



VIRTUAL REALITY MEDICAL TRAINING

—
Jack Pottle
NAMDET 2018



Question

What is...?

- Virtual Reality
- Augmented Reality
- Mixed Reality

VR (virtual)



AR (augmented)



MR (mixed)



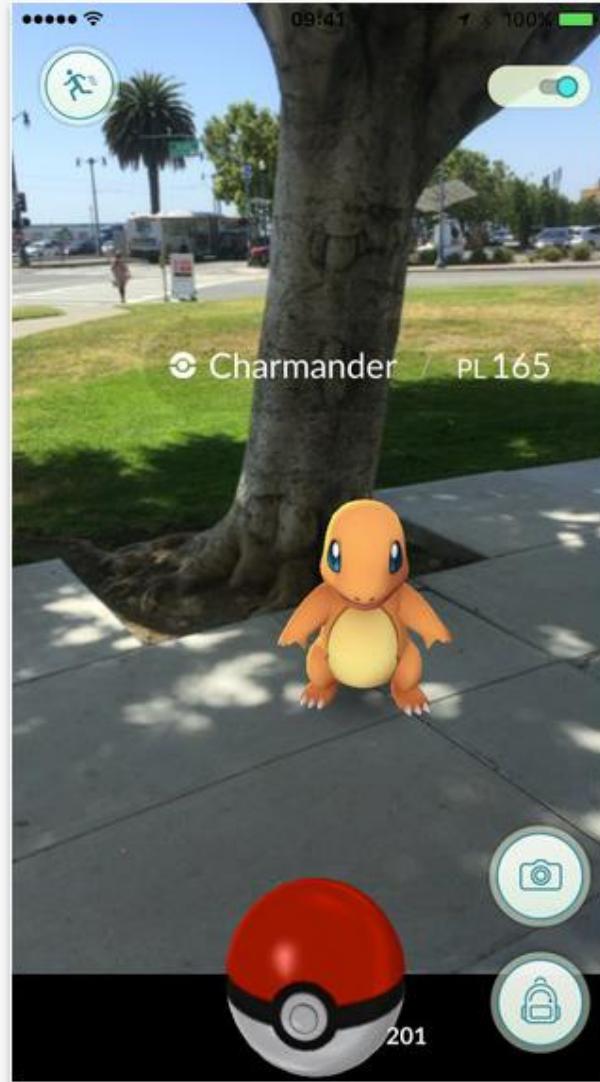
Digital environments
that shut out the real world.

Digital content on top
of your real world.

Digital content interacts
with your real world.

AUGMENTED REALITY













MIXED REALITY



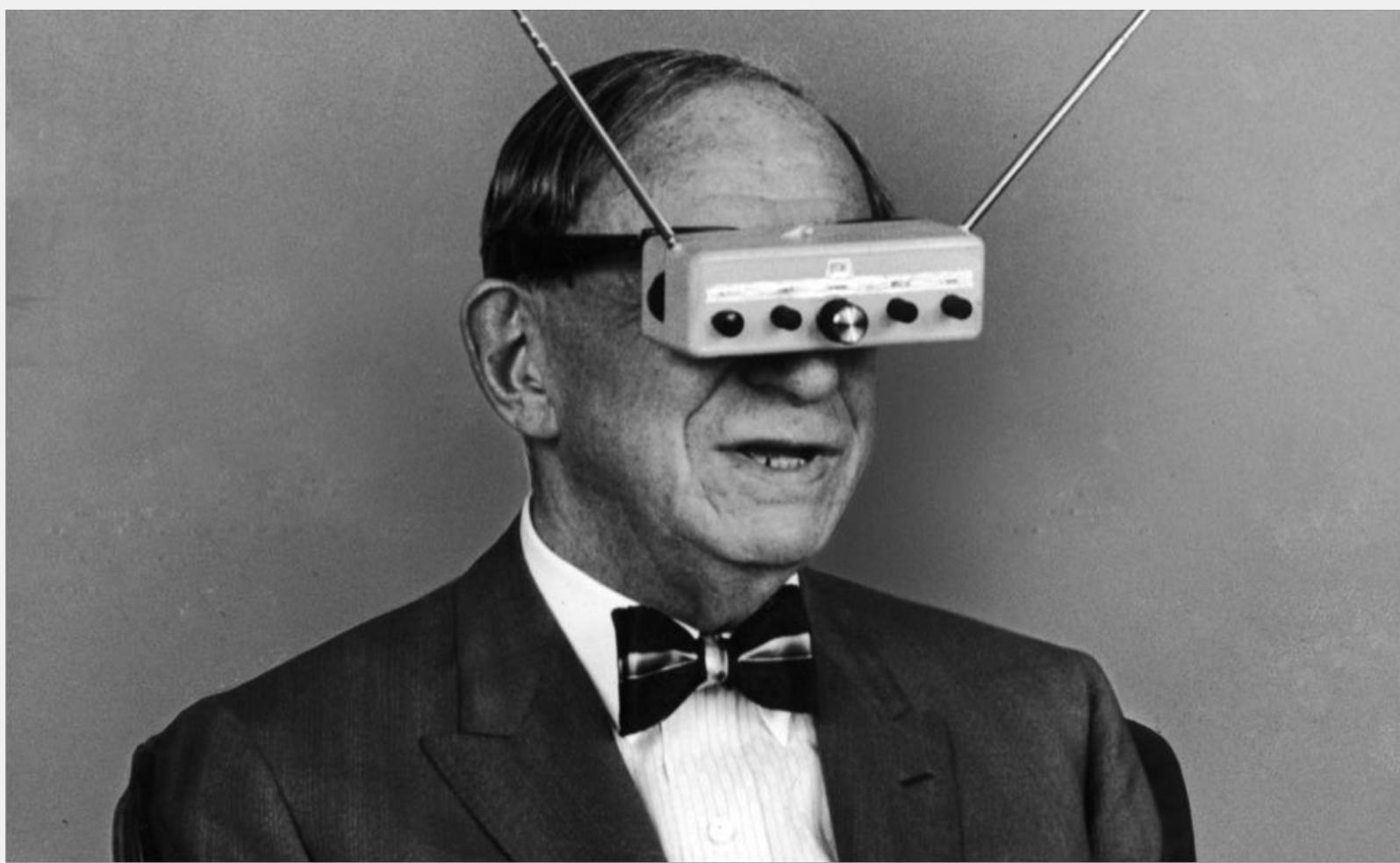




VIRTUAL REALITY

Virtual Reality Terminology

- Screen-based
- 360 video
- Fully immersive VR

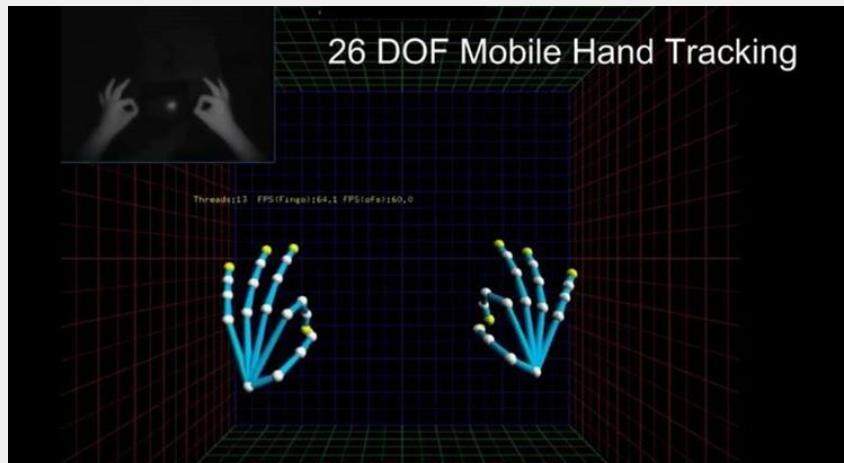














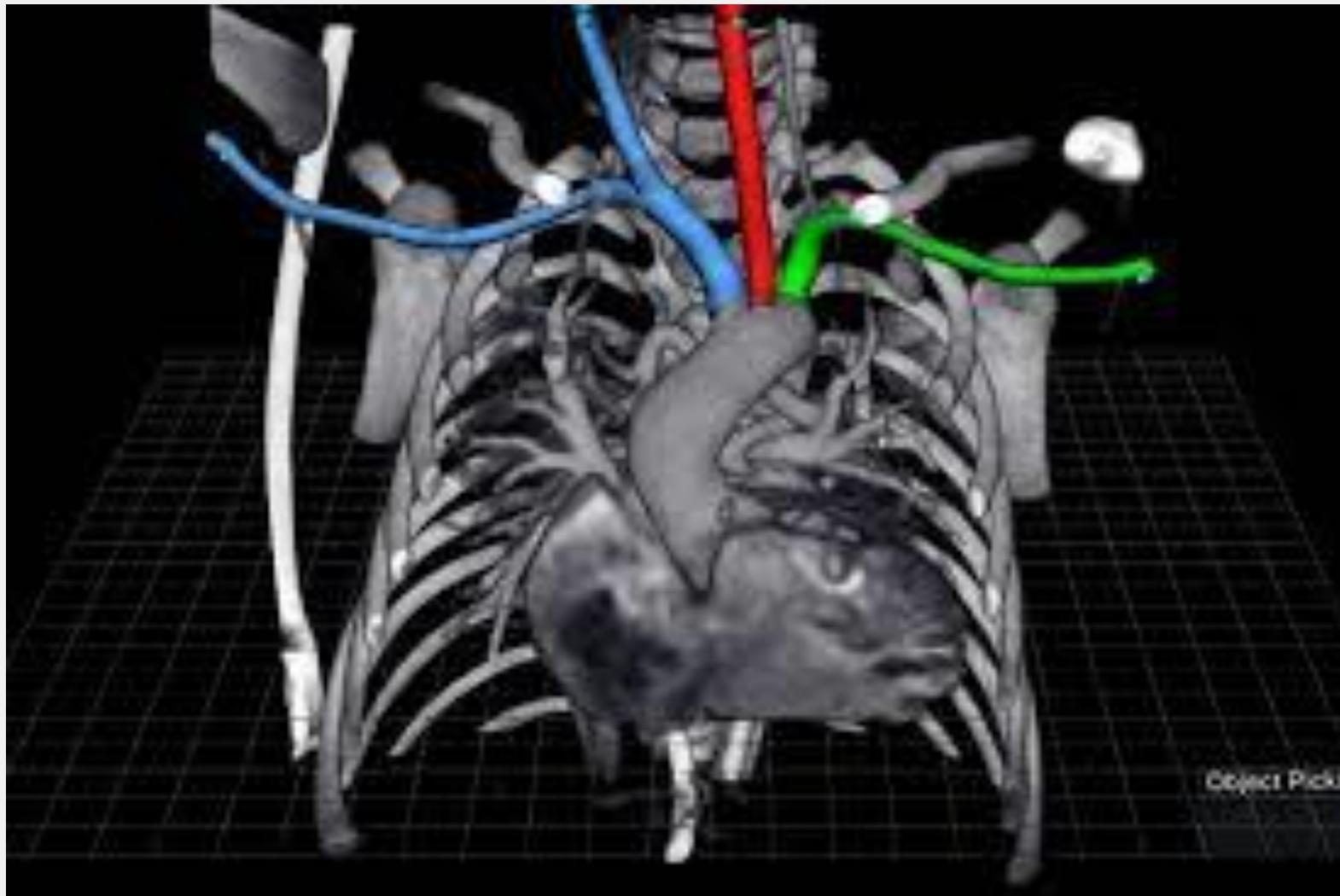
USES

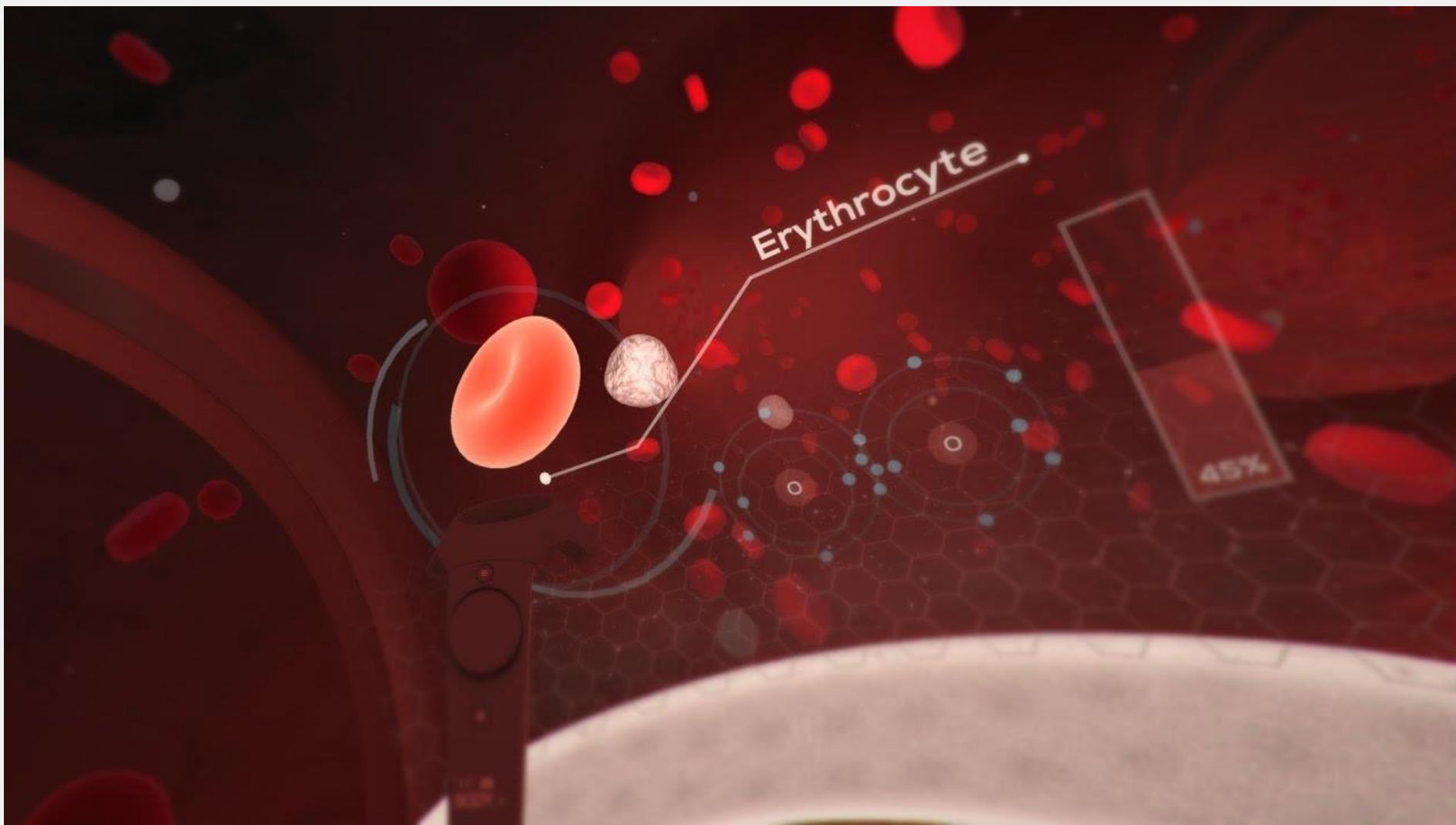












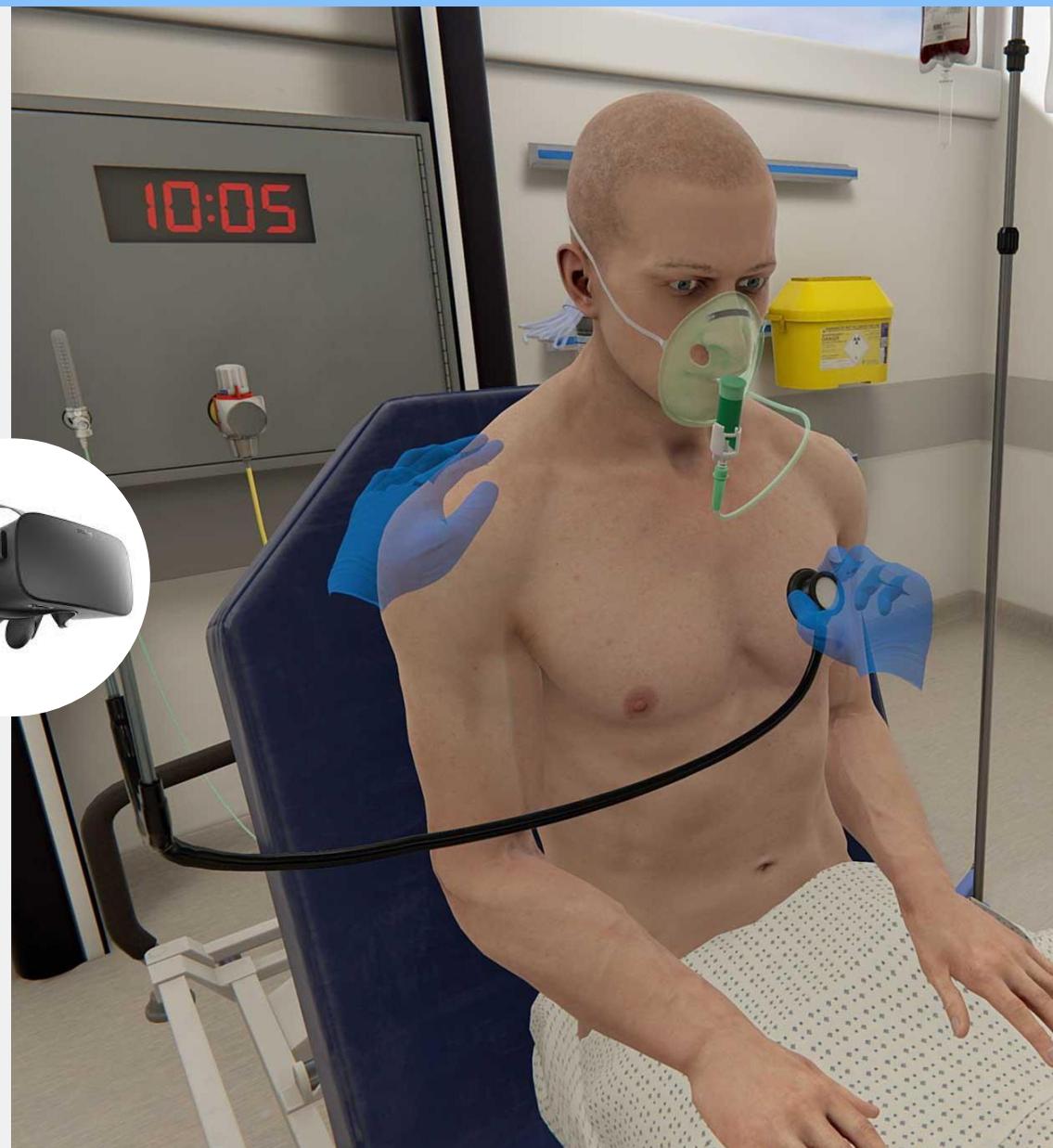


OMS

VIRTUAL REALITY SIMULATION

We create virtual reality medical scenarios, giving learners the benefits of traditional simulation in a scalable model.

This allows learners to practice more, learn from their mistakes, and improve patient care.



VR SIMULATION



IMMERSIVE



ADAPTIVE

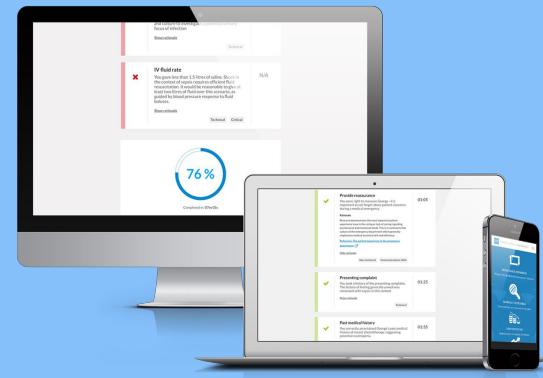


ENGAGING



EVIDENCE-BASED

GUIDED REFLECTION & FEEDBACK



PERSONAL



BLENDDED

DATA, ANALYTICS & REPORTING





The image displays three devices showing a medical simulation application:

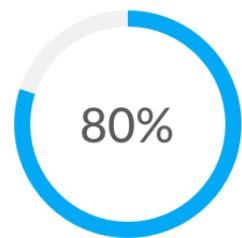
- Desktop Monitor:** Shows a patient summary with a red 'X' icon next to a section about IV fluid rate. The text states: "You gave less than 1.5 litres of saline. Shock in the context of sepsis requires efficient fluid resuscitation. It would be reasonable to give at least two litres of fluid over this scenario, as guided by blood pressure response to fluid boluses." Below this is a "Show rationale" button and a "Technical" button.
- Laptop:** Shows a summary of completed tasks: "Completed in: 07m 05s" and a large blue circular progress indicator showing "76 %".
- Smartphone:** Shows a summary of completed tasks: "REPEATABLE SCENARIOS", "GLOBALLY ACCESSIBLE", and "COST EFFECTIVE".

The laptop screen also displays a detailed breakdown of performance across three categories:

- Provide reassurance:** Scored with a green checkmark. Rationale: "Research demonstrates the most important patient experience issue is the caring or lack of caring regarding psychological and emotional needs. This is in contrast to the culture of the medical degree which generally emphasises medical technical skill and efficiency." Reference: "The patient experience in the emergency department." Buttons: "Non-technical", "Communications skills", and "Rationale". Time: 01:05.
- Presenting complaint:** Scored with a green checkmark. Rationale: "You took a history of the presenting complaint. The history of feeling generally unwell was consistent with sepsis in this context." Buttons: "Show rationale", "Technical", and "Rationale". Time: 01:25.
- Past medical history:** Scored with a green checkmark. Rationale: "You correctly ascertained George's past medical history of recent chemotherapy, suggesting potential neutropenia." Buttons: "Non-technical", "Communications skills", and "Rationale". Time: 01:35.

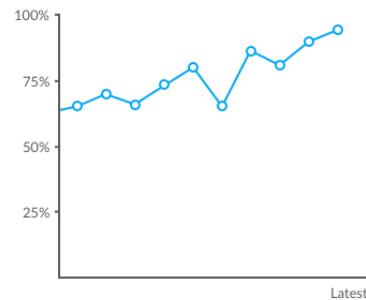
Analytics

Your average score

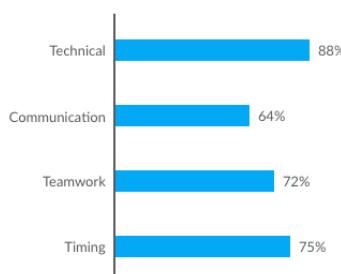


Cohort average: 75%

Progress



Skill performance



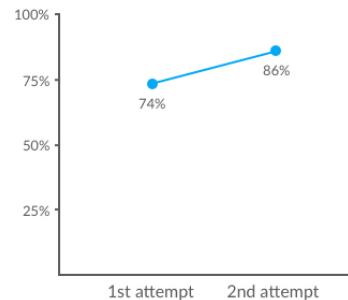
Engagement

12 sessions run

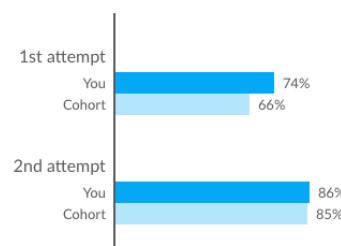
10 scenarios attempted

14 scenarios available

Improvement



Peer comparison



User Feedback

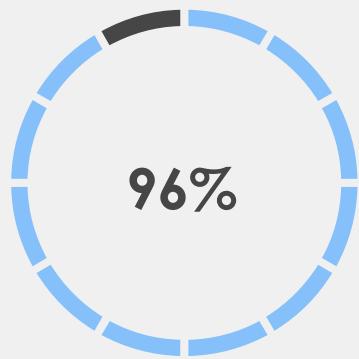
- “Definitely made me feel like I was in the situation dealing with the patient, as I would be in real life”
- “**I think the most important part was that it felt really life-like. Like it felt really, really real.**”
- “It’s something I’d be happy to turn up and spend some time doing a scenario or session each day.”
- “**I genuinely think if we did use this it would allow us to make better decisions in real life.**”

Clients and social media

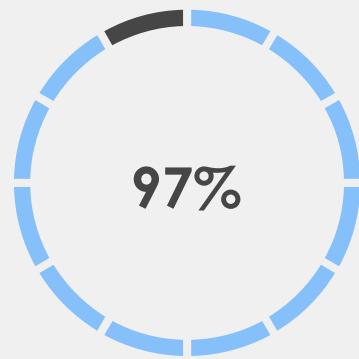
- “If anyone gets a chance to try @vrmedicalsim I'd wholly recommend it... hugely impressed!”
- “**Absolutely amazing teaching potential... mind spinning with the possibilities**”
- “Just had a first play with OMS VR simulation. Beginning, sceptical. End, gobsmacked. Seriously, clever stuff!”
- “**Initially I was pretty sceptical that VR could demonstrate the subtleties, after seeing this... my faith is restored. Good work!**”
- “This is the future of medical education!”



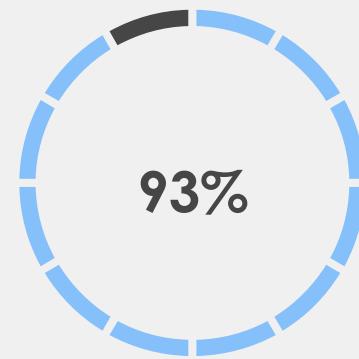
TRIALS



"This VR simulation is a **valuable** training resource"



"I would **choose** this VR simulation as a method of learning in future"



"This simulation is likely to **impact** on my clinical practice to the benefit of patient **care**"



EVIDENCE FOR VR EFFICACY IN SIMULATION

Virtual reality simulation has been widely adopted in surgical training where it has been shown to “**decrease injury, increase speed of operations and improve overall outcomes.**”⁽¹⁶⁾

The same is true in medicine where “virtual reality simulations can **bridge the gap between theory and practice** by immersing the learner in a realistic, dynamic, complex setting.”⁽¹⁷⁾

It can teach clinicians **complex procedures,**⁽¹⁸⁾ is **effective in CPR training,**⁽¹⁹⁾ can **improve communication skills,**⁽²⁰⁾ enhance critical thinking⁽²¹⁾ and **improve clinical decision-making.**⁽²²⁾

EVIDENCE FOR VR AND MEMORY

VR and episodic memory

VR presence and memory encoding

Immersion and healthcare education

Repetto (2016)

Virtual Reality as an Embodied Tool to Enhance Episodic Memory in Elderly

Frontiers in psychology

Makowski (2017)

“Being there” and remembering it: Presence improves memory encoding

Consciousness and Cognition

Gutierrez (2007)

The effect of degree of immersion upon learning performance in virtual reality simulations for medical education.

Studies in Health Technology and Informatics



QUESTIONS?

jack@oxfordmedicalsimulation.com
@vrmedicalsim