

ORIGINAL RESEARCH

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**ACTIVE PARTICIPATION VERSUS OBSERVATION
IN HIGH-FIDELITY SIMULATION: A
COMPARATIVE STUDY OF SKILL RETENTION
AND CLINICAL PERFORMANCE IN MEDICAL
EDUCATION****Akshay Doshi**¹, Arthur Foster¹, William Adeboye, Cameron Niven;¹*The Princess Alexandra Hospital NHS Trust, United Kingdom***Correspondence:** akshay.doshi@nhs.net[10.54531/PENL5723](#)

Introduction: High-Fidelity (Hi-Fi) Simulation is essential in medical education, offering realistic clinical training in safe environments. However, the intensive resource requirements of specialised equipment, dedicated simulation suites, and trained instructors frequently limit students' hands-on participation [1]. Many learners consequently spend most simulation sessions as passive observers. This study examines whether active participation in Hi-Fi Simulation leads to better performance in subsequent emergency scenarios compared to observation alone, while also investigating knowledge retention over time.

Methods: A longitudinal study was conducted with seven final-year medical students at a district general hospital. Participants first completed four emergency scenarios (DKA, sepsis, hyperkalaemia, major haemorrhage), actively managing one case while observing peers in others. Three months later, all students repeated the same scenarios using immersive VR technology. Performance was assessed through a validated scoring system evaluating clinical knowledge, procedural skills, decision-making, teamwork and time management.

Results: Active participants consistently outperformed observers by an average of 20% in VR simulations. The most significant differences appeared in time critical decision making and complex clinical reasoning. Active learners also demonstrated superior procedural accuracy and showed greater confidence during VR scenarios. These benefits persisted across the three-month interval between sessions.

Discussion: Our findings strongly support prioritising active participation in simulation training, even if this means covering fewer scenarios. This perhaps highlights a limitation in traditional Hi-Fi Simulation, with students spending

more time in observational learning than participating. Using simulation as a tool meets the need of undergraduate students by increasing their knowledge and confidence during active participation. Future research should investigate the translation of simulation performance gains to real clinical outcomes.

Ethics Statement: As the submitting author, I can confirm that all relevant ethical standards of research and dissemination have been met. Additionally, I can confirm that the necessary ethical approval has been obtained, where applicable.

REFERENCES

1. Issenberg SB, McGaghie WC, Petrusa ER, et al. Features and uses of high-fidelity medical simulations that lead to effective learning: a BEME systematic review. *Med Teach*. 2005;27(1):10–28. doi: 10.1080/01421590500046924.