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University of Edinburgh Veterinary Medicine

Innovative approaches in teaching the next generation of veterinarians.

Teaching clinical skills mastery using immersive simulation

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Originating from the surgery skills classroom of William Stewart Halstead, the approach of “see one, do one, teach one” prevailed for more than a century among medical educators in clinical skills education. With an increased awareness of patient safety, human factors, and adult learning theory, there has recently been a move to David Kolb’s experiential learning theory and the “knowledge, skills, drills” approach to clinical competency acquisition.

Immersive simulation as a training method was first developed in the aviation industry, where it was very costly if errors occurred. Immersive simulation was invented as a tool to safely practice skills ahead of the high-stakes real-life situation of flying a plane full of passengers. It was quickly adopted by the oil and gas industry and anesthetists for the same reason and has subsequently become a cornerstone of medical education.

Simulation facilitates the delivery of competency-based veterinary education requirements using immersive clinical role-play scenarios. Peer-assisted learning also works well using this teaching method. Immersive simulation allows all learners to have a consistent controllable experience of procedures and clinical situations, including those that occur infrequently but are of high risk to patients. Improved patient outcomes have been demonstrated in human medical education for several common technical procedures such as cardiorespiratory arrest. Our experience of teaching veterinary students’ clinical skills using immersive simulation is that it enhances the effectiveness of teaching procedures through the design focus of the scenarios and opportunity for repetitive drilling, while deepening understanding and awareness of the importance of nontechnical skills, such as communication and human factors that arise in veterinary medical care delivery.

An immersive simulation teaching exercise follows a well-defined structure. First, the students are given a briefing of the task or scenario. Boundaries around confidentiality and psychological safety are established. The simulation experience follows. Finally, the exercise concludes with a debrief between the teachers and students—this is where the magic happens. Students are asked to assess their individual performance followed by constructive feedback from peers and the class tutor. Students use this reflection and feedback to set future learning objectives. Effective debriefing requires a skilled teacher, able to draw out the students’ reflections while facilitating psychologically safe discussion. Evidence shows that this is how deep and impactful learning occurs.

The standard model of veterinary clinical education is knowledge acquisition, learning of procedural skills using



Students take part in an immersive simulation to develop consulting skills in Edinburgh vet school’s simulation lab.

manikins, and development of clinical reasoning skills followed by experiential learning on clinical rotations. At the Royal (Dick) School of Veterinary Studies, we recognized an opportunity to enhance clinical competency development by utilizing immersive simulation as a teaching tool to integrate theory with experience. In 2020, we introduced a series of immersive simulation practicals in CPR, consulting, euthanasia, and disaster response (a road traffic collision) to allow acquaintance with clinical practice before starting hospital rotations. These practicals allow students to drill clinical scenarios with no risk to real patients while facilitating an opportunity to reflect upon and improve performance. Initial evaluation of this teaching has shown improved procedural skills, situational awareness, clinical reasoning, metacognition, and reflective practice.

The introduction of immersive simulation learning at our vet school required both faculty (through courses and placement at simulation labs in medical schools) and facility development. We constructed a simulated consulting room with SMOTS cameras and audio streaming to observers, and for the road traffic collision simulation, we acquired a decommissioned car, equine and canine manikins, and body cameras to capture footage of the simulation exercise. Investment in staff training and infrastructure is costly initially, but research in medical education has shown this investment to be of exponential value in the form of enhanced learning outcomes in clinical competency acquisition.

Our current focus at the school is on research in and evaluation of immersive simulation-based veterinary education and developing additional simulation scenarios in veterinary anesthesia and challenging team situations.