vadla
SAFER, Stavanger and the Department of Global Public Health and Primary Care, University of Bergen
maysissel.vadla@safer.net

Implementation of simulation when time is scarce, and resources are limited

https://doi.org/10.69079/SIMZINE.R24.N16.00042

How to implement simulation-based training in a low-resourced setting? This is the story of a six-year journey from a rural hospital in Tanzania and how the staff managed to improve their clinical care for their non-breathing newborns through rigid, iterative quality improvement work, including a lot of simulations

The Golden minute: a Lifesaving Race Against Time

Clinical resuscitation guidelines recommend starting bag-mask ventilation of a non-breathing newborn within the first 60 seconds after birth. For each 30 seconds delay of ventilation, the risk of brain damage and death increases. Still, quickly starting ventilation is really challenging, and this goes for both high-and low resourced settings. Some studies show that less than 1% of the non-breathing newborns receive ventilations within this first golden minute of life. Recognizing a baby in need of ventilation, having the right equipment ready, mastering the technical skills of ventilating newborns and crucially, working effectively as a team are all necessary steps for reaching the goal of ventilating all non-breathing newborns within the golden minute. So how do we make sure that all these steps are implemented in our labour wards? How do we make sure that all the babies born at our ward will receive high-quality and timely ventilations if they need it? And more generally, how do we ensure implementation of clinical guidelines for all kinds of critical medical procedures in healthcare practices?

Practice Makes Perfect: The Impact of Simulation Training

If you are reading this article, you probably already know and agree on the value of simulation-based training for improving all the steps for successful newborn resuscitation listed above. Simulation can be used for training of the technical skills, and also for the non-technical skills like decision making, situation awareness and team communication. Lately, translational simulation has shown that simulation additionally can be used to find latent safety threats in the clinical setting, like lack of equipment or understaffing. In fact, simulation has already been proven to be effective in improving care for the non-breathing newborns, also in low-resourced settings. So, what are we waiting for? Just start training, or ...?

I don`t know about you, but many, including myself, immediately think "That is nice, and we would all love to do that, but we just don't have the time. We barely have time to care for our patients!". And surely, the clinical

In-situ individual skill-training using the novel manikin. Photo by Laerdal Global Health.

setting is really a busy working environment, and our patients truly are the most important task. Even so, and since I am writing this to simulationists, I also know that you are among the people who already find the time to train and that you probably do advocate for its efficiency, so I hope that the story I am about to tell you will encourage you to keep doing just that.

Challenges in Low-Resource Settings

At a rural hospital in northern Tanzania, a four hours' drive from the nearest city, Haydom Lutheran Hospital provides healthcare for a population of about 2 million people. Every year, nearly 3500 babies are born at this hospital. A dedicated staff of 20 midwives are responsible for taking care of the mother and the babies in all these cases, including the babies that do not breath at birth. That is for sure a busy work environment! To add to the picture, many of the mothers in labour arrive late at the hospital and in many cases, there are birth complications. In general, in Tanzania, 22 newborns out of 1000 liveborns die within the first month of life, about a quarter of these dying because of birth-related complications. This means that for many midwives working at this hospital, experiencing the loss of a newborn is sadly not that rare an event. And as for all healthcare workers, losing a patient is what we all fear the most. So, when Helping Babies Breathe entered the stage in 2009, providing a simulation-based training course for newborn resuscitation, Tanzania was first in line to provide the course for their midwives. The course lived up to the expectations regarding improving knowledge and skills in training for newborn resuscitation, but it failed to show translation of these training skills into improved clinical practice. Even though the midwives performed better in training after the course, they made the same mistakes when they arrived back at their labour ward caring for the real newborns. To overcome this challenge, refresher training was recommended, and Haydom implemented low-dose high-frequency skill training at their labour ward, this time showing reduction in newborn mortality! The Safer Births project investigated this intervention, among other birth-related interventions, and documented the improvements. Still, mortality rates were unacceptably high and the time from birth to start ventilation remained a challenge. Interviews with the midwives at the hospital also discovered that there was a need for a more realistic manikin and for feedback on the performance following the training. Laerdal Global Health co-designed a new manikin, the NeoNatalie Live, together with the midwives at Haydom. The new manikin was for sure more realistic, and it offered several different patient cases and importantly the manikin provided automatic feedback after training. This feedback was given in a prioritized order according to the clinical algorithm. So, when a midwife had trained, he or she would receive feedback like "Remember to tilt the head slightly backwards for open airways". To ease the training-load, the manikin was placed in-situ, at the labour ward for the midwives to train whenever time allowed.

Healthcare workers engage in hands-on, simulation training to improve confidence and competence in neonatal resuscitation. Photo: May Sissel Vadla

To assess if the training really improved the midwife's clinical behaviour, we collected data both from the trainings but also from all the real-life resuscitations at the hospital in the following year. Trained ...

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ADVERTORIAL

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Paul® e MamaAnne®: la simulazione per un inizio di vita sicuro

Ogni due minuti, una madre nel mondo perde la vita per cause spesso evitabili. La formazione del personale sanitario gioca un ruolo fondamentale nel prevenire queste tragedie. Laerdal Italia, con il simulatore avanzato per emergenze ostetriche MamaAnne® e Paul®, sviluppato da SimCharacter e distribuito da Laerdal a livello globale, offre strumenti innovativi per migliorare la sicurezza durante il parto e nei primi giorni di vita del neonato

Secondo l'OMS, nel mondo, ogni due minuti si verifica una morte materna. Molti di questi decessi sono prevenibili e in questo gioca un ruolo fondamentale la preparazione e formazione del personale. Costruire fiducia e competenze nell'affrontare le emergenze ostetriche attraverso il training in simulazione oggi è reso ancora più efficace grazie all'avanzamento tecnologico raggiunto dai simulatori che, coniugato all'interno dell'ecosistema Laerdal, favorisce una formazione basata sulle competenze (CBE), in cui gli scenari NLN e i casi pre-programmati sono mappati sui modelli validati AACN e QSEN, disponibili sulla piattaforma aperta Laerdal Scenario Cloud e integrati con sistemi di e-learning in Augmented Reality e con le checklist di Sim Capture for Skills per garantire il massimo profitto nel percorso di ogni allievo.

Per l'elevato realismo e i numerosi benefici clinici, **MamaAnne®** e **Paul®** si stanno affermando come strumenti preziosi anche nella formazione continua, volta alla prevenzione del rischio materno e perinatale. **MamaAnne®** nasce dallo sforzo congiunto di Laerdal Medical e Limbs & Things che hanno combinato le rispettive esperienze e competenze per offrire un nuovo standard in simulazione delle emergenze ostetriche, con attenzione all'inclusione. **MamaAnne®** è un simulatore di donna gravida che permette ai professionisti e agli studenti di esercitarsi in diversi scenari di complicanze quali le emorragie, i disordini ipertensivi della gravidanza e la trombo-embolia; ma anche da emergenze non tipicamente ostetriche quali le patologie cardiovascolari e la sepsi o la gestione di eventi avversi, oramai rari, collegati all'anestesia e dovuti prevalentemente al mancato controllo delle vie aeree in anestesia generale per taglio cesareo. Anche quest'ultimo è un fattore di rischio che aumenta la mortalità materna e per tale ragione dev'essere anch'esso oggetto di un'adeguata preparazione sia all'esecuzione sia all'indicazione, per garantire appropriatezza.

MamaAnne® è modellata sulla più innovativa delle piattaforme di addestramento, facilmente modulabile, flessibile e altamente realistica non solo nelle fattezze e capacità di articolazione, ma soprattutto nella fisiologia del parto e di punti di repere. Dotata di sensori capaci di rilevare le pressioni o trazioni esercitate, per un addestramento delle competenze guidato da feedback oggettivo, ha il vantaggio di avere un funzionamento intuitivo e di essere facile da configurare il ché, oltre a contenere i tempi di preparazione del simulatore, lo

rende perfetto nelle simulazioni in-situ. Inoltre, la possibilità di simulare simultaneamente più situazioni critiche, tutte controllate e monitorate dal software unico Laerdal Learning Application (LLEAP), fa di **MamaAnne®** un'esperienza formativa realistica e coinvolgente.

Paul® è stato sviluppato dal team di medici, ingegneri biomedici, sviluppatori software, truccatori ed esperti di effetti speciali di SimCharacter, azienda europea distribuita in esclusiva in Italia e nel mondo da Laerdal Medical a partire da gennaio 2024. Questa collaborazione, resa possibile dalla forte convergenza della mission e della vision delle due aziende, vedrà ulteriori sviluppi di prodotto e di soluzioni tecnologiche a forte impatto sugli effetti della simulazione nella clinica. **Paul®** è una rappresentazione accurata di un bambino pretermine nato nella 27a settimana di gravidanza, modellato sulla base dei dati MRI di bambini prematuri nella vita reale. Elogiato dai neonatologi e dagli infermieri della terapia intensiva neonatale per le sue caratteristiche altamente realistiche e convincenti, **Paul®** è un simulatore capace di coniugare la capacità di riprodurre complicanze quali le difficoltà respiratorie, le infezioni e i problemi di sviluppo neurologico che richiedono interventi tempestivi e alta specializzazione con la capacità di creare compassione ed empatia, emozioni richieste per prendersi cura instancabilmente di questi piccoli pazienti. Con **Paul®**, gli operatori sanitari possono acquisire competenze specialistiche essenziali nella gestione delle complicanze associate ai neonati pretermine, imparando a riconoscere i segni di distress respiratorio o infezioni e a intervenire con le procedure appropriate. Come MamaAnne anche **Paul®** ha il vantaggio di essere wireless, intuitivo nell'utilizzo e facile da preparare, ideale quindi per la simulazione in-Situ.

Paul® e **MamaAnne®** rappresentano un passo importante verso la sicurezza delle cure al momento della nascita, contribuendo a garantire che ogni inizio di vita sia sano e sereno.

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SIM VOICES

VR/XR: Un'esperienza immersiva presso UCAM (Universidad Católica San Antonio De Murcia)

https://doi.org/10.69079/SIMZINE.R24.N16.00043

Le simulazioni cliniche con l'utilizzo di tecnologie virtuali immersive sono il presente ed il futuro della formazione, compresa quella base in infermieristica. Queste nuove tecnologie creano ambienti di apprendimento sicuri e inclusivi, che possono adattarsi alle esigenze dei formatori e dei discenti a qualsiasi latitudine. L'articolo racconta come alla Universidad Católica San Antonio de Murcia si utilizzano la simulazione e le tecnologie emergenti VR/XR per la formazione sanitaria

VR/XR NELLA FORMAZIONE SANITARIA: BACKGROUND

La simulazione è una metodologia didattica applicabile a diverse professioni e discipline sanitarie. I contesti formativi dei professionisti sanitari chiedono sicurezza psicologica, apprendimento dagli errori e gestione delle crisi non tecniche [8]. Nella formazione sanitaria, la simulazione utilizza scenari con pazienti standardizzati per valutare abilità tecniche e non tecniche. La fedeltà psicologica, dove il discente percepisce la simulazione come un surrogato credibile, è fondamentale [2].

Le tecnologie emergenti, come la realtà virtuale e la realtà mista (VR/XR), colmano il divario tra teoria e pratica, facilitando l'apprendimento interprofessionale e aumentando l'alfabetizzazione digitale [5-6-7]. Queste tecnologie offrono un ambiente sicuro per il feedback e l'autocorrezione, permettendo agli studenti di raggiungere gli obiettivi formativi senza rischi reali [1]. VR/XR possono replicare situazioni pericolose e permettere l'apprendimento dagli errori senza conseguenze reali. Inoltre, favoriscono l'omogeneità e la trasferibilità a livello nazionale e internazionale [3].

Gli studi dimostrano che VR/XR aumentano la soddisfazione, l'efficienza operativa, la motivazione e la fiducia in se stessi degli utenti. Le sessioni di simulazione VR, in particolare, incrementano significativamente la fiducia in sé stessi [4-9].

UN'ESPERIENZA FORMATIVA IN SIMULAZIONE CLINICA IN UCAM: RISORSE E ORGANIZZAZIONE

Nell'ambito di un'esperienza di scambio presso la Universidad Católica San Antonio de Murcia (UCAM), ho avuto l'opportunità di esplorare l'applicazione della tecnologia nella simulazione infermieristica. Durante il mio soggiorno, ho apprezzato le infrastrutture dell'Università, in particolare un padiglione dedicato interamente alle simulazioni con aule strutturate in modo preciso:

- Aula briefing/debriefing: dotata di lavagna-schermo interattiva collegata in video con la stanza di simulazione e la "control room".
- Control room: con vetri float per osservare senza essere visti, dotata di hardware e software avanzati per gestire gli scenari formativi e salvare le registrazioni per analisi.
- Stanza di simulazione: con setting variabili secondo le esigenze, attrezzata con letti, manichini intercambiabili, carrelli, monitor e altre apparecchiature medicali.

La facoltà di infermieristica della UCAM dispone anche di spazi per simulazioni cliniche chirurgiche, domiciliari e di un'ambulanza didattica in un'area con auto e moto per scenari realistici. Le risorse umane sono fondamentali, con oltre 40 istruttori di simulazione clinica che gestiscono la simulazione nei 4 anni di università. La simulazione in UCAM rientra nelle ore di tirocinio. Ogni periodo di tirocinio (chiamato Practicum) include un monte-ore di simulazione specifico. Per esempio, il Practicum V (ultimo Practicum dell'ultimo anno, con un totale di quasi 500 ore) include 52 ore di simulazione distribuite in 13 sessioni da 4 ore ciascuna. Per gestire gruppi di simulazione ridotti, gli alunni vengono suddivisi in sottogruppi di massimo 15-16 persone coordinate da un istruttore di simulazione.

VR/XR NELLA FORMAZIONE INFERMIERISTICA IN UCAM

Dall'anno accademico 2023-2024, la facoltà di infermieristica UCAM ha

avviato un progetto pilota di formazione con VR per gli studenti dell'ultimo anno, inserito nel Practicum V. Tutti gli studenti hanno partecipato a due sessioni VR su un totale di 13. La prima sessione è stata dedicata a familiarizzare con la metodologia e il materiale necessario, mentre la seconda sessione ha riguardato l'allenamento con il triage in situazioni di maxi-emergenza (START). Il materiale utilizzato era stato creato in precedenza da un gruppo di ricerca dell'università e dai tecnici di VR della UCAM, ed hanno avuto a disposizione un'aula multimediale dedicata al progetto.

Due scenari progressivi sono stati utilizzati nella seconda sessione:

1. **Scenario immersivo digitale:** Ambientato nei pressi di un palazzo crollato con vittime da soccorrere, ogni vittima presentava caratteristiche descrittive e visive. L'obiettivo era assegnare il codice colore di priorità basato sui protocolli internazionali. I docenti potevano interagire in diretta aggiungendo eventi come esplosioni per allenare la sicurezza dei soccorritori.
2. **Video interattivo a 360°:** Registrato previamente con studenti-attori e esperti truccatori, rappresentava diverse situazioni cliniche con segni e sintomi visibili). L'obiettivo era assegnare correttamente in tempo reale il codice colore, con scenari che aumentavano in difficoltà includendo più pazienti, distrazioni esterne e meno tempo per completare il triage.

Alla fine di ogni esperienza si realizzava un debriefing strutturato e coordinato dall'istruttore di simulazione, essendo il momento più importante dell'apprendimento. In questa fase infatti, si analizzavano i risultati degli studenti, si ripercorrevano gli scenari assegnando il codice colore corretto e si realizzava un confronto costruttivo sugli aspetti di miglioramento tanto sanitari come tecnologici.

Dalla descrizione dei seguenti scenari con VR/XR emergono alcune considerazioni condivise con il docente, il tecnico VR e gli studenti:

- **Immersività e Coinvolgimento:** Queste tecnologie sono altamente immersive e permettono di lavorare su diversi obiettivi formativi.
- **Omogeneità e Standardizzazione:** Gli scenari possono essere riprodotti per un ampio campione di studenti garantendo uniformità e standardizzazione.
- **Ottimizzazione delle Risorse:** La riproducibilità degli scenari con VR/XR consente di ottimizzare il lavoro, riducendo l'investimento ripetuto di risorse rispetto alle simulazioni tradizionali.
- **Integrazione con Metodologie Tradizionali:** Queste tecnologie esprimono al meglio le loro potenzialità se integrate con lezioni e simulazioni tradizionali.
- **Ambiente Sicuro per l'Apprendimento:** Gli studenti si sono sentiti sicuri e non giudicati, liberi di commettere errori.
- **Durata delle Simulazioni:** Le simulazioni VR non superano i 15 minuti a causa del peso dell'hardware e dello stress sensoriale che poteva derivarne.

In conclusione, le tecnologie VR/XR hanno un grande potenziale nel migliorare l'insegnamento e l'apprendimento, consentendo la formazione simultanea di molti studenti. Nonostante la complessità nella creazione di contenuti VR/XR, queste tecnologie promuovono una omogeneizzazione a livello nazionale e internazionale, preparando efficacemente il personale sanitario a scenari reali impegnativi.

Bibliografía
Elenco completo dei riferimenti nell'articolo web.


Matteo Simioni
Tutor didattico del corso di laurea triennale in Infermieristica (Veneto) e docente a contratto dell'Università degli Studi di Padova
matteosimioni357@gmail.com

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DID YOU KNOW...

Virtual patients to teach large classes: the University of Bristol experience

https://doi.org/10.69079/SIMZINE.R24.N16.00044

Teaching physiology in a participatory and engaging manner to large classes is challenging. The authors take us step-by-step through a simulation-based session on the control of blood pressure for up to 250 students simultaneously: from how to prepare the simulator to how to involve students in interactive simulations to the final assessment

The most famous prize in our field is given to Physiology or Medicine. There is a good reason for this: with modernity, a deep understanding of physiology became the cornerstone for the practice of medicine. Secondary school students now get a basic introduction to cardio-respiratory anatomy (structure) and physiology (function). This knowledge is deepened for healthcare and bio-science undergraduates as part of their education and training. Most are able to list causes for changes in arterial blood pressure, but how intrinsic reflexes maintain blood pressure on a minute to minute basis is often beyond their grasp. How these responses support blood pressure during stress (e.g. orthostasis) or trauma (e.g. hypovolaemia), and the limits of this feedback control system are rarely well understood. Physiologic model-driven simulation helps learners explore these phenomena in their whole-body and clinical contexts. In this article we tell you about our experience at the University of Bristol.

Fig_1

Target audiences and learning objectives

The learning objective of this class is to explore mechanisms in the regulation of mean arterial pressure by the baroreceptor reflex, and specifically the response to hypovolaemia caused by acute haemorrhage. This facilitator-led class is delivered in Bristol to circa 800 first-year bioscience and healthcare undergraduates in large groups using virtual patients (Fig. 1). The same class is used for post-graduate surgical trainees to refresh knowledge of pathophysiology, and for veterinary students, using physiological quantities appropriate for canines.

Before [class design and training media]

The class is structured according to the phases of the hypothetico-deductive method: phenomenon to be highlighted; data gathering; hypothesis formation; prediction; verification; and reflection (Helyer et al., 2024).

A Maestro Evolve simulator (Elevate Healthcare, Sarasota, FL, USA) is used. Clinical signs and monitored signals are automatically generated by a physiological model, responding to removal of increasing volumes of blood. A non-model driven simulator with access to appropriate signs and signals can also be used, but requires scripting of responses, and cannot be made to react to unanticipated interventions suggested by students. It is important to establish the validity of the modelled responses. Minor changes were made to the pre-programmed baroreceptor reflex gain to accurately match the response expected for an 80 kg male patient. Validation was based on data from the scientific literature, both from humans and extrapolated from animals (Lloyd et al,. 2006)

Monitored signals are shown on a clinical monitor emulator and clinical signs can be obtained from a virtual patient (Fig. 2). This approach helps students understand the role of monitoring in recognising deteriorating patients. A lead II ECG trace, and systemic arterial and pulmonary arterial and central venous blood pressure tracings are shown on the monitor emulator. A numerical value for peripheral oxygen saturation (SpO2) is displayed, as

Fig_2

are values for heart rate (HR), systolic (SYS) and diastolic (DIAS) arterial pressures, and central venous pressure (CVP). Cardiac output (CO) can be shown as a continuous variable, or measured using the thermodilution method. Mean arterial pressure (MAP) can be shown on the monitor or derived from SYS and DIAS. The respiratory rate (RR) is also displayed. Learners derive other quantities using equations provided by the facilitator: stroke volume SV = CO/HR, and total peripheral resistance TPR ≈ MAP/CO. Consciousness can be assessed by the level of alertness of the patient.

To stress the system, a simulated acute blood loss resulting in a BV deficit of 600 ml (10% of total BV) is followed by 3 litres of blood loss (50% of total BV). This is followed by fluid treatment restoring BV to a total deficit of 2 litres (33%), and then to a deficit of 1 litre (17%). Each stage is triggered by the technician advancing the scenario, with clinical signs and monitored signals generated by the model. Learners are guided by a PowerPoint slide set also advanced by the technician. Active learning is promoted by using online polling tools at appropriate times during the simulation, which is also invaluable in assessing progress of learning. Learners enter values in structured data tables.

During [learner activities]

Learners are introduced to the physiological phenomenon. It is explained that the simulated subject was involved in a road traffic accident, but learners are not expected to make a diagnosis or treat them. Need be, time is spent reinforcing knowledge of the mechanism of the baroreceptor reflex and the concept of negative feedback. Data gathering is carried out at every stage.

Phase 0

First the clock is "turned back", showing monitored variables for the healthy subject during a check-up before the accident took place. This orientates learners to signs and signals to record as the class progresses and reinforces the importance of seeking out healthy baseline values, to be used in later analysis. Hypotheses are formulated for the response to a fall in BV, based on the relationships between BV, CVP & CO, and MAP, CO, & TPR.

Phase 1

This phase represents assessment in the emergency room. The patient is complaining of pain and has lost some blood, revealed to be 600 ml, but is stable. Predictions are made guided by the facilitator, and students note changes in signs and signals, as if observing the trauma progress in real-time. Changes (or not) in HR, CVP, CO and MAP, and derived SV and TPR verify predictions. Learners refine hypotheses on the action of the effector mechanisms that act to restore MAP, ensuring adequate coronary and cerebral perfusion as a priority.

Phase 2

This phase involves a serious deterioration to a total deficit of 3 litres. This illustrates another important clinical point of obtaining repeated and sequential measurements. Predictions are made and verified or falsified by observing changes. To add drama, the monitor emulator alarm sounds, and the patient loses consciousness. Subtle changes are noted on the ECG. Discussion centres on the success, or not, of the reflex in maintaining MAP. Depending on the learner group (scientists or healthcare students), potential treatments restoring BV are discussed. Some invariably suggest administering whole blood, with a useful learning point that normal saline is sufficient to deal with the acute primary problem: hypovolaemia. Observant students report that the value for SpO2 disappears, indicating poor peripheral perfusion and the importance of checking the carotid pulse.

Phase 3

BV is restored in two stages and learners complete the data tables. Blood volumes are not restored completely to pre-accident check-up value, which allows discussion of the concept of permissive hypovolemia that has developed from combat medicine.

After [post-simulation exercises and assessment]

Analysis of data is an integral part of physiology and forms a key part of our approach to teaching physiology. The reflection phase requires learners to analyse, plot, explain data, and draw conclusions based on their observations, predictions,...

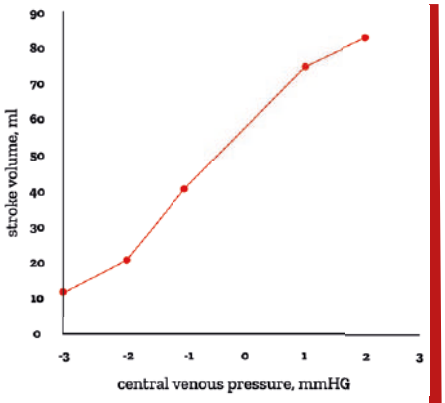

Fig_3

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- **Richard Helyer**
  University of Bristol
  richard.helyer@bristol.ac.uk
- **Katherine Harrison**
  University of Bristol
  kh15201@bristol.ac.uk
- **Eugene Lloyd**
  University of Bristol
  eugene.lloyd@bristol.ac.uk
  in/eugene-lloyd
- **Willem van Meurs**
  University of Porto
  vanmeurs@orange.fr

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ABOUT SOCHISIM

VIII Congreso Chileno de Simulación Clínica SOCHISIM 2024

El VIII Congreso SOCHISIM 2024, bajo el lema "Inteligencia Artificial en Simulación Clínica: Explorando el Horizonte de la Innovación", se llevará a cabo en Puerto Montt el 7 y 8 de noviembre. Este evento reunirá a simulacionistas de diversas áreas para explorar los avances en inteligencia artificial y su impacto en la formación en salud

El VIII Congreso SOCHISIM 2024 se realizará en la **Sede Patagonia de la Universidad San Sebastián** en **Puerto Montt**, bajo el lema: **"Inteligencia Artificial en Simulación Clínica: Explorando el Horizonte de la Innovación"**. Este evento será un espacio único de aprendizaje y colaboración para simulacionistas: académicos, técnicos, pacientes simulados, directivos e investigadores.

El objetivo del congreso es **abordar los avances en simulación clínica y la integración de inteligencia artificial (IA)**, analizando cómo la IA está transformando la formación en carreras de la salud y los entornos simulados. Al combinar la IA con la simulación clínica, se pueden crear escenarios educativos más dinámicos, precisos y personalizados desde lo técnico/tecnológico; así como una poderosa herramienta para los encargados del diseño de escenarios así como las herramientas evaluativas correspondientes.

Programa Destacado

El congreso contará con una serie de ponencias y talleres liderados por **expertos internacionales de renombre**.

Entre los conferencistas más esperados destacan:

- **Walter Eppich**, Professor of Work Integrated Research in a joint role between the faculty's Collaborative Practice Centre and the Department of Medical Education in the Melbourne Medical School. Professor Eppich currently serves as Professor and Chair of the SIM Centre for Simulation Education and Research at the Royal College of Surgeons in Ireland (RCSI) University of Medicine and Health Science in Dublin.
- **Mindi Anderson**, Associate Dean for Simulation and Immersive Learning, Professor, Healthcare Simulation Graduate Program Director, Central Florida University.
- **Frank Guido-Sanz**, Associate Professor Central Florida University, PhD, Florida International University
- **Peter Dieckmann**, Professor University of Stavanger, Senior Researcher CAMES Bestätigte
- **Andrés Díaz**, Médico Intensivista, Fellow en Simulación Clínica, Doctor en Educación. Director General Simulación e Innovación Universidad San Sebastián

Los asistentes podrán participar en una amplia gama de actividades interactivas, como conferencias magistrales, workshop académicos y de empresas, capítulo científico con presentaciones orales y de póster, una gran exposición comercial con las empresas líderes en Latinoamérica y el mundo, así como disfrutar de espacios de networking y camaradería en una de las ciudades más lindas de Chile.

¿Por qué Elegimos el Tema de Inteligencia Artificial?

El tema de este año, "Inteligencia Artificial en Simulación Clínica", fue seleccionado por su relevancia en la evolución del entrenamiento en salud. La IA no solo mejora la precisión en la simulación, sino que también facilita la creación de escenarios altamente personalizados y adaptativos, que responden a las necesidades específicas de los estudiantes y los profesionales de la salud. A medida que la simulación ...

ESCANEA EL CÓDIGO QR Y SIGUE LEYENDO
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Feel Good in VR with SimX: Avoiding Nausea and Discomfort

Virtual Reality (VR) offers exciting possibilities, but some users may experience nausea, dizziness, or discomfort, often referred to as VR sickness. However, with the right setup and knowledge of motion tracking and system features, such as those in SimX, you can significantly reduce these symptoms and enjoy an immersive experience

If you've ever experienced nausea, dizziness, or headaches after using a Virtual Reality (VR) headset, it's possible you've suffered from VR- or cyber-sickness. Like motion sickness, VR sickness can happen for various reasons and may emerge after only a few minutes in the headset or a few hours. While it's true some VR users do experience symptoms of VR sickness, it is a myth that VR will always make you sick. As you learn more about the features and circumstances that typically cause VR motion sickness, you can start to optimize your experience and enjoy any content you choose. This is especially important for simulation training, where you may be engaged in a VR headset for prolonged periods.

VR and Motion Sickness

There's little difference between the nausea you feel from VR and what you may feel while driving on windy or rough roads. Both forms of motion sickness happen because your brain is receiving mixed signals; you are standing or sitting still, but everything around you is generating motion. In other words, there is a difference between what you see and what your body is doing. Your senses report contradictory information to the brain, and the result is disorientation and physical symptoms. However, VR sickness can be mitigated depending on certain system features or even software quality. By optimizing your VR experience, you may be able to completely eliminate motion sickness.

High-Quality Content

Optimizing your VR experience includes choosing a headset and content that allows you to seamlessly navigate your virtual space. Experts continue to research, test, and push the boundaries of both hardware and software to make VR more enjoyable and comfortable for a larger audience. One specification to pay attention to when searching for the right headset is the Degrees of Freedom (DoF) tracking system, which allows a user's movement to be translated into virtual movement. Older generation headsets are limited to 3 Degrees of Freedom (3DoF), which refers to the number of directions a rigid object can move in 3-dimensional space. 3DoF systems can only track a user's rotational movement. Newer models (Oculus Quest and HTC Vive, both used at SimX) operate with 6DoF, which also tracks a user's transitional motion—moving forward, backward, up, and down (see sources).

Motion tracking technology plays a large role in a user's comfort levels and well-being while in the headset. Using headsets with only 3DoF limits translatable movement, increasing the mental disparity between a user and the virtual avatar. In addition to quality tracking features, pay attention to the frames per second (FPS) of your VR content. Lower frame rates increase latency, which can cause software to lag and look choppy. Lag will make VR motion sickness worse as it breaks the immersion and increases disparate motion, which causes disorientation, nausea, and dizziness.

Keep in mind that extremely high FPS rates and advanced graphics may not always be the solution if your internet connection or other system functionalities cannot support it. SimX runs on an optimized low-poly model to increase performance and reduce lag while avoiding any issues that come with over-producing our graphics.

Locomotion and SimX Room Scale

If you often experience motion...

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ABOUT SIMMED

I 5 workshop da non perdere al SIMMED2024

Il Congresso Nazionale SIMMED 2024 si terrà a Milano presso la Humanitas University il 14 e 15 novembre, riunendo esperti e professionisti della formazione sanitaria per esplorare le nuove frontiere della simulazione medica. Questo evento rappresenta un'importante occasione di aggiornamento e networking, con un programma ricco di conferenze, workshop e sessioni interattive dedicate alle ultime innovazioni in campo medico. SIMZINE ha selezionato cinque workshop imperdibili che approfondiscono temi fondamentali come la simulazione in situ, le tecnologie immersive, la scrittura divulgativa, la sicurezza dei pazienti e l'approccio educativo delle SimZones

Simulazione in Situ: uno strumento di Clinical Governance

Questo workshop ha lo scopo di introdurre gli operatori sanitari all'integrazione della simulazione in situ nella governance clinica, focalizzandosi sul miglioramento della sicurezza dei pazienti e della qualità delle cure. I partecipanti, sotto la guida di Luca Carenzo e di altri facilitatori dell'Humanitas University e non solo, apprenderanno come la simulazione in situ possa essere combinata con strumenti di governance clinica come audit, segnalazione degli incidenti e gestione del rischio per sostenere gli sforzi di miglioramento continuo. La sessione guiderà i partecipanti nella progettazione di scenari di simulazione che affrontano problemi reali, utilizzando i rapporti sugli incidenti come fonte chiave. Inoltre, saranno trattate le migliori pratiche per documentare e comunicare i risultati, promuovendo una cultura della sicurezza, della trasparenza e dell'apprendimento continuo nelle organizzazioni sanitarie.

Realtà Virtuale, Aumentata e Mista: le mille facce delle tecnologie immersive per la formazione medico chirurgica

L'uso crescente di tecnologie immersive come la Realtà Virtuale (VR), Aumentata (AR) e Mista (MR) sta trasformando la formazione medico-chirurgica. Queste soluzioni, riunite sotto l'ombrello dell'Extended Reality (XR), migliorano l'apprendimento delle abilità tecniche e delle "soft skills" offrendo ambienti coinvolgenti e controllati. Gli studenti possono ripetere compiti complessi, facilitando il trasferimento delle conoscenze teoriche alla pratica clinica reale. Il senso di presenza nelle simulazioni XR potenzia il coinvolgimento, aiutando a raggiungere risultati migliori, specialmente in attività ripetitive. Nel workshop, condotto da Mara Coduri e dal team del Joint lab for Emerging Technologies in Simulation (JETS) di Genova, i partecipanti esploreranno il potenziale educativo e i limiti di queste tecnologie, con la possibilità di testare soluzioni sviluppate in laboratorio.

Perché scrivere un articolo? Scrittura non accademica per promuovere la simulazione

Guidato da Pier Luigi Ingrassia, il workshop si propone di rendere accessibile il processo di scrittura di articoli informativi e coinvolgenti, con un focus specifico sulla simulazione in ambito sanitario. Il workshop evidenzia la necessità di diffondere le migliori pratiche nella simulazione sanitaria a tutta la comunità di professionisti, anche quelli meno coinvolti nell'accademia. I partecipanti verranno accompagnati in tutte le fasi della scrittura, dall'idea alla pubblicazione, esplorando uno stile comunicativo non accademico, adatto a un pubblico più ampio. I concetti chiave comprenderanno la scelta della voce narrativa, la strutturazione di un articolo e l'analisi di un articolo modello per trarre insegnamenti per la scrittura personale.

Dal rischio alla resilienza: migliorare la sicurezza dei pazienti con un approccio combinato di valutazione del rischio e simulazione in situ

Giovanni Rabito e il suo team propongono un approccio combinato di valutazione del rischio e simulazione in situ per migliorare la sicurezza dei pazienti. Le simulazioni in situ sono strumenti formativi fondamentali per il personale sanitario, permettendo di praticare le capacità di risposta in ambienti realistici. Tuttavia, essendo costose e complesse, vanno progettate con attenzione. Durante il workshop, i partecipanti acquisiranno competenze per utilizzare strumenti come l'HAZOP (HAZard and OPerability) per identificare le principali deviazioni dei processi, o applicare il protocollo di Londra di Vincent C. (2004) per analizzare i principali problemi assistenziali, come pure le buone pratiche che emergono dalle simulazioniuna cultura della sicurezza, della trasparenza e dell'apprendimento continuo nelle organizzazioni sanitarie.

Guida alle SimZones: Quando Insegnare, Allenare lo Fare Debriefing con il 'Good Judgement

Guidato da Federico Barra, il workshop introduce un approccio innovativo per migliorare l'organizzazione della simulazione a scopo educativo. Il modello SimZones suddivide l'apprendimento in cinque zone: la Zona 0 facilita l'apprendimento autonomo, la Zona 1 si concentra sulle abilità cliniche di base condotte sotto la supervisione di un istruttore; la Zona 2 consente l'applicazione di tali competenze in scenari realistici, la Zona 3 si dedica alla simulazione di crisi e situazioni complesse in team. Infine, la Zona 4 applica le conoscenze al contesto reale. L'approccio delle SimZones è utile in quanto consente di caratterizzare le attività di simulazione attuali (o desiderate), i docenti, il personale tecnico e le risorse necessarie per svolgere tali attività. Lavorando in piccoli gruppi i partecipanti avranno la possibilità di scegliere un argomento clinico rilevante e creare un percorso didattico che si estende attraverso le diverse zone (dalla Zona 1 alla Zona 3). Parte del workshop si focalizzerà sull'approccio Debriefing With Good Judgment per migliorare la qualità del feedback e il debriefing, con attività pratiche e sessioni interattive per consolidare le competenze.

SIMFACE

Ignacio Del Moral: simulacionista visionario que quiere cambiar el mundo

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https://doi.org/10.69079/SIMZINE.R24.N16.00045

En esta nueva entrega de nuestra sección SIM Face, nos sumergimos en la historia de Ignacio Del Moral, o como prefiere que le llamen, Nacho. Energía, pasión y un deseo imparable de mejorar el mundo que le rodea son solo algunos de los rasgos que definen a este líder en el campo de la simulación clínica. ¿Qué lo impulsa? ¿Qué sacrificios ha hecho en su camino? Nacho comparte su inspiradora visión sobre el futuro de la formación médica y nos deja ver también un poco de la persona detrás del profesional. ¡Sigue leyendo para conocerlo mejor!

Hola Ignacio, muchas gracias por dedicar tiempo a nuestros lectores. Nos gusta comenzar con una pregunta simple para romper el hielo: ¿Cómo describirías, en tus propias palabras, quién es Ignacio Del Moral?
¡Hola y gracias por vuestra invitación! Prefiero que me llaméis Nacho... y me considero una persona con energía y entusiasmo para tratar de mejorar el mundo a mi alrededor, aunando personas, construyendo puentes y moviendo hacia adelante proyectos que contribuyan a hacer mejores a las personas y a las organizaciones.

La simulación clínica está revolucionando la forma en que los profesionales de la salud se entrenan...

Lee nuestra entrevista con él para saber más en simzine.news

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SIMTALKS

Innovation comes from Ukraine: interview with Nataliia Lopina

https://doi.org/10.69079/SIMZINE.R24.N16.00046

In this interview Nataliia Lopina, founder of ClinCaseQuest, shares her inspiring journey from academia to entrepreneurship in the healthcare simulation industry. She discusses the innovative approach behind ClinCaseQuest, the challenges of balancing personal life and business, and her vision for revolutionizing medical education with advanced simulation technologies and AI integration

Nataliia Lopina

Nataliia Lopina, ClinCaseQuest's CEO and Founder, cardiologist. She developed a mathematical model based on stratifying the severity of medical errors for clinical simulation and a defragmented debriefing model. SESAM recognizes defragmented debriefing as Advances in Simulation in 2024.

nataliia.lopina@gmail.com
in/lopina-nataliia
nataliia_lopina_
x.com/Nataliia_Lopina

Hi Nataliia, we are delighted to have you join us as we continue our journey to highlight women entrepreneurs in education and healthcare simulation. Can you share a bit about your journey to becoming an entrepreneur in the healthcare simulation industry?

I began my career deeply rooted in academia at Kharkiv National Medical University, where I earned a Master's degree and later a Ph.D. in Internal Medicine. As an emergency cardiologist and an assistant professor at the Department of Internal Medicine, I was immersed in both clinical practice and medical education. However, the onset of the COVID-19 pandemic highlighted the urgent need for advanced online clinical simulation training. This realization propelled me to found ClinCaseQuest, where I developed a unique concept of cognitive branching for clinical simulation. This approach integrates a mathematical model that stratifies the severity of medical errors with a defragmented debriefing model, enhancing the realism and educational value of medical simulations.

I think there is quite a lot of competition in your business field. What's special about ClinCaseQuest?

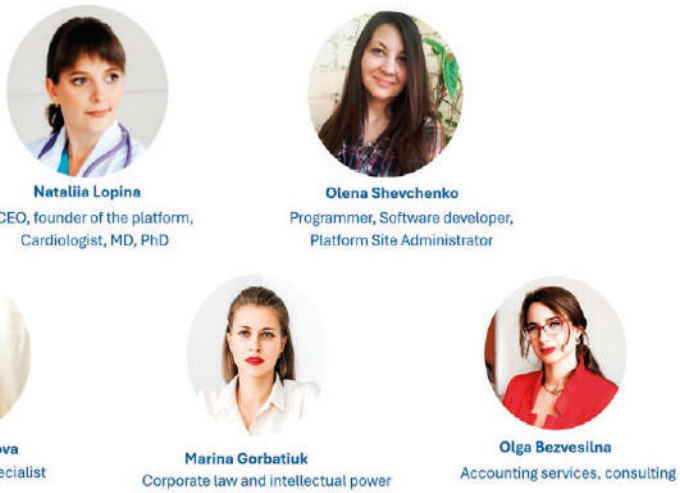
Indeed, the healthcare simulation industry is highly competitive. What sets ClinCaseQuest apart is our innovative approach to simulation training. We employ a mathematical model that stratifies the severity of medical errors, integrated with a defragmented debriefing model, that helps us build an adaptive personal experience for our learners. This combination results in gaining clinical experience like in own real clinical practice and also enhances learning by allowing users to critically analyze medical errors and strengthen the cognitive connections essential for developing competencies. This strategy ensures that the experience gained through our simulations translates effectively into practical skills.

SESAM recognizes defragmented debriefing as Advances in Simulation in 2024.

If you were to look back at the past, what was the exact moment when you decided to become an entrepreneur and found ClinCaseQuest?

I believe the seeds for ClinCaseQuest were planted early in my childhood. Even as a child, I was passionate about creating games; I would sketch out prototypes and game mechanics, and play doctor with my dolls, running a small makeshift hospital. This early interest in medicine and simulation blossomed during my clinical practice and academic tenure at the medical university. There, I closely observed the limitations of

traditional training systems and the urgent needs of clinical practice. The turning point came with the onset of the COVID-19 pandemic. It highlighted the critical need for high-quality simulation training that was independent of the trainer's skill level and could standardize the learning experience across various settings. This spurred me to integrate my clinical insights with my vision for effective educational methodologies, ultimately leading to the founding of ClinCaseQuest



How do you balance the demands of entrepreneurship with your personal life?

Balancing entrepreneurship with my personal life is a continuous learning curve for me. As a mother of two wonderful boys, I often liken my startup to having a third child—it demands constant attention and care. Despite these challenges, my deep affection for my family and my work helps me find equilibrium. I strive to ensure that each can thrive and lay a strong foundation for the future. It's about prioritizing, planning, and sometimes, allowing myself to embrace the chaos that comes with juggling these roles.

What does it mean to be an entrepreneur in Ukraine?

Being an entrepreneur in Ukraine, particularly during these challenging times, is a blend of unique opportunities and significant challenges. The ongoing war has led to a substantial exodus of foreign medical students who traditionally bolster the medical education sector. Despite these challenges, the war has also enriched the practical and clinical experience of our medical and educational institutions.

Our engagement with higher education institutions is currently non-commercial; it's focused more on scientific collaboration and practical support to help sustain traditional educational systems through these turbulent times.

At the same time, there are significant opportunities for obtaining grant funding available to Ukrainian entrepreneurs, and for us, this represents a great chance to continue our development.

I appreciate being an entrepreneur in Ukraine because the high level of digitalization simplifies and streamlines many operational processes. Ultimately, sustaining and developing businesses now is crucial for the future recovery and growth of Ukraine

Who have been your mentors or role models on your path to entrepreneurship?

My concept of a mentor is more of a collective image, as I view everyone I meet along my journey as a mentor. I am profoundly grateful for the support from our startup ecosystem in Ukraine, which fosters mutual development and ...

Read in your language

DID YOU KNOW...

Juego de escape basado en simulación clínica para la enseñanza de la Nutrición

https://doi.org/10.69079/SIMZINE.R24.N16.00047

Considerada una de las mejores comunicaciones del Congreso Internacional de Simulación en Salud y II Simposio de Operaciones en Simulación en Salud celebrado en Argentina el pasado mes de mayo, este artículo presenta un juego de escape basado en simulación clínica para estudiantes de Nutrición de la Universidad Austral. La actividad, parte de la asignatura "Evaluación Alimentaria y Nutricional del Adulto", combinó conocimientos teórico-prácticos con habilidades blandas como el trabajo en equipo. Los estudiantes debían estabilizar a un paciente simulando situaciones clínicas reales. La experiencia fue valorada positivamente, mejorando la comprensión de los contenidos y la motivación

Introducción

En los últimos años, la gamificación ha tomado relevancia como metodología de enseñanza-aprendizaje en la educación superior ya que favorece, entre otros, la motivación de los estudiantes. Las estrategias varían dependiendo las edades de los estudiantes, el acceso a tecnologías y los objetivos pedagógicos. Los juegos de escape (JE) se basan en crear escenarios donde un grupo de personas se encuentran atrapadas y, para salir, deben resolver situaciones problema en un tiempo específico. Promueve habilidades blandas y permite revisar contenidos teórico-prácticos planteándolos como consignas necesarias para "escapar".

Esta comunicación tiene como objetivo presentar el diseño de un juego de escape basado en los principios de simulación clínica (SC), dirigido a estudiantes de la carrera de Nutrición de la Universidad Austral.

Cómo desarrollamos el juego de escape

En la materia "Evaluación Alimentaria y Nutricional del Adulto" se diseñó un JE con los siguientes objetivos de aprendizaje:

evocar y aplicar conceptos teórico-prácticos de la disciplina en un espacio lúdico (objetivo técnico)

coordinar las tareas para una mayor eficacia en la resolución del juego (objetivo no-técnico).

comunicar de forma clara, precisa y respetuosa, para ser asertivos a la tarea (objetivo no-técnico).

desarrollar una actitud paciente y cooperativa para fomentar la participación del grupo (objetivo no-técnico).

El JE, además de generar motivación y desafío, se planteó según las directrices de la SC ya que pretendía introducir la metodología de entrenamiento de la simulación y acercar a los estudiantes al centro de SC de la universidad, lugar donde se desarrolló el juego. El primer paso para diseñar el JE fue partir de un escenario de juego: "*A raíz de una situación de emergencia, médicos y enfermeros debieron ausentarse de la sala de internación, solicitando a los nutricionistas del hospital (estudiantes) que mantengan estable a un paciente (simulador) hasta su regreso. Al pie de la cama se encuentra la hoja de indicaciones necesarias para dicho fin (posición del paciente, oxigenoterapia, medicación para el dolor, medicación antihipertensiva y seguridad del paciente). Las instrucciones sobre cómo se implementan esas prácticas las obtendrán al desarrollar las consignas del juego*"

El juego planificado en la simulación clínica

El juego se preparó basado en el modelo para la implementación de simulación clínica de la universidad (Latugaye, D, y col, 2024) que consiste en 3 pasos: antes, durante y después.

Antes

Preparación

Se seleccionaron los contenidos de la asignatura que se incluirían en el juego. Se consideraron según el grado de dificultad en la aplicación o el interés en la fijación del aprendizaje. Luego, se pensaron las actividades según se pretendía conseguir una destreza, una resolución teórica o una síntesis en los conceptos. Las actividades en los JE deben tener una línea conductora en la cual la solución de unas sean el inicio para la resolución de otras. En el juego que se describe, se propuso:

- Realizar tamizaje nutricional
- Repasar antropometría
- Recordar las características de los métodos para evaluar la composición corporal
- Valorar la masa grasa a partir del pliegue tricipital
- Reconocer técnicas para medir la

función muscular
- Consolidar la necesidad de revisar la calibración de los instrumentos de medición

Una vez diseñadas las actividades en forma de acertijos, crucigrama, aplicación de técnicas, se prepararon los recursos materiales, se plantearon los tiempos, se anticiparon salvavidas para que los estudiantes pudieran avanzar en el juego.

La sala de juego se equipó con cámaras y audio para poder observar la dinámica del juego desde afuera y comunicarse con los estudiantes en caso de necesitarse.

Antes de la implementación, se realizó una prueba piloto con un grupo de docentes. Con la limitación de no haber sido la población objetivo de la actividad (estudiantes), esta instancia funcionó para revisar las actividades y recursos, así como las instalaciones de la sala.

Prebriefing

Para el día de la implementación, antes de iniciar el juego, se preparó la información a brindar a los estudiantes sobre el entorno del juego. La misma consistió en explicitar los objetivos de aprendizaje, el objetivo propio del juego y la función del simulador involucrado. También, explicar que el JE se contextualiza en un ambiente de confidencialidad y respeto, que el error no se sancionará, sino que se reflexionará y que el uso de las cámaras se dispone con un fin académico.

Durante

Desarrollo del juego

Durante el juego, los docentes se ubicaron fuera de la sala para no intimidar la participación del grupo de estudiantes. Los profesores observaron el desarrollo del juego y estaban atentos a brindar los salvavidas previstos para colaborar en el logro del objetivo. Además, realizaron una observación basada en los objetivos de aprendizaje, registrando cada actividad y acción por parte de los estudiantes. La finalización del juego se alcanzó al realizar las 5 prácticas previstas logrando la estabilidad clínica del paciente (simulador) o con la finalización del tiempo estipulado.

Después

Feedback o debriefing

Se planificó realizar una reflexión luego de finalizado el juego. Los profesores observadores guiaron la reflexión de los alumnos participantes. La misma se desarrolló de dos maneras distintas: poniendo el foco en las actividades propias de la asignatura y realizando feedback o devolución de cada técnica; o poniendo el foco en la dinámica grupal, además de las técnicas, utilizando estrategias de debriefing. En ambos casos, el estudiante tuvo un rol activo analizando su participación y la del grupo en relación con los objetivos de aprendizaje y las oportunidades de mejora.

Evaluación de la actividad

En la encuesta de evaluación global de la materia se incluyeron preguntas sobre el JE para conocer su implicancia en la comprensión y fijación de los contenidos, así como de la dinámica desarrollada.

Comentarios finales

La actividad se implementó por dos años consecutivos y, aunque se respetó la planificación en ambos, se observaron diferencias al momento de la ejecución. El desarrollo del juego representó las dinámicas grupales que surgieron durante las clases teóricas y los estudiantes lo transcribieron también en la evaluación.

Aunque todos los estudiantes de ambos años comentaron estar de acuerdo con que el JE contribuyó a la integración de los contenidos, la primera cohorte, que presentaba dificultades de relacionamiento entre ellos, refirió comentarios como: *"[...] el trabajo del equipo, el escuchar a un otro y respetar la opinión del otro [..]"*, *"[...] tratar de aprender a trabajar en equipo [...]"* y el *"[...] trabajo en equipo, pensamiento lógico."*. Mientras que, en el grupo del siguiente año, se valoró principalmente la práctica de las habilidades técnicas para la evaluación nutricional: *"Estuvo bueno para poder pensar en el momento qué hacer y ver lo que recordábamos de contenidos. Además, nos permitió entender los aspectos que había que tener en cuenta en la evaluación nutricional para lograr escapar"* y *"Me pareció muy divertida la forma de recordar los conocimientos, me ayudó a ver cosas que no tenía tanto en cuenta"*.

La inclusión del JE como estrategia de enseñanza-aprendizaje fue valorada positivamente no solo por estudiantes, sino también por profesores. El JE resultó una estrategia educativa eficaz para los objetivos pedagógicos planteados además que introdujo a los estudiantes en la simulación clínica.

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Betiana Leticia Peralta
Carrera Nutrición, Facultad de Ciencias Biomédicas, Universidad Austral
LPeralta-ext@austral.edu.ar
in/leticia-peralta

Carolina Astoul Bonorino
Centro de Simulación Clínica, Facultad de Ciencias Biomédicas, Universidad Austral
cbonorin@austral.edu.ar.

Guadalupe Vilar
Departamento de Educación Biomédica, Facultad de Ciencias Biomédicas, Universidad Austral
guvilar@austral.edu.ar

Dolores Latugaye
Centro de Simulación Clínica, Facultad de Ciencias Biomédicas, Universidad Austral
dlatugaye@austral.edu.ar

SIM CORNER

La Camera Immersiva Gener8: l'esperienza degli studenti di medicina e del personale ospedaliero di Torino

La formazione medica sta evolvendo rapidamente grazie a tecnologie immersive e interattive. La camera immersiva Gener8, distribuita in esclusiva in Italia da Simulkare, rappresenta un'innovazione fondamentale per la formazione degli studenti di Medicine and Surgery dell'Università di Torino e del personale dell'AOU San Luigi Gonzaga. Questa tecnologia avanzata permette di ricreare ambienti clinici complessi e scenari di emergenza realistici, fornendo un'esperienza formativa unica. Attraverso l'interazione diretta con ambienti virtuali, i partecipanti possono migliorare le loro competenze pratiche e decisionali, favorendo un apprendimento più efficace e una preparazione ottimale per la pratica clinica reale

La Tecnologia Avanzata della Camera Immersiva Gener8

La camera immersiva Gener8 si basa su una combinazione di tecnologie immersive e interattive avanzate, progettate per offrire esperienze di simulazione ad alta fedeltà. Il suo scopo è quello di ricreare ambienti realistici in cui i partecipanti possono interagire con i contesti simulati in modo naturale, potendo sperimentare non solo il lato clinico di uno scenario, ma anche gli aspetti emotivi e sensoriali. Questa tecnologia offre la possibilità di mappare tridimensionalmente spazi reali, come sale operatorie, stanze di degenza, ambulanze o scenari di emergenza attraverso l'uso di fotocamere a 360 gradi. Questi ambienti fisici possono essere riprodotti fedelmente all'interno della camera immersiva tramite un software dedicato che rielabora le immagini al fine di generare la giusta compatibilità con le tre pareti interattive. Inoltre, permette di ricreare dettagliatamente gli spazi di lavoro dei professionisti sanitari, consentendo loro di esercitarsi o di apprendere nuove procedure o abilità avendo la sensazione di essere nel loro naturale ambiente di lavoro. Inoltre, anche gli studenti possono apprendere ed esercitarsi in contesti simulati che rispecchiano fedelmente le condizioni ospedaliere o extraospedaliere, incrementando così il realismo dell'esperienza formativa. Questo approccio è particolarmente utile in scenari complessi o rari che possono essere difficilmente simulati nella pratica clinica quotidiana.

Una caratteristica di questa stanza immersiva risiede nel livello di interattività che propone. Ogni elemento dell'ambiente simulato può essere manipolato in tempo reale grazie all'uso di tecnologie touch. I partecipanti possono interagire con dispositivi virtuali, quali monitor elettromedicali o strumenti chirurgici simulati, e persino con pazienti virtuali. Questo tipo di interazione permette agli utenti di svolgere attività cliniche in modo completamente immersivo, come se stessero operando in un contesto reale. Inoltre, la capacità di ridimensionare, spostare e modificare gli oggetti e gli strumenti virtuali fornisce un controllo diretto e dinamico sugli elementi della simulazione, rendendo l'apprendimento ancora più pratico e coinvolgente. Inoltre, in questa camera immersiva vi è la possibilità di simulare non solo l'ambiente fisico, ma anche condizioni atmosferiche e sensoriali. Questo permette di introdurre elementi come vento, nebbia, o variazioni di temperatura, aumentando il livello di realismo degli scenari simulati. È possibile anche utilizzare stimoli uditivi e olfattivi per riprodurre suoni ambientali specifici o odori caratteristici di situazioni particolari, come un incendio, tramite apparecchiature specifiche compatibili con la sala stessa.

Infine, tutto ciò che accade nella sala immersiva può essere catturato e video registrato dalla sala di regia. Inoltre, quando il numero dei partecipanti ai corsi è molto elevato vi è anche la possibilità di condividere, in tempo reale, le immagini degli scenari in corso in una sala congressi o aula magna, così da fornire a tutti quanti la possibilità di assistere a ciò che sta accadendo all'interno della camera immersiva.

Innovazione Pedagogica nella Formazione Medica

Un punto di forza della camera immersiva è la possibilità di simulare casi clinici rari o scenari che potrebbero non essere facilmente accessibili durante le esperienze pratiche convenzionali. Ad esempio, uno studente può essere esposto a un'emergenza cardiologica in un paziente in contesto extraospedaliero, o alla gestione di una persona in condizioni psichiche alterate in un ambiente non convenzionale come una casa abbandonata o un sottopasso poco illuminato. Queste esperienze aiutano a sviluppare capacità decisionali e operative in condizioni controllate e prive di rischi per il paziente e per l'operatore, offrendo un ambiente sicuro in cui applicarsi ed apprendere. Inoltre, in camera immersiva, è possibile replicare scenari ad alto rischio evolutivo in cui è fondamentale prendere decisioni rapide e precise. L'accesso a questi tipi di simulazioni prepara gli studenti a gestire situazioni critiche nella pratica clinica reale, migliorando non solo le loro competenze tecniche ma anche quelle interpersonali e

collaborative. Infatti, la possibilità di ripetere uno scenario più volte e ricevere un feedback immediato favorisce un apprendimento iterativo, in cui gli errori diventano parte integrante del processo di formazione. In aggiunta, la camera immersiva offre uno spazio didattico ideale per l'apprendimento collaborativo e multidisciplinare attraverso scenari clinici complessi in cui vengono coinvolti studenti di diverse discipline (medicina, infermieristica, cc.).

Prospettive Future

Le prospettive future del Centro MedSim puntano a potenziare l'accesso degli studenti ad esperienze formative di tipo immersivo. Infatti, l'obiettivo del centro MedSim consiste nel fornire agli studenti la possibilità di sviluppare fin dai primi anni di carriera universitaria una connessione tra conoscenze teoriche, applicazione pratica e coinvolgimento emotivo, elemento caratterizzante l'esercizio della professione medica. Inoltre, il centro si propone l'obiettivo, sul lungo periodo, di rimanere al passo con lo sviluppo tecnologico, per rendere le simulazioni ancora più interattive e personalizzabili, adattandole ai diversi livelli di preparazione degli studenti. Questo approccio consentirà di formare in maniera sempre più mirata e specifica i futuri professionisti sanitari che si troveranno pronti ad affrontare le future sfide lavorative con un livello di consapevolezza maggiore.

Utilizzo della camera immersiva Gener8 presso il Centro di Simulazione Medica Avanzata MedSim

Attività	Obiettivo
Formazione emergenza extraospedaliera	Sviluppo delle competenze di gestione delle emergenze in situazioni di crisi, come incidenti stradali o alterazioni psichiatriche.
Addestramento professionale ospedaliero	Simulazione di casi clinici in ambienti reali, miglioramento delle abilità operative e collaborative in contesti ospedalieri.
Progetti di tesi e ricerca	Valutazione di protocolli sperimentali e studi clinici in ambienti personalizzati, come la simulazione dell'esercizio fisico in pazienti specifici o la comparazione dell'efficacia della simulazione in alta e bassa fedeltà sulla necessità di richiedere un'emogasanalisi in pazienti con specifico quadro clinico.

- **Federico Abate Daga**
  Dipartimento di Scienze Cliniche e Biologiche, Università degli Studi di Torino
  federico.abatedaga@unito.it
- **Lorenzo Odetto**
  A.O.U. San Luigi Gonzaga, Regione Gonzole, Orbassano
  lorenzo.odetto@unito.it
- **Marinella Clerico**
  Dipartimento di Scienze Cliniche e Biologiche, Università degli Studi di Torino / A.O.U. San Luigi Gonzaga, Regione Gonzole, Orbassano
  marinella.clerico@unito.it
- **Giuseppe Reimondo**
  Dipartimento di Scienze Cliniche e Biologiche, Università degli Studi di Torino / A.O.U. San Luigi Gonzaga, Regione Gonzole, Orbassano
  giuseppe.reimondo@unito.it
- **David Lembo**
  Dipartimento di Scienze Cliniche e Biologiche, Università degli Studi di Torino
  david.lembo@unito.it
- **Savino Sciascia**
  Dipartimento di Scienze Cliniche e Biologiche, Università degli Studi di Torino
  savino.sciascia@unito.it

Read in your language

SIM VOICES

Ser o no ser... Reflexiones de un paciente simulado experto

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Este artículo explora las diferencias entre los pacientes simulados, estandarizados y entrenados en el contexto de la simulación clínica. Destaca la importancia de utilizar actores profesionales en las simulaciones para garantizar calidad, realismo y ética, subrayando cómo estas técnicas contribuyen a la formación humanizada de futuros profesionales de la salud

Para comenzar este artículo, partiremos definiendo los términos "paciente simulado", "paciente estandarizado" y "paciente entrenado" según el diccionario de simulación en salud de la Agency for Healthcare Research and Quality.

- **Paciente Simulado:** Nota: Este término es a menudo sinónimo de "paciente estandarizado". Corresponde a una persona que ha sido entrenada cuidadosamente para simular a un paciente real con tanta precisión que la simulación no puede ser detectada por un clínico experto (Borrow, 1987).

- **Paciente Entrenado:** Este concepto surge con la finalidad de tener un nombre genérico para las diferentes personas que han recibido capacitación para aportar como pacientes a la formación de los profesionales de la salud e incluye a los pacientes simulados y estandarizados (Phillipa Moore, 2016).

- **Paciente Estandarizado:** Para esta definición, y como mencionamos anteriormente, se define de la misma manera que un paciente simulado, con la diferencia específica de que este paciente debe ser capaz de estandarizar y repetir su interpretación las veces que sea necesario. Ejemplo: un ECOE/OSCE.

Pero lo más relevante es que en ninguna definición se menciona al paciente simulado como un actor o profesional de las artes escénicas entrenado para interpretar una patología física o mental, ni se menciona su rol docente en la retroalimentación entregada en el debriefing.

Dentro de las aplicaciones del teatro, refiriéndonos a las maneras de utilizar las técnicas o herramientas que nos ofrece la educación artística escénica y realizadas por actores profesionales, nos encontramos con diferentes áreas donde el actor puede desempeñarse fuera del escenario teatral. Damos algunos ejemplos: payaso de hospital, pedagogía teatral, entrenador de oratoria y comunicación no verbal, paciente estandarizado, locución y doblaje, entre otras.

Es importante destacar que la simulación clínica es un multiverso de conocimientos y experiencias simuladas que sugieren o imitan factores o situaciones que los profesionales viven en su quehacer clínico. Así como hablamos de diversas carreras de las ciencias médicas, también debemos hablar de las complejidades en estas, desde un examen físico a un paciente modelo, donde la dificultad técnica y no técnica es menor que en una simulación de alta complejidad, como lo es trabajar con el duelo, escenarios de urgencia o malas noticias.

Me sugiere realizar la siguiente reflexión: el paciente simulado debe ser un actor profesional experto (formación profesional universitaria) y no un actor de oficio. No con la finalidad de polemizar, pero sí con el deber de respetar una profesión en la que se nos educa en ética y moral profesional afines a la profesión y, sobre todo, ya que

somos educadores, que aportamos en la formación de futuros profesionales de la salud. Hoy, la labor de un paciente simulado es entregar simulaciones de alta calidad, tanto a niveles de representación como en retroalimentación, y es deber de todos los educadores, incluidos los pacientes simulados, formarse en ello.

Aquí nombro algunas diferencias que podemos observar entre un paciente simulado actor y uno no actor.

Actor

- Profesionales capacitados (actuar, feedback)
- Puede entrar y salir de la emoción con facilidad.
- Usa "sí mágico" y memoria emotiva.
- Facilidad para aprenderse un caso clínico e improvisar.
- Puede guiar la entrevista si el alumno se pierde en esta.
- Son comunicadores y entregan las herramientas.
- Acceden a la caracterización.
- Tienen la ventaja de auto-observarse desde un otro.
- Generan una distancia con el estudiante, al igual que lo hace un paciente nuevo.
- No existe la inhibición al ser observado.
- Puede repetir el mismo escenario manteniendo los mismos gestos, volumen, tono y movimientos.
- Pierde el objetivo de la escena.

Paciente Entrenado No Actor

- Comunidad (vecinos, estudiantes, familiares, etc.).
- Puede actuar solo en algunos tipos de escenarios.
- Carece de herramientas actorales.
- Mayor dificultad para entrar y salir de la emoción.
- Carece de herramientas comunicacionales.
- Puede simular con el fin de aprender sobre sus propias patologías, dificultando la objetividad del escenario.

Hoy, como actor profesional y coordinador de pacientes simulados, es mi deber aportar a las simulaciones calidad, realismo, ética, seguridad y respeto. Como ya hemos visto, son muchas las competencias que se pueden aprender con esta hermosa metodología, y más aún hoy, generar un acercamiento a los cuidados humanizados o, más bien, a la humanización sanitaria.

Read in your language

ADVERTORIAL

SIM CORNER

Revolutionizing Healthcare Education with Physiological Simulation

Healthcare education is entering a new era, driven by cutting-edge digital simulations that enhance both teaching and learning. By simplifying complex physiological concepts and boosting student engagement, tools like AIBODY are transforming the way future professionals develop practical skills and critical thinking, bridging the gap between theory and real-world application

Aaron Smith
Chief Medical Officer of AIBODY
Aaron.Smith@aibody.io

In the classroom today

In a packed lecture hall, 100 medical students watch as a digital patient comes to life on the big screen. The professor adjusts a few parameters, and instantly, the virtual liver responds to a simulated medication, showing subtle changes in enzyme levels. The students aren't just observing, they're engaging, each on their own devices, adjusting variables and seeing how the body reacts in real time. This isn't just theory anymore; it's hands-on learning, powered by physiological modeling, bringing complex biomedical concepts into clear focus for everyone at once.

Physiological Simulation in Enhancing Learning Physiology

In the rapidly evolving world of healthcare, digital simulations of human physiology offer transformative learning solutions, bridging the gap between theory and practice. New advances in the digital simulation of human physiology enhance the understanding of complex physiological concepts, making education more interactive and impactful for future professionals. Physiological modeling involves creating mathematical representations that mimic the complex behaviors of biomedical organs and systems. This area of biomedical engineering seeks to enhance our understanding of how key components of the human body—such as genes, proteins, cells, organs, and systems—interact across different scales. It also provides a means to measure and predict how these interactions shift in response to diseases or treatments. Today we even talk about the so-called *Organ-on-a-chip* technology, which replicates the physiological environment and functions of human organs on a small chip with high precision, accurately mimicking organ-level physiology and disease conditions (Deng et al. 2023).

A real example

Derek Miller, MSN, RN, CBRN, CCRN, Nurse Education Specialist at the North Carolina Jaycee Burn Center and an adjunct faculty member at the University of North Carolina School of Nursing, has spent much of his teaching career at the forefront of integrating advanced technologies into healthcare education. Most recently, Derek participated in a multiphase pilot using the AIBODY learning platform and simulations with his nursing students who were learning the basics of critical care for acutely ill and injured patients. After years of experimenting with various tools to improve his teaching methods, Derek discovered that this approach not only simplified the teaching of complex concepts but also transformed his entire outlook on education.

Pilot Phase 1: Enhancing Didactic Lectures with Real-Time Simulations

During the initial pilot phase, Derek incorporated simulation and the accompanying high-fidelity visualizations into his didactic lectures, focusing on myocardial ischemia, the pathophysiology of coronary artery occlusion and the corresponding changes to the electrocardiogram. The real-time simulations allowed students to visually grasp the progression of ischemia and its impact on cardiac function. This dynamic learning experience enabled students to make immediate connections between physiological changes and their manifestations on the ECG, significantly enhancing their understanding of a complex topic.

Pilot Phase 2: Small Group Simulations for Intensive Learning

Building on the success of the didactic lectures, the second pilot phase involved small group simulations that provided a deep dive into the nursing process for conducting a primary survey of an acutely injured patient. Simulations presented real-time scenarios where students could apply theoretical knowledge to practical situations. Derek observed exponential engagement during these sessions, with students demonstrating a much higher level of participation and critical thinking compared to other lab experiences. The interactive nature

of these sessions allowed students to explore the nuances of patient care, reinforcing their understanding and application of the nursing process.

Pilot Phase 3: Independent Learning through Asynchronous Simulations

The final phase of the pilot introduced an independent asynchronous simulation experience, again focusing on the primary survey for an acutely injured patient. Students were presented with custom scenarios they could freely explore via the simulation. Their work required minimal technical support or educator intervention, fostering a sense of learner autonomy. Upon completion, students received real-time feedback through detailed reports, allowing them to reflect on their performance and identify areas for improvement. This phase highlighted the effectiveness of self-directed learning while maintaining a high standard of educational rigor.

Learning Physiology with Purpose-Built Innovation

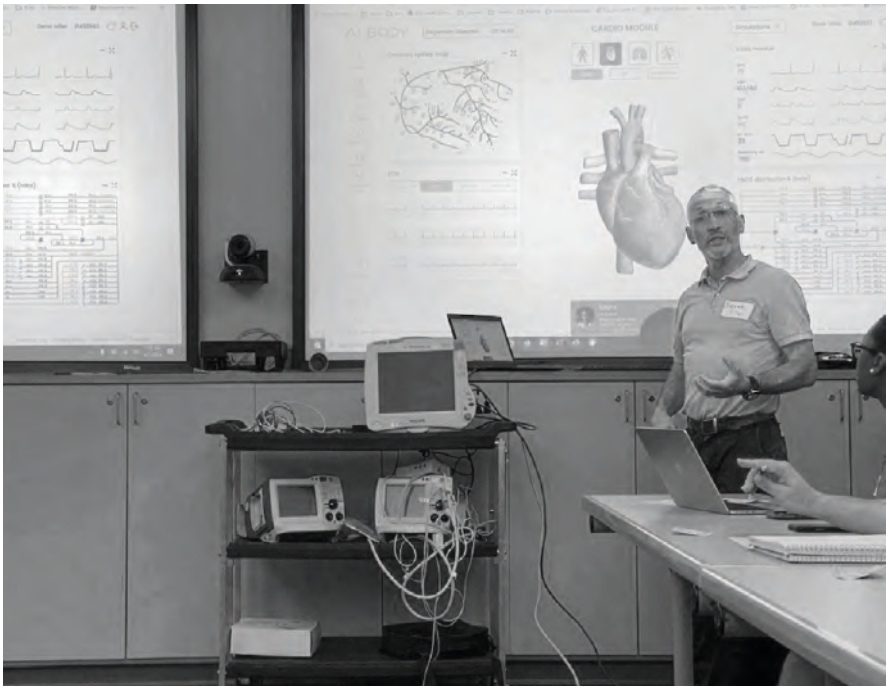
AIBODY is designed from the ground up to provide vivid, real-time simulations of physiological processes. It enables educators to illustrate complex topics such as cardiovascular and respiratory physiology with unprecedented clarity. Derek explains, "In my teaching, I emphasize effective clinical practice through the interconnectedness and nuanced complexity of the human body. These advances in simulation allow for a powerful, visually immersive tool to help learners connect cellular and tissue changes with rapid changes in patient conditions."

With AIBODY, Derek is able to demonstrate healthy organ function, the impact of disease and injury, and the effects of various treatment options. Its interactive, visual approach has dramatically improved his students' understanding and retention of complex physiological concepts.

AI and User-Friendly Tools in Physiological Simulation for Learning Physiology

Large Language Model (LLM) artificial intelligence further enhances educational impact in this solution. The platform interacts directly with students' inquiries, adjusting visualizations in real-time to create a dynamic, responsive learning environment. "This unparalleled level of experiential learning bridges the gap between the interdisciplinary study of physiology and the development of critical thinking skills," says Derek.

The provision of user-friendly "natural language" controls mean that educators and students alike can use it without needing extensive technical training. This ease of use, combined with cloud-based delivery, allows students to access their course content anytime, anywhere, enabling unlimited opportunities for independent learning.



Transforming the Learning Experience with a Physiology Simulation Software

Derek's students responded enthusiastically, with a Net Promoter Score (NPS) of 75, which is considered excellent. Feedback highlighted the innovative, interactive, and educational qualities of the approach. One student remarked, "It's much better than other simulations I've used—much more interactive and user-friendly." Derek's experience illustrates the platform's potential to revolutionize healthcare education. "This pilot has truly transformed the learning experience," he says. "It has brought learning to life in a way that I've never seen before."

Conclusions: Advancing Healthcare Education with Physiological Simulation

Physiological simulation is changing the way healthcare professionals are trained, turning abstract concepts into interactive, real-world applications. With AI-driven platforms like AIBODY and user-friendly features, students can dive deeper into complex physiological topics, making learning both more engaging and intuitive. Derek Miller's experience highlights how this method not only enhances comprehension but also encourages students to take ownership of their learning. As these tools become more accessible, they hold the potential to significantly enrich healthcare education, making it more practical and impactful for the next generation of professionals.

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DID YOU KNOW...


Luca Carenzo
Dipartimento di Anestesia e Rianimazione, IRCCS Humanitas Research Hospital - Rozzano, Milano
luca.carenzo@gmail.com


Elena Costantini
Capo Sezione Terapia Intensiva Generale - Humanitas Research Hospital - Rozzano, Milano
elena.costantini@humanitas.it

Clinical Governance: hard wiring quality and simulation

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Hospitals are intricate systems where patient safety depends on seamless collaboration between various factors. Clinical governance ensures accountability and continuous improvement in healthcare quality. While simulation is widely used for training, its integration into systemic patient safety efforts remains limited. The authors share their thoughts about the potential of in-situ simulations, incident reporting, and structured debriefing to address real-world risks, improve healthcare outcomes, and foster a culture of safety within hospitals through proactive, data-driven approaches

Hospitals are complex systems within which various factors - environmental, human, technological, procedural, and quality-related - interact to form a dense network of relationships. Any disturbance in this network's balance can pose a threat to safety. Patient safety has become a primary focus for healthcare improvement, therefore ensuring quality assurance is crucial and should be actively pursued as a fundamental value of healthcare organizations. Clinical governance is the means by which healthcare organizations are held accountable for constantly improving their quality services and delivering safe, effective and compassionate care. This is achieved by gathering several clinical and non-clinical professionals to discuss and constantly review several key aspects of practice. The basic structure of clinical governance is represented as a temple, with its foundation resting on five key cultural elements: systems awareness, teamwork, communication, ownership, and leadership. The pillars of the model—clinical effectiveness, clinical audits, risk management, patient and public involvement, staff management, education and training (including simulation), and openness — uphold the core partnership between patients and professionals.

Simulation is commonly employed across many healthcare domains with a focus on skills, teamwork, and communication. However, this application is often limited to educational purposes rather than full integration into systemic patient safety programs. Despite the benefits of simulation, there is a lack of widespread adoption and deep integration at a system level and there is a need for more deliberate alignment between simulation programs and the quality, risk, and safety leadership within healthcare organizations. A key aspect of this process is that the organization simulation program should be hard wired with the organization risk management and auditing team in a bi-directional way and data should be openly shared between the two departments

In-situ simulation, conducted within the hospital using real equipment and often during regular clinical activities, ensures that training is relevant and reflective of real-world scenarios, enhancing both technical and non-technical skills. This form of simulation helps learners feel more comfortable in their own environment and can reveal local system errors and latent threats that are often overlooked in off-site simulations. Latent safety threats are system-based threats that could predispose to medical errors. For example, faulty equipment, ergonomic hazards, or insufficient resources are common latent safety threats that can be discovered during these simulations. Scenarios, settings and teams used in these simulations should ideally be derived from the hospital's incident reporting system, or when not available from real cases that happened in that specific organization, to address

genuine risks and past errors, thus directly contributing to patient safety improvements, and ensuring that the training directly addresses real-world challenges.

Incident reporting is the practice of openly disclosing and documenting adverse events, near misses, medical errors, or other safety-related incidents that occur during the delivery of care. Incident Reporting Systems (IRS) are fundamental not only for collecting events but especially to feed data for reflection on why events happened and ways of preventing them. These reports can be used to inform training programs and policy changes which will lead to better patient care. IRS are typically based on computer platforms, usually web-based (although paper-based forms exist) where healthcare professionals report incidents confidently without fear of retribution. It is crucial to educate staff about the importance and role of a reporting system to reduce under-reporting of incidents due to fear of blame and to ensure that timely feedback can be given to them. From the IRS report and follow-up analysis the simulation program can build organization specific scenarios that allow for a thorough training and evaluation of team dynamics, procedural efficacy, and specific system vulnerabilities, ultimately leading to better local preparedness and response to critical events.

Effective debriefing plays a critical role in transforming simulation experiences into learning opportunities through structured reflection and feedback. Specific tools for debriefing in the context of quality improvement exist such as the PEARLS framework for Systems Integration (PSI) offers a structured approach to debriefing systems-focused simulations, aiming to identify and address gaps in the healthcare system rather than focusing solely on individual performance.

Finally, the outcomes of simulations conducted within the framework of clinical governance should be thoroughly documented and shared with key stakeholders, including hospital management. These findings can be communicated through posters, abstracts, and other formats to ensure that the lessons learned benefit the wider healthcare community and guide departmental and organizational leadership. This proactive approach aligns with the principles of high-reliability organizations, which emphasize continuous learning and improvement in healthcare delivery.

A real-world application

Since 2022, the 14-bed general adult intensive care unit at IRCCS Humanitas Research Hospital, a busy tertiary academic center, has implemented an integrated clinical governance program. This initiative includes a series of simulated activities, such as skill stations for nursing personnel, surprise drills to test the medical emergency team, and in-situ multidisciplinary clinical simulations to address actual safety concerns or near-miss events reported within the unit.

The in-situ simulation program began with the creation of a multidisciplinary working group composed of doctors and nurses. We then collaborated with key hospital departments, including risk management, simulation technologies, training and education, and communication. The risk management team reviewed incident reports related to our unit and helped select events to be transformed into clinical scenarios for the simulations. Simulation technologies facilitated the use of simulators and monitors from the local simulation center and managed their transport to and from the ward. The training and education department supported the transformation of simulations into official hospital training sessions, including CME accreditation, which proved to be an excellent strategy for ensuring staff engagement. Additionally, the communications and press office was notified to capture photos and issue press releases, integrating the activity into the hospital's internal communications and intranet photo galleries.

To maximize the learning experience, we repeated each scenario three times over the course of two to three weeks, ensuring that the medical and nursing teams varied each time. The simulations were unannounced for the staff on duty, conducted in the early afternoon in a real clinical space, ideally a single room if available, without disrupting ongoing clinical activities. Collective feedback was provided at the end of each session, and the overall experience typically lasted about 30 minutes.

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Complete list of references on the web article.

Read in your language

DID YOU KNOW...

Emotisim: Gestión de emociones en Simulación

https://doi.org/10.69079/SIMZINE.R24.N16.00024

La inteligencia emocional es crucial para mejorar la comunicación, gestionar conflictos y fomentar relaciones productivas en entornos laborales y de formación. Las autoras presentan el taller «EmotiSim», que explora cómo la simulación educativa puede reforzar estas competencias emocionales, ayudando a los profesionales a reconocer, expresar y gestionar las emociones de forma eficaz. A través de actividades prácticas y teóricas, los participantes desarrollan habilidades esenciales para afrontar los retos emocionales, mejorar la seguridad de los pacientes y aumentar la confianza en la toma de decisiones

La importancia de la inteligencia emocional

La inteligencia emocional (IE) ha emergido como una competencia fundamental en los entornos laborales y educativos. La habilidad para identificar, expresar y gestionar emociones no solo mejora la comunicación, sino que también facilita la resolución de conflictos y fomenta relaciones más saludables y productivas. De acuerdo a lo que describe Bisquerra (2003) emoción es un estado complejo del organismo caracterizado por una excitación o perturbación que predispone a una respuesta organizada. Las emociones se generan como respuesta a un acontecimiento externo o interno. Frente a un evento externo, el individuo lo internaliza de acuerdo a su experiencia y habilidades emocionales, lo hace desde el punto de vista biológico o físico (corporal), se genera un determinado comportamiento o reacción frente a este estímulo, luego se hace consciente o se analiza desde el punto de vista intelectual para darle significado y generar una reacción para enfrentar al estímulo inicial.

Definiciones de emoción e Impacto de la inteligencia emocional en la salud

Casassus define emociones como: *"Un flujo de energía encarnada de carácter relacional y que contiene información"* (2015), Se considera una respuesta a situaciones importantes para el individuo o una experiencia personal que también se describe como una disposición a la acción, a tomar decisiones frente a un determinado estímulo. La emoción es una energía que relaciona las situaciones externas con las experiencias que trae un individuo, es donde confluye la experiencia psicológica y biológica.

Un profesional de la salud con adecuadas habilidades de comunicación y desarrollo de la IE disminuye el número de demandas recibidas, el grado de adherencia de los pacientes a los tratamientos prescritos y el grado de satisfacción frente a la atención recibida es mayor; pues se estima que los fallos en comunicación son importantes en el 70% de los eventos adversos de la seguridad del paciente (Birks 2007; Rabol et al., 2011)

El taller EmotiSim: una experiencia transformadora

Para relacionar emoción con comunicación y seguridad del paciente, se planificó y ejecutó un taller a 42 profesionales sanitarios y afines del mundo de la simulación, a través del cual se exploró cómo la educación basada en simulación puede fortalecer estas habilidades señaladas teniendo en cuenta los siguientes objetivos:

- Identificar las emociones expresadas por otros en situaciones simuladas, mediante ejercicios prácticos y recursos audiovisuales, para que los participantes desarrollen una percepción emocional.
- Demostrar habilidades mejoradas en la expresión emocional y comunicación no verbal durante las simulaciones, mediante actividades diseñadas que consideran los aspectos paraverbales ante los cuales los asistentes pudieran transmitir sus emociones de manera más efectiva.
- Desarrollar la confianza y competencia en la gestión de conflictos emocionales en escenarios simulados, aplicando las habilidades aprendidas en situaciones simuladas para manejar conflictos emocionales de manera eficaz, con aplicaciones directas en entornos laborales y educativos.

Ejercicios prácticos, recursos y resultados del taller

El taller "EmotiSim" se estructuró en tres segmentos claves: **(1)** una introducción teórica, **(2)** un desarrollo

práctico, (3) un cierre con reflexiones y conclusiones. Cada segmento fue diseñado para maximizar el aprendizaje y la aplicación práctica de las habilidades emocionales.

La sesión comenzó con una actividad rompehielos para fomentar un ambiente colaborativo, luego se presentó una breve exposición que abarcó los conceptos básicos de la comunicación teniendo en cuenta el modelo de Jakobson (1948) y de la inteligencia emocional, siguiendo el modelo de Mayer y Salovey (1997). Este modelo desglosa la IE en cuatro áreas principales:

a. Percepción y valoración de las emociones: la capacidad para percibir y expresar las emociones con precisión.
b. Facilitación emocional del pensamiento: utilizar las emociones para facilitar el pensamiento y la toma de decisiones.
c. Comprensión y análisis emocional: entender las emociones y el conocimiento emocional.
d. Regulación emocional: manejar las emociones para promover el crecimiento personal e intelectual.

La importancia de estos conceptos se discute en el contexto de la educación basada en simulación, destacando su relevancia para la comunicación efectiva en entornos profesionales y educativos.

El núcleo del taller consistió en ejecutar actividades prácticas diseñadas para identificar y clasificar emociones en situaciones simuladas. Para ello se aplicó la escala Trait Meta-Mood Scale (TMMS 24) elaborada por Salovey et al. (1995) y adaptada al castellano por Fernández-Berrocal, Extremera & Ramos (2004). Dicho instrumento evalúa la creencia o percepción que cada persona posee acerca de la capacidad para atender, comprender o regular sus propios estados emocionales, es una medida del nivel de IE percibida en su dimensión intrapersonal. Consta de 24 ítems presentados en un formato tipo Likert de 5 puntos (1 =muy en desacuerdo, 5= muy de acuerdo) y distribuidos en tres subfactores (8 ítems por factor):

a. Atención emocional: grado en que cada sujeto piensa acerca de sus sentimientos
b. Claridad emocional: habilidad para comprender nuestros propios estados de humor
c. Regulación emocional o reparación: capacidad para reparar los estados emocionales negativos y mantener los positivos.

Por otra parte, se utilizaron recursos audiovisuales, donde los participantes observaron y analizaron escenas de experiencias en salud, para identificar las emociones expresadas. Este proceso de observación y reflexión les ayudó a mejorar su precisión en el reconocimiento emocional así mismos.

Una de las actividades destacadas fue el uso de ejercicios de observación y análisis situacional. Los participantes trabajaron en grupos pequeños para discutir y reflexionar sobre las emociones observadas en diferentes escenarios...

> ***La educación basada en simulación no solo enseña habilidades, sino que también inspira confianza y competencia***

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Read in your language

DID YOU KNOW...

Center for Advanced Simulation in Medicine, University Hospital Careggi, Florence, Italy
innocenti.fra66@gmail.com

Simulation for cardiopulmonary resuscitation training

https://doi.org/10.69079/SIMZINE.R24.N16.00050

This article explores the effectiveness of cardiac arrest simulation in medical education, particularly through high-fidelity simulation (HFS). By analyzing a recent training program for Emergency Medicine residents in the Università di Firenze, it highlights how simulation enhances both technical skills, such as CPR, and non-technical skills like teamwork. While notable improvements were observed in team performance and CPR timing, certain aspects like compression depth and differential diagnosis remained challenging. The article also discusses the trainees' positive feedback and considers ways to further optimize the training process for better outcomes in real-life emergencies.

Introduction

High-fidelity simulation (HFS) is a training modality highly appreciated among students and residents. In fact, it allows hand-on learning, in a safe environment, without time constraints, where procedures and skills can be tested and retested, until reaching an adequate mastery[1]. Moreover, it offers them the possibility to engage as leaders in managing critical situations, an event quite rare in the clinical arena, when the most experienced member often leads the team during crises[2]. In past years, we already demonstrated that a simulation course including 7 sessions determined a significant improvement in residents' Technical (TS) and Non-Technical Skills (NTS)[3].

Cardiac arrest: a paradigmatic clinical scenario

In 2023, during the training by High-fidelity Simulation of residents in Emergency Medicine of the Università di Firenze, we focused our attention on the management of the adult patient with cardiac arrest. In the presence of these clinical conditions, physicians are expected to apply an algorithm. It includes a clear sequence of TSs, most of which can be objectively assessed by the simulation system. Therefore, they are comparable between different scenarios, not left to the subjective judgment as other critical conditions, like cardiocirculatory shock or peri-arrest. Beside knowledge, an efficient teamwork performance is needed to complete all the required critical actions.

We evaluated that the clinical condition "cardiac arrest" could represent a paradigmatic situation, where we could test whether the use of HFS was effective to contemporary improve TS and NTS.

Team simulation scenario

Our experience

What we did

Forty-eight residents, in their II and III year of the training program, who had already been exposed to simulation for 1 or 2 years, were divided into four groups for this study. Between March and September 2023, they performed 7 sessions, the first four on a weekly basis, two refresh sessions after three months and a simulation-based competition after 2 weeks. At the beginning of the program, all groups received a dedicated one-hour training about cardiopulmonary resuscitation. Each session included 3 scenarios about the management of critically ill patients, and, among them, there was always one scenario on cardiac arrest (Figure 1). Scenarios were run according to a prespecified track and were followed by a structured debriefing, based on the Delta-Plus method. It offered the opportunity to reflect on the performance during simulation, focusing on the strengths of the team and on the possible improvements raised by the participants. During the debriefing, participants were also given a feed-back about their performance during CPR.

Trained observers rated both technical skills (TS) and non-technical skills (NTS) at the end of each scenario. TS were measured based on the feedback from the mannequin and the times measured by observers. NTS were evaluated using the Team Emergency Assessment Measure (TEAM) scale[4].

What were the results

As reported in Figure 3, ventilation-to-compression ratio, ventilation and compression frequency were applied correctly from the beginning; mean time to compressions was always < 1 minute and the length

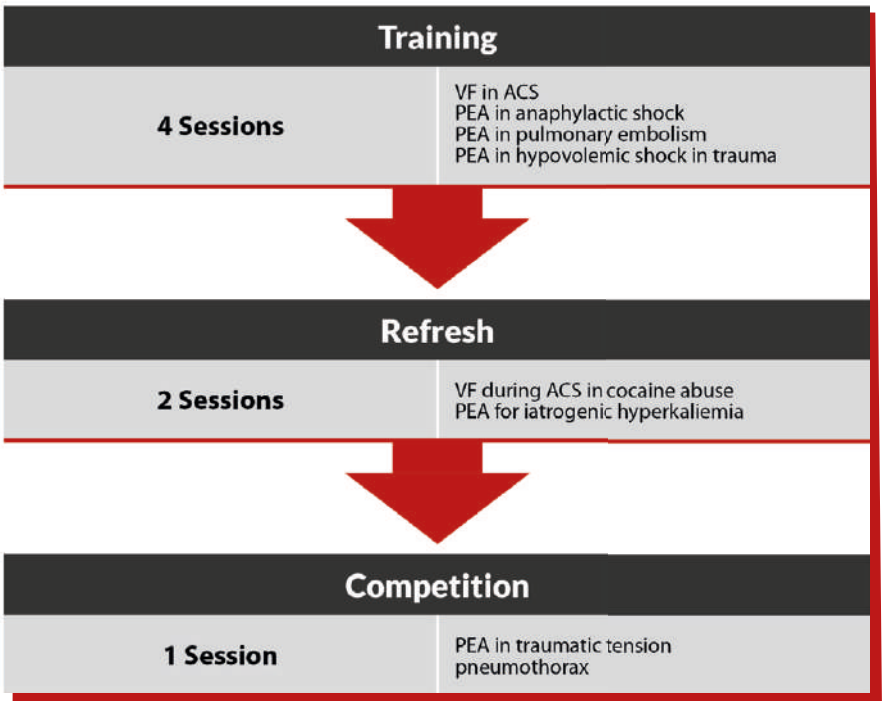

Fig.1

of pauses decreased in following sessions. Significant deficiencies were observed in differential diagnosis and compression depth, which was good immediately after the training and worsened thereafter. TEAM score significantly improved between the first simulation and the final competition.

What the trainees perceived

As reported in Figure 3, ventilation-to-compression ratio, ventilation and compression frequency were applied correctly from the beginning; mean time to compressions was always < 1 minute and the length of pauses decreased in following sessions. Significant deficiencies were observed in differential diagnosis and compression depth, which was good immediately after the training and worsened thereafter. TEAM score significantly improved between the first simulation and the final competition.

An endless debate: is simulation really effective?...

	Session 1	Session 2	Session 3	Session 4	Refresh 1	Refresh 2	Competition	p
Time to compression (sec)	39±41	23±17	68±19	45±20	14±2	52±46	31±28	0.256
Length of CM interruptions (sec)	79±111	13±10	36±33	12±14	55±57	23±17	40±29	0.463
Hand position (% correct)	0.25±0.5	10±10	14±5	33±22	17±7	4±6	ND	0.014
Compression depth (mm)	35±5	37±2	35±8	29±2	31±7	32±7	ND	0.410
Percent of adequate compressions (%)	58±20	65±38	75±7	46±5	65±35	60±26	ND	0.759
Compression frequency (c/min)	120±3	106±8	113±4	112±10	118±6	117±4	ND	0.087
Time to shock (sec)	167±41	-	-	-	93±25	-	-	0.007
Effective ventilation (yes/no)	3	3	2	3	3	2	3	-
Vent/comp. alternance (yes/no)	4	3	3	2	3	4	3	-
Correct time to adrenaline (yes/no)	2	4	4	2	3	4	2	-
Correct diagnosis (yes/no)	2	3	3	1	4	2	4	-
Correct specific treatment /yes/no)	2	3	3	2	2	2	4	-

Fig.3

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Elenco completo dei riferimenti nell'articolo web.

- **Lorenzo Maiorano**
  Lorenzo.maiorano9@gmail.com
- **Rudy Marchetti**
  rudy.marchetti86@gmail.com
- **Alessio Prota**
  Alessio.prota@gmail.com
- **Antonio Annovi**
  annoviantonio@gmail.com
- **Adriana Gianno**
  adri.gianno89@gmail.com
- **Elisa Capretti**
  ela.capri@gmail.com

Center for Advanced Simulation in Medicine, University Hospital Careggi, Florence, Italy

Read in your language

SIMREVIEW

XR-Clinic: variety and immersiveness

XR-Clinic, developed by MVR Technologies and distributed by Nasco Healthcare, is one of the most innovative solutions in the world of VR simulation. In this review, part of the SIM Review column, we look in detail at the features of this powerful tool, which allows healthcare professionals to experience realistic clinical scenarios in a safe and immersive virtual environment. Discover the strengths and limitations of XR-Clinic, along with the final verdict: is it really the ideal solution for advanced clinical training?

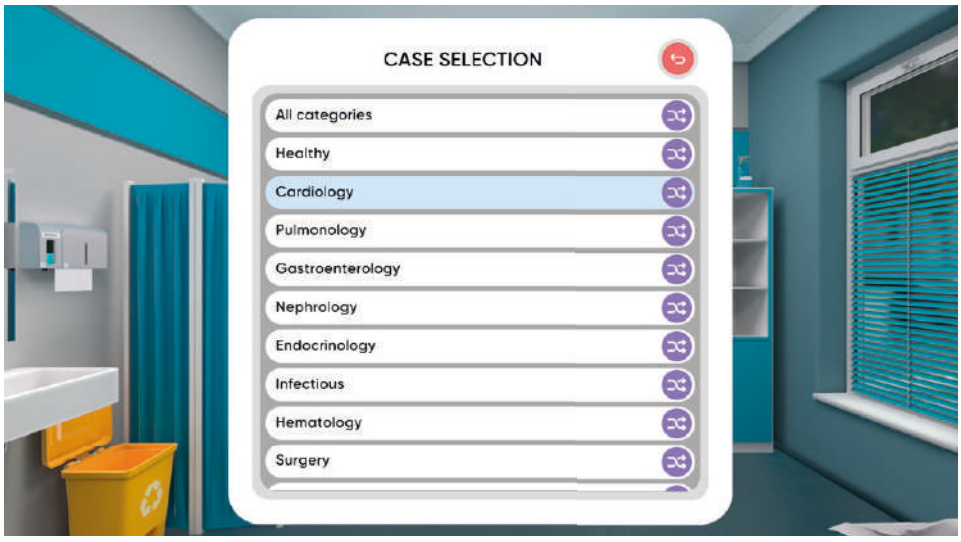
Introduction

Serious games represent an innovative and engaging tool for learning and training, combining playful dynamics with educational objectives. In health care, the use of games based on clinical cases is increasingly popular, targeting both medical and health profession students and already working professionals. These tools are based on realistic and interactive scenarios, enabling participants to make diagnostic and therapeutic decisions in a safe and controlled environment.

The main objective is to simulate clinical situations, both simple and complex, to facilitate the consolidation of theoretical and practical skills. Users can explore different intervention possibilities without the risk of compromising the health of real patients. This approach allows training in clinical reasoning, stress management skills and teamwork, skills that are essential both for those in the learning phase and for those who need to maintain high professional standards.

XR-Clinic

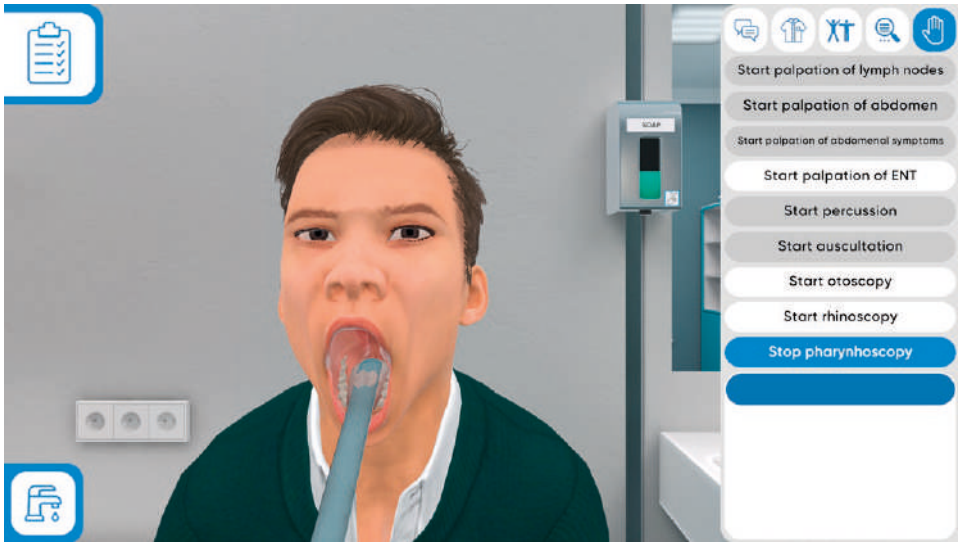
At startup, **XR-Clinic** presents itself with a huge amount of categories and scenarios covering a fair amount of topics. Once we enter inside a scenario, unlike most clinical serious games, we do not find the patient directly but have to let him or her in.



This waiting time allows for important reflection by the learner, or group of learners, before letting the patient in and thus start the scenario.

Once inside, we can interview the patients as well as position them in the most comfortable way for our examination, since, depending on the position we choose, we can perform the different examinations (e.g., have them open their mouth or sit up).

The peculiarity of the scenario is that it encompasses the entire outpatient clinic, with both a chair and an examination couch present.



Excellent fidelity

In general, XR-Clinic, both the VR and Desktop versions, comes with very simple but well-detailed graphics, and above all, very light: it was deliberately tested on an older notebook, and there were no signs of lag.

Immersiveness and variety

XR-Clinic aims to be a superior immersive experience, putting users and caregivers directly at the center of the clinical scenarios. This is evident as the scenario is very free-form in that you can use your clinic entirely, including washing and disinfecting hands before the visit.

Another strong point is the integration with VR headsets, which add an extra layer of realism to the experience. Most interestingly, however, is the scalability: XR-Clinic is designed to work well in both universities and hospitals, thanks to scenarios with progressive difficulty, making it accessible to different types of users, from novices to the most experienced. In addition, it does not require particularly sophisticated hardware to run, although it may take a few extra seconds to boot up for the first time.

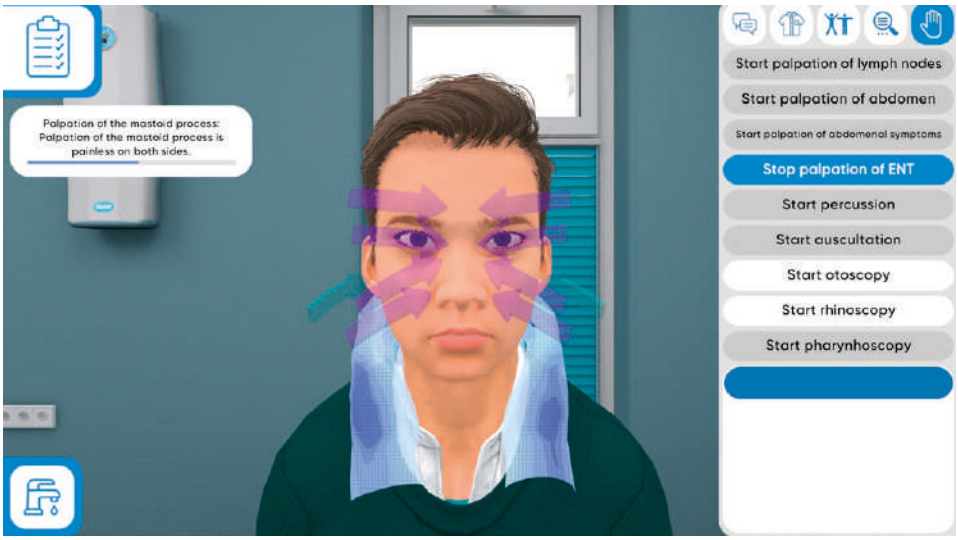
But it's not without its challenges. The eye-catching graphics and compact interface, based mostly on icons and with few explanatory labels, can slow down the first approaches. In short, although the design visually works, some users may find it a bit difficult at first, either VR or desktop version. Once you get past the initial learning curve, XR-Clinic proves to be a valuable ally for medical learning and practice.

Pros

- Immersive experience.
- Variety of clinical cases.
- Integration with advanced hardware.
- Accessibility and scalability.
- Technical requirements.

Cons

- Graphics and learning curve.



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- No dropdown menus
- Realistic Enviroments

Networking enriches holistic professional development for nurse simulationists internationally

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Holistic professional development in nursing simulation thrives through active engagement in formal and informal opportunities. In this article, we celebrate the journeys of nurse leaders Eliana Escudero Zúñiga and Amanda Wilford, who have shaped healthcare simulation over two decades. Their advice highlights networking, mentoring, and involvement in global simulation organizations.

Holistic professional development involves a balance of formal programs and informal opportunities at conferences, through committee meetings, and by engaging the simulation community. The International Nursing Association for Clinical Simulation and Learning (INACSL) celebrates nurse leaders like Eliana Escudero Zúñiga, RN, MSN, MEd and Amanda Wilford, MA, Dip ANC, RN(hons), SFHEA, EdD(c) who have elevated nursing through their 20+ years of healthcare simulation contributions. In this article, we highlight their professional development journeys, careers spanning academics, clinical, and industry, and ask their advice for nurse simulationists.

Both nurse leaders agree that professional development requires networking, participation in an organization, and informal mentoring that comes through committee service. Involvement in a simulation professional organization is more than one-time conference attendance. *"Networking and advice from colleagues have been transforming, both professionally and personally,"* Mandy suggested. As an example of getting involved at a deeper level, Eliana encourages nurse simulationists to contribute to enduring initiatives; she's facilitated translation of the Healthcare Simulation Dictionary, *Healthcare Simulationist Code of Ethics*, and Healthcare Simulation Standards of Best Practice™ into Spanish and in doing so served both the Society for Simulation in Healthcare and INACSL.

Mandy (from the UK) and Eliana (from Chile) acknowledge it is difficult to participate in live professional development with time zone differences. Ideally, simulation organizations will record webinars and committee meetings so their audience can watch at a more convenient time; however, recordings do limit interactivity with the group. Eliana encourages nursing simulationists to attend meetings synchronously and in person if budgets are favorable, particularly because attendance promotes intercultural understanding and linguistic diversity. Further, Mandy encourages nursing simulationists to take advantage of professional development online. She adds, *"INACSL is my 'go to' organization as the website and membership offers a range of professional growth activities for novice and experienced simulationists globally."*

Professional development continues after you've met initial goals and achieved a level of expertise. Mandy and Eliana encourage nurse simulationists to give back through mentoring the simulation community. *"There have been so many ways that I have been supported and learned with and from others by volunteering with the Society in Europe for Simulation Applied to Medicine (SESAM) for a few years and now with INACSL,"* Mandy highlights. She gave an example of her continued development that comes from facilitating the INACSL Simulation Education Program, ...

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