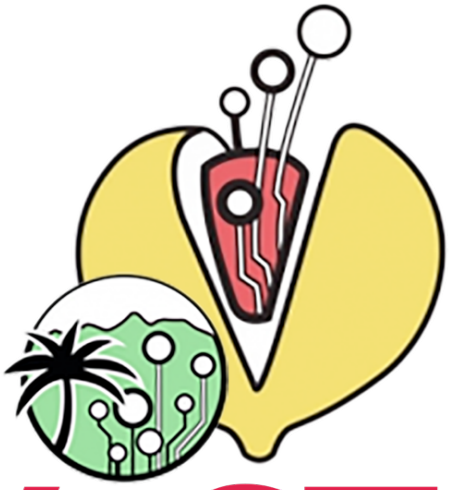
InVeST 2023
CONFERENCE PROCEEDINGS

February 3RD - 5TH

School of Veterinary Medicine, St. George's University
Grenada, W.I.



InVeST
2023

St. George's University
SCHOOL OF VETERINARY MEDICINE
Grenada, West Indies

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Abstracts: Keynote Presentations

Keynote 1

Immersive Simulation in Veterinary Education

Daniel Fletcher

Learning outcomes:

1. Describe the principles and benefits of deliberate practice in clinical education
2. Explain the 3 steps in an immersive simulation: Pre-Brief, Simulation, and Debrief
3. List 3 pros and 3 cons of immersive simulation with deliberate practice compared to the traditional clinical apprenticeship model

Keynote 2

Building Connections Across Disciplines – An Approach to Creative Work

Dave Killpack

Paleontology, Skincare, & Equine Anatomy…Video Games, Agriculture, & Dog Food. These are just a few of the topics you can expect to hear about as this presentation offers a journey through a variety of projects, created for clients, or with students. As you will see, although the topics might seem unrelated, there is a running theme of leveraging connections, both intra and interpersonally, as well as a paradigm through which I view such creative endeavors. By sharing these methods, it is my hope to empower the audience to take on an expanded scope of work and achieve greater success in their own projects. From reconstructing extinct species to dissecting extant ones, from simulating crop yields to 3D printing veterinary models, this unique overview is sure to provide some uncommon insights and spark your creativity.

Keynote 3

Applications of simulation-based learning: the human touch

Jenny Moffett

Simulation-based learning provides educators with an ever-expanding range of applications and opportunities. The rapid adoption of simulation techniques in recent decades gives this approach to learning a unique, international reach within health professions' education. As the sophistication and diversity of simulation-based learning increases, however, it can be easy to lose sight of the critical elements of design and implementation that lead to effective educational outcomes.

In this keynote session, we focus on the "human touch" of simulation, i.e., the knowledge, skills and attitudes of simulation professionals that support deep approaches to learning for our students. If we consider that simulation-based learning acts as a "bridge between classroom learning and real-life clinical experience" (SSH, 2019), this causes us to reflect on what teaching approaches best build this bridge.

Simulation experiences can evoke feelings of fear or anxiety for some learners (Paskins & Peile, 2010; Nielsen & Harder, 2013), whilst others find it difficult to engage with or "buy in" to scenarios (Rudolph *et al*., 2014). Simulation professionals can address and mitigate the effects of such barriers to learning by planning and facilitating learning sessions with an attention to learners' psychological safety. As a result, students are more able to focus on their own learning, and develop the technical and non-technical qualities that equip them for real-world veterinary medicine.

This session will draw on insights from working with human medical professionals at RCSI, home to Europe's largest clinical skills simulation facility, and outline key ways for programme leads, module coordinators, curriculum developers and simulation professionals to utilise the human touch to optimise their simulation activities.

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Abstracts: Workshops

Workshop 1

Novel Canine Ovariohysterectomy (OHE) Surgical Trainer System

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Background: We produced two surgical training models that, when used in conjunction, simulate a canine OHE procedure in its entirety. Model 1 consists of a flexible silicone model simulating the ventral abdominal body wall with anatomically accurate and durable abdominal features allowing identification of pertinent landmarks, rough and sterile surgical preparation, draping, incising and three-layer closure. Model2 consists of a female reproductive tract model that is inexpensive, easily (re)produced, and constructed from ordinary materials. It accurately represents the relevant reproductive anatomy, including the connecting ligaments. These combined models allow for surgically relevant manipulation of the "tissues", such that the various psychomotor skills necessary to complete an OHE in a canine patient are consistently performed.

Structure of Workshop: Demonstration of the utility of this two-model system will be performed by instructors. Participants will work in small groups to explore how we currently use each of these two models in a laboratory setting by working through our models' training guides with each of these models. Next, a demonstration of how each model is made will be performed, with each participant creating model 2 from the start through to completion (all materials provided), such that they can take it with them and replicate it at their own institutions.

Intended Outcomes: Attendees will gain:

1. An ability to replicate model
2. An opportunity to understand how to use this to enhance learning

Level of Attendees: Everyone (technicians, veterinarians, surgeons, etc.) is welcome and able to participate.

Workshop 2

Practical Tips for Debriefing for Simulation and Clinical Training Environments

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Learning Outcomes:

1. Describe the 5 stages of a debrief
2. Demonstrate the 3 educational strategies that can be used during the Analysis Phase and explain their pros and cons
3. Explain the 3 types of performance domains and design strategies to debrief on them

Level of Attendees: Both veterinarians and veterinary technicians

Workshop 3

Using Virtual Reality in Your Veterinary Courses: How to Get Started

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Background: Recent literature supports the use of active learning in the STEM disciplines and curriculum of health professions[1,2]. Furthermore, technology in the classroom, when used appropriately, has been shown to improve student performance by 12 percentile points when compared to students that do not use technology to support the learning process[3]. The use of virtual reality (VR) has gained popularity in medical education because of its benefits in skill acquisition[4-7]. Similar to large animal veterinary medical education where facilities, safety, and geography can be challenging obstacles to achieving real life educational objectives, agricultural education is turning to the use of virtual reality. Preservice Agricultural Science teachers are using VR to learn about the complex systems that are public school classrooms and how to effectively leverage technology for teaching in the 21st Century.

Structure of the Workshop: Participants will be led through the basics of what VR is, what it can do, and learning situations that are best suited to VR. Participants will then spend time creating a video to reinforce the principles learned in this course.
Intended Outcomes: Following participation in this workshop participants will be able to…
1. Define Immersive Technology
2. Identify appropriate use cases for immersive experiences
3. Create an educational immersive experience

Level of Attendees: Beginner to Intermediate with an interest in learning more about VR
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1. Freeman S., Eddy, S.L., McDonough, M., et al. Active Learning Increases Student Performance in Science, Engineering, and Mathematics. Proc Natl Acad Sciences. 2014; 111(23):8410-8415.
2. Parmelee, D.X. Team-Based Learning in Health Professions Education, Why Is It a Good Fit? In: Michaelson LK, Parmelee DX, McMahon KK, and Levine RE ed. Team-Based Learning for Health Professions Education. A Guide to Using Small Groups for Improving Learning, 1st ed. Sterling, VA: Stylus Publishing; 2008:3-8.
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Workshop 4

Case Writing Workshop Emphasizing Development of Basic Communications Scenarios for Students

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Background: Veterinarians must communicate with clients by means other than face to face interactions at least 30% of the time, and therefore need to develop skills for these other means of communications, such as phone calls, in an effort to ensure successful patient outcomes. Typically, communications training programs lack phone conversation preparation, which presents a missed opportunity for educators to instruct students on this important form of communications. Having faculty understand the importance of teaching skills to support this type of communication medium will be emphasized and practiced.
Structure of the workshop: We envision 30 minutes of didactic instruction and 60 minutes of case writing on the subject material. Examples of appropriate phone conversation scenarios will be provided. Participants will be encouraged to create their own cases with the guidance of two facilitators. Feedback will be offered on the participants' products.
A room with flexible seating would be required to allow participants to work small groups; flip charts w/stand and markers, projector, and screen are also required.
Intended Outcomes: Participants will be introduced to scenario development, which they can then use with their students to enhance phone-centric skills required for successful communications in that medium.
Level of Attendees: Advanced beginner to intermediate.

Workshop 5

Messy Medicine: using simulation to support learning around uncertainty

Jenny Moffett

Background: Health professions' learners can struggle with negotiating complex and uncertain situations, with many experiencing a dissonance between their "idealized visions" and "the lived reality" of medicine (Wald *et al*., 2018). Studies from human medicine outline the importance of an ability to tolerate uncertainty for health professionals, with benefits for their own health (i.e., reduced burnout, reduced work-related stress), and those of their patients (i.e., better communication, reduced medical error) (Bovier & Perneger, 2007; Cooke *et al*., 2013; Iannello *et al*., 2017).

There is relatively less work on tolerance of uncertainty within veterinary medicine. However, the nature of the work, e.g. treating a variety of species, working independently, means that this attribute is likely to be important for veterinary professionals too (Hancock *et al*., 2017).

Early work in this domain suggests that undergraduate health professions' learners come into contact with uncertainty in somewhat predictable places, categorised by their nature (e.g., problem-based and workplace-based learning), and/or timing (e.g., entry into the university setting, transition into clinical work placements) (Moffett *et al*., 2019). This work has also highlighted that simulation-based learning can play a vital role in helping learners to negotiate the complexities of real-world professional practice.

Structure of the workshop: In this workshop, underpinned by a social constructivist framework, participants will unpack the concept of uncertainty, from the perspective of veterinary education. Specifically, participants will engage in a rich pictures process (Cristancho & Helmich, 2019) to explore their own learners' experiences of uncertainty and devise practical strategies to prepare students for the "messiness" of veterinary medicine.

Intended learning outcomes: By the end of the workshop, participants will be able to:

1. Recognise opportunities within simulation experiences to help learners navigate uncertainty
2. Appraise practical teaching skills which can support learning around uncertainty
3. Create a plan to incorporate learning around uncertainty within their own teaching context

References

1. Bovier PA, Perneger TV. (2007). Stress from uncertainty from graduation to retirement—a population-based study of Swiss physicians. Journal of General Internal Medicine, 1;22(5):632-8.
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Workshop 6

Virtual Reality 'Field Trips' for Lecture and Anatomical Review

Charles Price, David Nahabedian, Farihah Khan, Linden Pederson and Jack Nelson

Background: Virtual Reality is becoming prevalent in educational environments. This workshop explores VR as an alternative presentation and learning tool for anatomy. Using free software, and Quest 2 headsets, participants will get experience in VR by exploring virtual spaces and data from animal CT/MRI.

Structure of workshop:

Introduction: 15min. welcome/ context presentation of how VR is used, where we see it going, and instructor introduction

Circuit: ~25 mins long, with a 5min. break and a 15 minute 'wrap up'

Level of Attendees: Anatomists, Vet educators, VR enthusiasts (any experience level)

Station A: Beginner skills station - Participants will run through 'First Steps' tutorial
Station B: Experienced - Intro to Gravity Sketch controls (skips A)
Station C: VR Field Trip - Example of VR Anatomy lecture/presentation

Workshop 7

Difficult conversations – a New Tool

Beth Dronson and Elpida Artemiou

The delivery of the workshop is an international collaboration between Ross University School of Veterinary Medicine, St. Kitts, West Indies represented by Dr. Elpida Artemiou and (2) Dr. Beth Dronson, adjunct faculty at the University of Pennsylvania, School of Veterinary Medicine, Philadelphia, PA, USA.University of Pennsylvania, School of Veterinary Medicine

Background: Exploration of the HEART protocol is a valid and reliable approach to enhance learners communication skills in high stakes interactions such as handling angry clients or a medical mistake. Critical information will be shared in a step- wise fashion to move the conversation in a positive direction.

Structure of the workshop: The workshop will focus on a didactic description of the HEART protocol- (Hearing, Empathizing, Action, Responding and Thanking the client), and an interactive portion. In small groups participants will practice in prepared simulations as well as engaging in discussion of the learnings. This highly experiential workshop integrates both The Universal Upset Person Protocol - Dike Drummond, MD and the core principles of the Calgary Cambridge Observation Guide developed by Jonathan Silverman, Suzanne Kurtz and Juliet Draper.

Level of Attendees: This workshop will enhance any stage of communications program and will be of interest and value for both novices and experts in communication skills.

Workshop 8

The VIN Virtual Clinic: An Online High-Fidelity Clinical Simulator

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Background: The VIN Virtual Clinic (VVC) allows students to practice clinical decision-making skills and see the outcome of their actions. The VVC currently offers 27 patients in 6 case groups: congestive heart failure, acute hemorrhagic shock, hyperadrenocorticism, amphetamine toxicosis, lymphoma, and polyuria/polydipsia.

The current VVC provides randomized levels of difficulty, a more intuitive case flow than previous iterations, gamification options, an instructor mode, and streamlined case authoring. A case editor to allow instructors to create and edit cases is in development.

The VVC is available to all veterinary students and academics on the Veterinary Information Network. It is also used in teaching at veterinary colleges in the U.S. and Europe (1).

The VVC has also been utilized as the foundation for a case challenge allowing students to examine and run diagnostics on their patient while discussing their case with other students and mentors on the VIN message boards.

Structure of the Workshop: Participants will interact with VVC cases and be asked to rate and discuss the simulations on difficulty, user interface, and realism.

Intended Outcomes: Participants will be asked to suggest improvements, cases they would like to see added to the VVC and design of studies to assess the utility of the VVC in the classroom/student lab.

Level of Attendees: Educators who are interested in teaching problem-oriented case management, as well as clinical reasoning. No programming or advanced computer skills required. Beginner-intermediate

References:

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Abstracts: Presentations

Simulation in Veterinary Teaching

Presentation 1

Improving teaching by understanding the emotional impact of Cardiopulmonary Resuscitation Simulations.

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Background: The use of cardiopulmonary resuscitation (CPR) simulation has been adopted for training the qualified veterinary team (Fletcher *et al*, 2012) and more recently in veterinary education (Pollock, 2019). Kolb's experiential learning theory (Kolb, 1984) forms the foundation of simulation training, but how are novice students prepared for this educational process?

Summary of work: Sixty-Six clinical year Veterinary Medicine students from the University of Cambridge worked through a ten-minute CPR simulation in groups of 3-5. Each member then completed a 'hot' debrief and a debriefing questionnaire, before repeating the process with a different ten-minute CPR simulation. The debriefing questionnaire responses were reviewed and analysed using thematic analysis.

Results: Following the first simulation, students initially felt disorganised (24%), relieved (17%), and unprepared (30%). Following the second simulation twice as many students now felt organised (46%) and calm (29%). The most common theme emerging from the debrief discussions was recognition of the need for clearer communication within the team. The most frequent suggestion of how to improve, focused on improving communication (44%), the use of the Reassessment Campaign on Veterinary Resuscitation (RECOVER) algorithm (21%) and identifying a team leader (23%).

Take home message: Educators are now aware of the emotions, and therefore additional training needs, evoked by CPR simulation training with novice students. Negative emotions such as disorganisation and unpreparedness can be discouraging for the students and their learning process. Teaching support relating to assigning job roles, leadership, closed loop communication and familiarity with the RECOVER algorithm have been developed. Guidance for educators on how to brief the students, manage negative emotions, explore the benefits of experiential learning, set expectations and individual student learning goals have been developed.

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Presentation 2

Comparison of massed versus spaced instruction for teaching equine nasogastric intubation and rectal exam in veterinary students

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Background: It is common practice in veterinary education to teach multiple skills in a single session to enhance time efficiency. However, there is concern that this may impact knowledge and skill retention[1,2]. We hypothesize that teaching students 2 psychomotor skills in a single longer session versus 2 shorter sessions spread over 2 days would lead to increased cognitive load and decreased performance and skill retention of both skills.

Summary of work: To test this hypothesis, we compared students' perception of cognitive load and immediate and short-term retention as evaluated via a structured assessment on 2 skills: equine nasogastric intubation and equine rectal exam.

Results: Twenty third-year veterinary students were enrolled in the study; 17 students completed all aspects of the study. A student's t-test or Mann Whitney U test was performed to compare cognitive load, checklist score, global score, and time to complete task between groups. There were no differences between groups in cognitive load for the first learned skill (p>0.39). For the second learned skill there was higher cognitive load (p=0.04) for the students learning 2 skills in one session. There were no differences in initial checklist or global score between groups for either skill (p>0.11). However, the group with 2 skills in 1 session completed the second skill more slowly compared to the students with 1 skill per session (p=0.01).
Take home message: Overall, the findings from this study suggest that there was increased cognitive load associated with 2 skills per day but no impact on skill performance.
References

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2. Brashers-Krug T, Shadmehr R, Bizzi E. Consolidation in human motor memory. Nature 1996;382:252-55.

Presentation 3

Comparison of three canine models for teaching veterinary dental cleaning

Julie A. Hunt, DVM, MS[1]; Paul Schmidt, DVM, MPH, DACVPM[1]; Jamie Perkins, DVM[2]; Genesis Newton, BS[1]; Stacy L. Anderson, DVM, MVSc, PhD, DACVS-LA[1]
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Background: Dental cleaning prevents and treats periodontal disease, one of the most common diagnoses in small animal practice. Students learn to perform dental cleaning through deliberate practice, which can be performed on models. This study sought to compare educational outcomes from three dental cleaning models: low-fidelity ceramic tile, mid-fidelity 3-dimensional (3D) printed canine skull, or high-fidelity canine head.
Summary of work: Students (n=36) were randomized to a 1-hour practice session on one of the three models and provided survey feedback about their model. After one week, students performed a dental cleaning on a canine cadaver while being video-recorded. Experts (n=10) provided feedback on each model.
Results: Experts rated all models as suitable for teaching dental cleaning, but the 3D skull and full head models as more suitable for assessing student skill. Students were more positive about the realism and features of those two models as compared with the tile model. All model-trained students were equally effective at removing calculus from the cadavers' teeth. Students who learned on the tile model were a median of 4 minutes slower to remove calculus from their cadaver's teeth than students who trained on the canine head model.
Take home message: Although students may be more accepting of the 3D skull and full head models, all models were equally effective at teaching the skill. Experts approved all models for teaching, but recommended the 3D skull or full head model if student skills were to be assessed. Low-fidelity models remain effective training tools with comparable learning outcomes.

Presentation 4

Validation of an effective, easy to use canine naso-oesophageal feeding tube model

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Background: Animal simulators are commonly used for teaching, practicing and evaluating veterinary clinical skills. This is the result of a reduction in the use of live animals in veterinary education (Hart 2005). Some simulators can be expensive and where possible a low fidelity, in-house, cost-effective alternative can be made allowing more model availability and more student practice in a low stakes environment without patient welfare concerns. It is recommended models undergo expert evaluation and validation before being incorporated into medical training (Schout 2010, Williamson 2016).
Summary of work: An Ikea dog teddy was fitted with two silicone rubber straws to simulate nostrils and a small plastic barrel container with rib spaces cut out inserted into the thoracic space. The straws

had an endotracheal tube attached to mimic the oesophagus. Eight experts, vets and vet nurses, and twelve students tested the model for feeding tube placement and completed a survey.
Results: 88% of experts agreed or strongly agreed that landmarks, structures and feel were realistic and that the model was suitable to teach students the preparation and steps of the skill. 100% of students agreed or strongly agreed that landmark structures were present, felt realistic and that the model was helpful in performing the skill.
Take home message: The survey results confirmed the simulator provided adequate haptic feedback, providing realistic landmarks and a lifelike feel and resistance when placing the feeding tube. Several subject matter experts reported the model was adequately realistic and the steps required to perform the procedure were adequately represented making it suitable for teaching and assessment purposes.

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Presentation 5

So, you want to build a sim lab? Lessons learned from the creation of a multi-purpose simulation and teaching laboratory at Cummings School of Veterinary Medicine at Tufts University

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Background: Historically at Tufts, there was no centralized space for simulation, and there were limited resources for model-based independent practice. As a result, existing models and simulators were infrequently used, and those that were used were dependent on stakeholder availability. When an outdated and under-utilized wet lab space was slotted for renovation, we capitalized on the opportunity to not only update the space, but also to enhance simulation-based teaching.
Summary of work: Guided by a committee of diverse stakeholders, the space was renovated into a state-of-the-art, technology-enhanced, and reconfigurable teaching and simulation laboratory. A laboratory manager was hired to maintain and grow the space as a core simulation resource.
Results: During the process, we overcame many challenges, from finding creative solutions to storage limitations, to maintaining flexibility for a variety of uses. This space, and simulators, are now available to students for independent practice 24/7.
Take home message: The simulation laboratory has been a positive addition to our campus, despite some limitations and growing pains. We have invested heavily in simulation technologies now that we have a dedicated location for their storage and staff to maintain them. The space sees frequent use by pre-clinical and clinical courses, student groups, house officers, and hospital staff. Although less ideal than space dedicated solely to simulation, a multi-purpose laboratory is a reasonable alternative. Uniquely, the simulation lab space shares a wall with our spay neuter clinic, and we are excited to leverage this physical proximity with learning experiences that ease the transition from simulated practice to real patient practice.

Presentation 6

Development and validation of a bovine uterine prolapse model

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Background: Uterine prolapses occur sporadically and replacement is difficult to teach in a live animal laboratory setting. The objective of this study was to develop a cost-effective model that replicates a uterine prolapse case including caudal epidural, replacement of the prolapse, and placement of a Buhner suture.

Summary of work: This approach used a half cow obstetric model (Veterinary Simulator Industries), the tail on which was replaced with a tail containing vertebrae and tubing to simulate an epidural space, a uterus created from Dragon Skin-10™ silicone with slime inside to add weight, and the vulva replaced with a thicker EcoFlex™ material. Second year veterinary students at TTU SVM and bovine practitioners evaluated the model.
Results: Twenty–seven students and 18 veterinarians evaluated the model and completed the associated questionnaire. All students agreed or strongly agreed the model overall was easy to work with, and 23 agreed or strongly agreed it looked and felt realistic. Two students disagreed that there were adequate landmarks for the epidural. Two veterinarians disagreed that the epidural model looked and felt realistic with enough landmarks and 1 thought it could teach bad habits. All but 2 veterinarians thought that the prolapse part looked and felt realistic. All veterinarians felt that it would teach the steps and improve welfare and increase students' ability. Fifteen veterinarians felt that the Buhner part looked realistic, and 12 agreed it felt realistic; however, 3 believed it could teach them poor technique.
Take home message: In conclusion, we believe this model can teach students the steps of uterine prolapse replacement.

Presentation 7

Use of a peer-led clinical skills log in veterinary undergraduate training

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Background: Clinical skills are important in veterinary undergraduate training. Assessment of clinical skills is through objective structured clinical examinations (OSCE), at the end of the year. All the OSCE-able clinical skills are available for the students to practise during open access to the clinical skills facilities. Each skill has clear instructions, in the format of skills guides and online videos, in the aim that students can further develop their skills. Skills may be 'self-taught' using the provided materials in a flipped classroom format, and students also have compulsory practical classes, facilitated by academics.
Summary of work: In 2019, The University of Surrey introduced a peer-led clinical skills log, for which completion is compulsory as a unit of assessment. This was first time any sort of peer-led team learning has been used within the veterinary curriculum at Surrey. The introduction of the clinical skills log coincided with combining three separate modules (each with their own set of OSCE-able skills) into one larger module. The aim was to hold a single OSCE, with a greater number and more diverse range of stations. To encourage the continued practise of clinical skills, the skills log was designed that each skill must be performed at least twice, requiring the student to sign and date completion and to be countersigned by a peer.
Results and Take home message: The introduction of this clinical skills log appears to have encouraged students to engage with the clinical skills available and improve their overall performance of the skills.

Presentation 8

A clinical simulation for improving confidence in small animal anaesthesia and neutering procedures in undergraduate veterinary students

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Background: The ability to safely and effectively perform surgery is an essential skill for veterinarians. Surgery is stressful for inexperienced surgeons and a source of anxiety for veterinary students. Repetitive practice on models can allow students to prepare for performing individual anaesthesia and surgery skills in a low stress environment. Clinicians at a university neutering clinic found that students had competency in performing individual anaesthesia and surgical skills yet struggled to combine the individual skills effectively when faced with a live animal neutering case, causing stress, anxiety and poor performance.
Summary of work: A preparatory practical class was developed into a simulation of the process of planning, inducing and maintaining anaesthesia in given small animal cases and preparing for and performing midline canine ovariohysterectomy, flank feline ovariohysterectomy and open and closed

canine castration on models. Students were surveyed prior to and after the simulation practical day about their confidence in various aspects of small animal anaesthesia skills and neutering procedures. A further survey was completed following a day spent performing live animal surgery at a supervised neutering clinic.
Results: The number of students reporting confidence in anaesthesia skills on average increased from 31% to 97%. The average reported confidence in surgery skills increased from 35% to 94%. Clinicians felt students were able to cope with multi-tasking required to effectively perform anaesthesia and surgery in live animals.
Take home message: Simple simulations can increase student confidence and ability to bring together individual clinical skills and improve performance in a live animal surgical environment.

Presentation 9

Using a Delphi study to create an evidence-based list of farm animal clinical skills to inform curriculum revision

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Background: The role of farm animal veterinarians is evolving with increasing emphasis on advisory work. However, new graduates still need a variety of clinical skills to be able to perform many routine procedures. It is timely to develop an evidence-based list of clinical skills for entering farm animal practice to ensure that training meets the needs of the profession.
Summary of work: Farm animal veterinarians participated in a multi-round Delphi study to develop a consensus-based list of the most important clinical skills for a new graduate. Participants were also asked to reflect on their decision-making process. The list was used to inform a curriculum-wide review of farm animal clinical skills teaching.
Results: The Delphi study resulted in a list of 72 skills for cattle and sheep organized in order of importance for a new graduate. In the qualitative data participants explained prioritizing skills that foster credibility with farmers e.g., animal handling, are required when examining and treating sick animals and for coping with emergencies. The Delphi results have informed revision of the farm animal teaching, with practical classes in each year of the curriculum designed to build progressively from animal handling to basic clinical skills and routine procedures. A variety of innovative learning resources have been developed to support the teaching, including models and flipped classrooms.
Take home message: An evidence-based approach to identify the most relevant clinical skills for a new graduate entering farm animal practice has allowed a focused revision of the use of simulation in teaching that helped to ensure resources are deployed efficiently and effectively.

Presentation 10

Development of a comprehensive simulated patient model for the physical examination of the dog

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Background: Learning and practicing novel skills in physical examination labs using live animals can be challenging, particularly when the animal loses compliance.
Student education in clinical skills is important, but the humane use of animals must be kept in the forefront. (1) Commercial simulation models are available, but can be quite expensive and tend to focus on one body system or skill. (2) This model provides a representation of a dog, including multiple body systems for examination. The goal is not to identify abnormal findings or evaluate for disease, but to gain familiarity with procedure, instrumentation and self-awareness for proper performance of physical examination. Students then have familiarity with the procedure before approaching the live animal, thus allowing a more comfortable experience for the animal and a more worthwhile learning experience for the student.
Summary of work: This model is constructed with simple materials purchased locally and relatively inexpensively. It encompasses multiple study points; eyes, ears, thoracic auscultation, abdominal palpation, rectal examination. Student feedback is via verbal communication and survey.
Results: Student response to the model has been overall positive, results from student feedback will be discussed.

Take home message: Students are able to practice physical examination techniques multiple times at their own pace by using this model, thus solidifying their skills prior to examination of the live animal. The results are improved student learning and decreased discomfort of the live animal patient.

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Presentation 11

Utilizing 3Dimensional printing in the development of a simulation model for musculoskeletal physical examination in the dog

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Background: St. George's University (SGU) veterinary students participating in the musculoskeletal physical examination lab have reported that it is challenging to learn the skill of evaluating joint stability.

Most of the difficulty lies in that the animal being evaluated is usually a healthy, sound dog. Students verbally report that there is no opportunity to evaluate "normal" versus "abnormal" joints. Simulation models of the various individual joints exist and are commercially available (1), but they can be expensive to purchase and ship, with lengthy delivery time to an offshore school like SGU. We propose utilizing close-range photogrammetry to scan dry dog bones (purchased via a supply company), then recreate these bones utilizing 3D printing technology. Photogrammetry is a proven technique to reconstruct various objects in 3D, and has a broad range of uses, including geographical studies, industry, medicine and animation (2). With the resulting printed bone models, the joints can be reconstructed to simulate either sound or diseased joints. Incorporating the joints into a life-like stuffed animal model can better mimic the experience of performing examination in a live dog.

Summary of work: The current focus is on Cranial Cruciate Rupture and Hip Dysplasia models of the dog.

Results: The model is still untested by students, results should be available at the time of the conference

Take home message: Utilizing this technology allows the production of custom and proprietary teaching models, which can be incorporated into teaching physical examination of the joints.

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Presentation 12

Bringing the standardized patient into the classroom setting

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Background: Using principles from simulation and adult learning theory this presentation outlines some practical considerations on the use of standardized patients in a conventional classroom. To improve students' education programmes are increasingly turning to simulation modalities when training undergraduate nurses and other healthcare professionals. With simulation education permeating into teaching learning and assessment practices, it is now commonplace in health professional programs around the world.

Summary of work: The results in the literature revealed that the students utilizing standardized patients believe it is a useful and realistic method for developing skills in history taking and communication also increased confidence and comfort levels are reported (May, Park & Lee,. 2009). However, the use of simulated patients requires a number of resources such as suitable labs or rooms, adequate numbers of trained SP's and budget to conduct such an experience (Maloney & Haines,. 2016). These barriers can reduce the availability and access to the modality and benefits of simulation.

Take home message: The discussion will offer firsthand experience of navigating some of the issues of bringing a standardized patient into the classroom using both simulation and adult theory to underpin

the experience. Observing a standardized patient during a conventional classroom experience may prove an novel initiative opening up the realms and theory of simulation to a wider audience.

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Technology in Veterinary Teaching

Presentation 13

Engaging your students through interactive 3D models using Sketchfab and Powerpoint

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Background Considering topics of veterinary medicine, such as embryology and anatomy, there is difficulty in visualizing complex structures and understanding three-dimensional (3D) relationships. These concepts can be confusing when presented on the printed page or shown as images in a presentation. To address these concerns, we experimented with creating our own models and the free online interactive display platform, Sketchfab. Our aim was to see if these models can be created with 3D software and then also be incorporated into Powerpoint for lecture presentations.
Summary of work: Our 3D models were created in 3D industry software (i.e. Pixologic Zbrush, Cinema 4D and Blender) and later optimized for online viewing by reducing the file size and topology. These models were then uploaded to Sketchfab and annotated to provide viewers with a tour of the model and anatomical landmarks. The model files were tested for compatibility with Powerpoint and to see if other faculty could download them from Sketchfab for their own presentations.
Results: We successfully created models from scratch and were able to use them for interactive tools for learning in Sketchfab. These models were successfully added to Powerpoint presentations and others were able to download models from Sketchfab and add them to their own presentations as well.
Take home message: 3D interactive models can be created and used as educational tools in Sketchfab and Powerpoint. Sketchfab did not require any third-party plugins and will work with all major modern web browsers and cell phones, creating an interactive experience for an audience.

Presentation 14

Evaluation of in-person scoring vs scoring of digitally recorded simulated suture skills examination

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Background: To evaluate agreement between in-person performance scores and digital-recording assessment scores by the same examiner using a simulated suturing skill examination.
Summary of work: With ethics approval, veterinary students underwent a simulated skills examination that was proctored by an in-person examiner and simultaneously digitally recorded using 2 wide-angle cameras mounted overtop and to the side of the surgical field. Performance scores were based on a 9-item rubric. In-person examination scores were compared for agreement with those obtained by blind review of the digital recording of the same session, by the same examiner, 6-18 months following in-person examination.
Results: 39 students were enrolled. All rubric categories could be assessed during digital assessment of the recording from the camera mounted above the surgical area. In 2 instances, the side digital recording had to be reviewed to confirm correct needle holder grip. There was excellent concordance correlation between performance scores from in-person and post-hoc digital assessment (r=0.93).
Take home message: The excellent agreement between in-person and digital-assessment suggests that digital recording of skills examinations can provide adequate suturing skills assessment. This

presents several benefits. Digitally recorded assessment allows for blinding which can reduce assessor bias/favoritism, it provides a record of performance that students can review and critically self-reflect upon to learn from, and it could reduce the number of in-person examiners required to complete surgical skills examinations. Another potential advantage is that digitally recorded assessment could become an option for students who experience anxiety in performing a skills exam in the presence of an examiner.

Presentation 15

Is digitally recorded simulated suture skills testing associated with lower stress in veterinary students than traditional in-person assessment?

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Background: Since stress and anxiety can affect exam performance, it seems relevant to explore assessment methods to benefit student mental health. The objectives of this study were to investigate stress amongst veterinary students undergoing simulated suture skills examinations and determine if video recording can reduce stress compared to in-person examination.
Summary of work: Thirty-nine students were prospectively enrolled and randomized to undergo 2 simulated suture skills exams, one proctored by a faculty examiner, the other video recorded. Survey data modified State-Trait Anxiety Inventory (STAI), salivary cortisol, heart rate (HR) and blood pressures were obtained at baseline, prior to, and following examinations.
Results: STAI scores were significantly higher post in-person exam compared to pre-in-person exam ($p=0.0014$) for first session and compared to enrolment baseline ($p=0.035$) regardless of session. Pre exam STAI scores were significantly higher for in-person exams compared to video-recorded exams ($p=0.0312$) during the second session. Blood pressure was significantly higher during the first session regardless of exam type ($p=0.018$) and HR was lower at baseline than pre and post suture, regardless of group ($p<0.0001$). There were no significant changes for cortisol. Students reported more stress with the in-person exam ($p<0.0001$) and indicated that if given a choice, they would preferentially opt for video-recorded exams ($p<0.0001$). Twenty-eight of 32 students with suture skills exam experience reported that the simulated examination was less stressful.
Take home message: STAI scores and self-reported stress levels were significantly lower following digitally recorded exams. Video recording of skills testing can reduce perceived stress in veterinary students.

Presentation 16

Designing and evaluating flipped classroom to optimize learning in clinical skills and animal handling classes

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Background: Online flipped classrooms are increasingly used as preparation for clinical skills classes.[1] Our Clinical Skills Lab team started to develop flipped classrooms using a standardized template[2] in a pilot project prior to the pandemic. During COVID-19 in-class time was more limited, therefore, faculty developed flipped classrooms for all animal handling and clinical skills practicals. The current study aimed to evaluate the bank of flipped resources.
Summary of work: Detailed feedback was collected from students representing every cohort of the veterinary and nursing programs. An online form combined Likert scale and free text boxes; students also wrote reflective diary entries. Focus groups were conducted with instructors who taught the practical classes. Data were analyzed to identify potential changes to flipped resources and the processes surrounding them.
Results: Student feedback indicated that flipped classrooms helped them prepare for practicals, reduced anxiety about what to expect, and allowed them to use practical time more effectively. They liked concise, well explained, interactive content and recommended adherence to the structured template and more quizzes. Focus group participants reported in-class time was more focused on teaching skills and giving feedback. Managing students who had not done the flipped material was

discussed as a potential challenge. Where relevant improvements were identified, suggestions were taken to appropriate individuals to action.

Take home message: Flipped classrooms are effective for student preparation and allow instructors to optimize in-class time. Feedback identified strengths and areas for improvement, which was important as ultimately flipped classrooms are forever, not just for COVID.

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Presentation 17

***MedMicroMaps*: a novel interactive digital diagnostic tool for infectious disease to enhance *e*-learning in second year medical school at St. George's University, Grenada**

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Background: Medical education has undergone major changes in the past 20 years to adapt to the digital-centered student population by modifying content for less didactic lecture and more time for self-study with e-Learning[4,6]. St. George's University (SGU), a Caribbean medical school with alumni ranking #2 in USA for total licensed physicians[7], has evolved the curriculum to incorporate *e*-Learning material. Studies across diverse disciplines have established the benefits of *e*-Learning modules[1,2,3]; however, the field of microbiology is lacking *e*-resources tailored for post-graduate studies. To address the challenges of virtual and hybrid delivery format due the time of COVID-19 pandemic restriction, we created a comprehensive "map" of microbiology causative agents to provide a systematic supplemental guide for a content on infectious disease administered in second year of School of Medicine (SOM).

Summary of work: Aim 1: To evaluate user engagement of microbiology digital media resources (*MedMicroMaps*, pathogenesis animation, Case-Based Guides).

Aim 2: To collect qualitative and quantitative feedback from study participants on individual utilization of digital media resources and self-reported impact on mastery of the course material. Students in Term 4 Spring 2022 (*n*=865) in hybrid delivery format were provided link to Microbiology Digital Media Resources website hosted on SGU Digication webserver, via QR code announcement during first live lecture of infectious disease system module. Case-Based Guide to *MedMicroMaps* were hosted as live Zoom session and recorded on Panopto. A link to Feedback Survey in Qualtrics was provided to students enrolled in Term 5 via Course email announcement on SGU Sakai server.

Results: User uptake showed 498 and 244 QR code scans for 1st and 2nd system modules, respectively, with reduction in QR scans for subsequent modules (less than 50). User engagement on the Digication website indicated 1000+ views per module per month for Terms 4 and Terms 5, with increased viewing the weekend prior to the module. After the final infectious disease module, 79 students (9.1% response rate) completed the Qualtrics survey. Majority of the responses indicated Extremely Satisfied (65%, *n*=52) or Somewhat Satisfied (21.25%, *n*=17) to "Rate your overall satisfaction with the Microbiology digital study resources". When prompted for specific utilization of the *MedMicroMap*, students ranked Exam Preparation highest (71.4%, *n*=50), followed by used with Practice Questions (57.4%, *n*=43). User engagement of Case-Based Guide to *MedMicroMaps* indicted higher usage of recorded session the weekend after posting (44%, *n*=35) as compared to attending live session (34.1%, *n*=27).

Take home message: We conclude that the provide resources were collectively beneficial to students during time of hybrid lecture delivery format.

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Presentation 18

Use of virtual reality to teach rural veterinary practice skills to DVM students in the professional veterinary program at Texas A&M University

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Background: At the same time that demographics are reflecting a declining number of students from rural backgrounds a need exists for veterinarians to serve rural communities. Students from non-rural backgrounds have an interest in rural medicine yet lack experience with livestock and conditions specific to rural communities. Therefore, educators must prepare students for the challenges and rewards of rural practice.
Summary of work: Fifty-six third year veterinary students enrolled in a rural practice elective were used. Virtual reality (VR) was used in four modules – Rural Practice Culture, Animal Behavior, Judicious Use of Antimicrobials, and Field Necropsy techniques. Students were surveyed on the usefulness of VR, their learning preferences, and overall experience with VR.
Results: Fifty-seven percent of students rated their overall experience with VR as good or very good. Sixty-five percent agreed or strongly agreed that VR helped them learn rural practice concepts. Sixty-two percent agreed or strongly agreed that VR will be important in the future of veterinary education. When given the option of using VR or traditional video for learning field necropsy techniques 100% of students preferred the traditional video. Common reasons given for VR dissatisfaction were motion sickness and blurry images.
Take home message: The majority of students reported a positive outcome following the use of VR. Challenges exist with motion sickness and image quality. Solutions may include limiting the time students are in the VR environment and using higher quality viewers. Further research is needed to improve the user experience and to report learning outcomes following VR use.

Presentation 19

Anatomage® table: it's future in veterinary anatomy education

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Background – Traditional pedagogy in veterinary anatomy requires many dog and cat cadavers, well ventilated laboratory space for dissection, and large cold rooms for storage. Exposure to the fixatives, such as formaldehyde, is one of the major concerns. To overcome these issues, virtual anatomy learning tools are being implemented in medical and veterinary education worldwide.
Summary of work - The Anatomage® Table with "TableEDU 5.0" virtual anatomy software was purchased at St. Georges University, School of Veterinary Medicine, with the primary aim to reduce the formaldehyde exposure, by reducing the number of cadavers used for dissection; and provide the newest technology to the students with a view to enhancing learning in veterinary anatomy. The Anatomage® Table allows virtual dissection of the dog and cat with a 3-dimensional view of the organs and body systems. The models are reconstructed from CT image data. The Anatomage® table was used for delivery of teaching material in spring 2020 in carnivore anatomy course.
Results – Student perspectives on the usefulness of the Anatomage® Table in teaching Veterinary Anatomy have been assessed in an ad-hoc manner through daily interactions of the teachers with the

students while working with the Anatomage® Table. Overall, the feedback on the use of the table was perceived as positive.
Take home message – We believe that the Anatomage® Table can replace a considerable amount of cadaver dissection. Further improvement in image quality and an increase in the number of animal models is required for its effective use in veterinary schools.

Presentation 20

MyCoachVet: an online strategic learning resource for SGU veterinary students

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Background: *MyCoachVet* is an online resource designed to help SGU Veterinary students develop as proactive, self-regulated learners. The intent is to assist these students to understand the efficacy of their current learning strategies and address any areas of concern. Considering the demanding learning needs of professional school, this self-reflective process is deemed critical by medical educators (1). Unfortunately, there is a lack of published evidence that professional schools are successfully helping students become effective self-regulated learners (1,3). Some key concerns are that when learning strategy advice is provided, it's generic and not always professional school/content specific. Another issue is that several veterinary schools, including St. George's University, are moving to a flipped classroom model where students are required to be more self-regulated learners (2, 3).
Summary of work: Primarily designed for entering veterinary students, *MyCoachVet* allows learners to identify areas of challenge through a series of self-directed questions. Specific strategies are identified among topics such as time management and memorizing. Embedded throughout are basic, one-topic, tipsheets and video clips. Students may also utilize the more directed and integrated "Coach Me" feature, which focuses on the process of applying evidence-based learning strategies to the medical education context.
New students are encouraged to explore *MyCoachVet* during orientation. Once on *MyCoachVet* students can also navigate using a convenient, clickable, site map.
Results & Take home message: This short communication session will explore *MyCoachVet* as well as review detailed qualitative feedback from students who have utilized this resource. There will be a focus on how *MyCoachVet* was developed and evolved.
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Presentation 21

Use of cognitive task analysis to create a teaching tool for ultrasound pregnancy diagnosis in the bitch

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Background: Training with ultrasound models has been shown to reduce task time and technical failures, with even short, simulated sessions making large improvements in ability.[1,2] Cognitive task analysis (CTA) has been used to develop teaching protocols previously in many sectors.[3] Experts are recorded completing a task while asking them to describe the details of each step. Recordings are analysed to determine the key steps and formatted into a procedural list.
Summary of work: We used CTA to derive a teaching protocol using a model developed at the University of Surrey. The aim was to create a list of procedural steps which were easy to follow for novice students in practical classes and open access revision areas.
Seven expert veterinary surgeons with experience of pregnancy were recruited. Each, following familiarisation with the model, were asked to perform the tasks involved in pregnancy diagnosis while

'talking aloud'. Participants were filmed, and audio transcripts created. Analysis led to the creation of a list of procedural steps. Experts at a panel meeting discussed and agreed on a final procedure.
Results: The video analysis and expert panel meeting resulted in 23 steps to complete the procedure. These comprised three stages; set up, pregnancy identification and estimation of gestational age. This 'gold-standard' protocol was made into a clinical skills document.
Take home message: CTA can be used to create a teaching protocol allowing students to have detailed instructions to practice in a safe environment. Although consensus was reached, not all experts said or did every step which was agreed on the final protocol.
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Presentation 22

Optimizing learning: evaluation of feedback methods during skills training

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Background: Feedback has been shown to be one of the most powerful and effective influences on student achievement however the optimal method for providing feedback to students during veterinary skills training has yet to be determined.
Summary of work: A prospective study was undertaken to evaluate student confidence and outcomes with varying sources of feedback during skills training on a simulation model. Forty students naïve to IV catheter placement were randomly assigned to either self-directed or instructor-directed feedback groups. A questionnaire containing 14 questions with a 5 point Likert scale ranking self-confidence related to knowledge and skill associated with IV catheter placement was completed at the start and completion of the study. Students in the self-directed group performed the skill with access to video recording for self-assessment. An expert provided feedback to students in the instructor-directed group. Final performance of the skill was captured via video capture to permit evaluation using a 30-point scale by a blinded observer. Data were analyzed using Mann-Whitney, Wilcox Sign Rank and Wilcoxon tests and $P<0.05$ was considered significant.
Results: Questionnaire scores were higher in the post-questionnaire with a significant change in the scores for 12 of the 14 questions in both groups of students. Students assigned to the instructor-directed group had a significantly higher score on the skill performance compared to students in the self-directed group ($P<0.05$).
Take home message: Self-reported confidence in knowledge and skill related to IV catheterization technique improved irrespective of feedback method however skill performance was superior with instructor-directed feedback.

Presentation 23

Piloting an interprofessional, skills and case-based project at University College Dublin's School of Veterinary Medicine

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Background: A pilot IPE event using a skills and case-based approach utilising communication skills, ensuring each participant knows and understands the abilities and roles of the profession in each team and ultimately improve teamwork and patient care through simulation based learning (Tierney 2011).
Summary of work: Four final year veterinary medicine (MVB) and veterinary nursing (SVN) students participated. A simulated patient was developed allowing both professions to contribute. Following an ice-breaker, a Talking Wall (Parsell 1998) was used. Both professions outlined their perception of treatment and the role of the other profession in that treatment. Following this, groups swapped lists,

edited, clarified and discussed areas of uncertainty. A pre-brief was performed and the skills/case-based session lasted 90 minutes. A debrief and short survey was completed afterwards.
Results: Talking Wall results showed 75% had the same level of respect for the other profession while 25% had a new found respect. This 25% represented MVB students only. Results from the case-based simulation showed 50% had a better understanding of the other professions role in patient care – 75% of MVB students stated better understanding while 25% of SVNs stated better understanding.
Take home message: All participants enjoyed the Talking Walls. All enjoyed working through the case-based simulation with the other profession and found the other profession complemented their approach. Working through the case-based simulation provided more insight, respect and better understanding of the other profession. All participants strongly agreed they would like a similar IPE approach during their studies, ideally before working together in final year.

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Abstracts: Posters

Poster 1

Development of a model for bovine proximal paravertebral block

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Background: Using models to simulate common procedures in veterinary practice is necessary to allow students repeated practice, enhancing their understanding of the procedure and competency. At the Ontario Veterinary College, it was determined that students had limited opportunities to develop their mastery of the bovine proximal paravertebral block commonly used for standing surgery in cattle (rumenotomy, caesarian).

Summary of work: Using the mounted skeleton (T12-S3) of a mature Holstein cow, silicone, force resistive sensors and Arduino boards; a model was developed to enhance learning. Four force resistive sensors representing the paravertebral nerves were embedded in silicone and placed under the appropriate spaces between the lateral processes of T 13-L1, L1-L2, L2-L3 and L3-L4 on the left side of the spine. Vinyl and varying thickness of silicone, representing a dairy or beef cow was laid over the spinal processes. Cloth was draped over the model to mimic a cow and to hide all the visible landmarks.

Results: The learners digitally palpate the space between the spinal processes and advance a 9 cm spinal needle into the model. Correct placement and depth of the needle is detected by the sensor and is rewarded with both a light and an audible 'moo' when the sensor is triggered, providing the learner with feedback in a self-directed learning environment.

Take home message: Preliminary tests involving approximately 120 2nd year students learning this block resulted in a positive experience for the learner and a robust model.

Poster 2

Teaching green in Grenada: repurposing for educational advancement

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Background: The School of Veterinary Medicine at St. George's University is known for its superior clinical preparedness of our students. There are several hands-on didactic laboratories, as well as a multitude of student club wet labs. However, there is a very limited population of live animals to use for laboratory teaching, often consisting of the animals owned by students and faculty who are themselves participating in the wetlab. To decrease the stress on our teaching population of animals and increase the effort to 'go green', many educators have developed teaching models from refuse. The island of Grenada has no official programs for recycling, and only one landfill that is almost to maximum capacity. By using unwanted items and creative ingenuity, many successful and effective teaching models have been developed.

Summary of work: Models created include a chest tap model, blocked feline, biopsy/foreign body retrieval models for endoscopy, and a canine rectal model, which assists students in learning to palpate. Components included a toilet paper tube, a condom to mimic mucosal tissues, anal sacs, rubber bands and a plastic doll's gluteal region for the prostate. Advanced models have been developed with beads representing tumors.

Results: Students were able to obtain a clear visualization of what to encounter during an exam on a live animal, increasing preparedness and student engagement.

Take home message: Thinking creatively while utilizing readily available materials to educate can lead to effective teaching tools, eliminate purchasing expensive models, and decrease stress on animals.

Poster 3

Development of a simple marble ophthalmology model

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Background: Learning and practicing novel skills in physical examination labs using live animals can be challenging, particularly during evaluation of more sensitive areas such as the eyes.Student education in clinical skills is important, and humane use of animals must be kept in the forefront. (1) Commercial simulation models are available, but can be quite expensive (2)This model provides a representation of the eye. The goal is not to identify abnormal findings or evaluate for disease, but to gain familiarity with ophthalmoscope manipulation, procedure, and self-awareness for proper performance of ophthalmological evaluation.Students will then have familiarity with utilization of the ophthalmoscope and positioning in relation to the patient before performing the examination on the live animal, thus allowing a more comfortable experience for the animal and a more worthwhile learning experience for the student.

Summary of work: This model is constructed with a marble and glitter, and mounted using PVC elbow on a wooden board. Student feedback is via verbal communication and survey.

Results: Student response to the model has been overall positive, results from student feedback will be discussed

Take home message: Through the use of this simulated ophthalmological model, students are able to practice ophthalmoscopic techniques multiple times at their own pace, thus solidifying their skills prior to examination of the live animal. This results in improved student learning and decreased discomfort of the animal.

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Poster 4

Equine forelimb simulation model

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Background: One of the clinical skills that our veterinary students must perform is the safe handling of the equine forelimb in order to clean out the hoof (hoof picking skills) and then to hold the limb in such a way that hoof testers can be applied. This requires the student to run their hand down the palmar surface of the limb, pick up the limb and place it between their thighs in order to have their hands free to apply the hoof testers. This is a skill that causes some stress to non-equine oriented students and has the potential to be a dangerous maneuver depending on the confidence of the student and the temperament of the animal. In testing situations (OSCEs (Objective Structured Clinical Examination)), it is impractical to use a live animal to demonstrate these skills due to the number of students to be tested. These reasons became the rationale for the development of the EFS model, which was constructed to flex in the same manner as a live horse forelimb and would allow students to practice the above-mentioned skills to gain confidence and ability.

Summary of work: The construct is a wooden hinged "bony column" attached to a barrel on a stand with cotton padding over-top and a Davis horse boot as the horse foot. Both the barrel and limb are covered in black cotton fabric. Rubber molding has been applied to simulate the frog and a shoe placed as would be on a live horse.

Take home message: This model allows safe practice of the techniques required to assess the equine foot.

Poster 5

Development and validation of a bovine castration model and rubric

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Background: Veterinary students require deliberate practice to reach competence in surgical bovine castration, but animal availability limits opportunities for practice. We sought to create and validate a surgical bovine castration model consisting of a molded silicone scrotum and testicles used with a scoring rubric in a veterinary clinical skills course.
Summary of Work: Third year veterinary students (n = 19) who had never castrated a bovine were randomized into two groups. The traditionally trained group (T) castrated a live bull calf after attending a 50-minute instructional lecture. The model-trained group (M) received the same lecture and a two-hour clinical skills session practicing bovine castration using the model. All students were subsequently digitally recorded while castrating a live bull calf. Performance recordings were scored by a blinded investigator. Survey data was collected from the students and expert veterinarians testing the model (n = 8).
Results: Survey feedback from both groups was overall positive. Students in group M had higher performance scores than students in group T (M group mean 80.6; T group 68.2; P=0.005). Reliability of rubric scores was adequate at 0.74. There was no difference in surgical time (M group mean 4.5 min; T group 5.5 min; P=0.12). Survey feedback indicated that the model was considered useful by experts and students.
Take home message: Training on a bovine castration model improved students' performance scores, providing evidence for validation of the model and rubric. The bovine castration model and rubric appear valid for use in teaching and evaluating veterinary students' skill.
Acknowledgment: The authors would like to acknowledge the helpful assistance of LMU-CVM model builder Bill Collingsworth for his critical assistance in constructing the bovine castration model.

Poster 6

Development of large animal specific suture pads

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Background: Teaching core surgical skills to veterinary students is essential to prepare new graduates for day one competency. The use of simulators is increasingly prevalent due to ethical considerations, costs and decreased availability of live animals or cadavers[1]. Many simulators do not mirror the unique challenges of performing surgery on large animals. This poster describes the development of two bovine-specific suture simulators (standing flank skin closure and uterine closure).
Summary of work: Models were prepared with materials to simulate bovine tissues. For the skin closure model floor mats were glued to fake leather fabric to imitate bovine skin. The uterine suture model was prepared using a stretchy cotton/lycra mix. The materials were attached to custom made frames (2x2 feet?) that were suspended upright to simulate standing surgery. Students had the opportunity to practice Ford interlocking, near-far-far-near, inverted cruciate and the Utrecht uterine suture patterns on the respective models.
Results: The models were used in the newly developed Production Animal Medicine and Surgery selective for 6th term SGU SVM students. Students had access to written and video instructions of the suture patterns and a faculty member demonstrated them in the lab session. Students' dexterity in handling surgical instruments and performing the suture patterns in a vertical position improved over the duration of the session. Informal interrogation of students during and after the session was positive with all students agreeing that the models helped improve their suturing skills.
Take home message: Simple inexpensive models can be developed to mimic large animal core surgical skills and improve student dexterity and confidence.

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Poster 7

Small bowel simulator for surgery training

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Background: Small bowel surgery is often performed in first opinion small animal veterinary practice, and it is important that all veterinary surgeons have the necessary skills for this procedure.Students are typically trained in this kind of surgery using cadavers or preserved body parts. In Brazil access to suitable cadavers for surgical training is limited. (1,2,3) As an alternative to cadavers we created a small bowel simulator with mesenteric vessels and an abdominal cavity to allow enterotomy training in dogs and cats.

Summary of work: The abdominal cavity was created using a polyester pot with its inner side painted red, and its top covered with a 3-layer silicon pad to simulate skin, subcutaneous tissues and abdominal muscle. A silicon tube and latex membrane with false red vessels simulating a small bowel portion with mesentery was glued to the bottom of the pot. The choice of materials was based on the characteristics needed to mimic the incision steps, suture resistance, and requirement to be able to perform the saline solution test to check the integrity of the bowel suture.

Results: The bowel simulator was useful to perform enterotomy training, with appropriate saline testing after enterorrhaphy.

Take home message: The bowel simulator gives students appropriate training for enterotomy surgery without the use of cadavers.

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Poster 8

Development of a low-cost, low-fidelity surgical simulator to teach feline castration

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Background: Training veterinary students to perform castration and ovariohysterectomy is of great importance. In order to become proficient, students must develop an adequate knowledge of anatomy, procedural steps, and tissue handling. Simulators allow students to get hands-on-experience in a standardized and safe environment without risk to a patient.[1,2] The purpose of this study was to develop and validate a low-cost, low fidelity feline castration simulator that could be used by veterinary students to improve surgical competence and confidence prior to live animal surgery.

Summary of work: A feline castration model was constructed using a paper plate, cotton balls, elastic bands, and examination glove. With ethics approval, 51 veterinary students from two veterinary teaching hospitals were recruited to use the model and respond to a survey that consisted of five or six 10cm visual analogue scales and six or seven short answer questions.

Results: Prior to the study, students had performed an average of 1.5 live feline castrations (range: 0-20). The mean results of the visual analogue scale (VAS) questions are shown in Table 1. All students reported that the model was beneficial with some room for improvement.

Take home message: Students reported that this model was easy to construct, could be used to acquire knowledge of the surgical steps and increased their confidence in performing feline castrations. Additionally, students reported that the model was easy to use and could be constructed at home.

Table 1. Mean VAS scores from student surveys regarding feline castration model u

Survey Question	Mean VAS score (cm)
Pre-exercise confidence	3.8
Skills can be acquired from model	8.4
Model increased user confidence	8.7
Model is easy to use	9.4
Model is easy to construct	9.3
Post-exercise confidence	7.9
Difference in pre- and post-exercise confidence	4.0

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Poster 9

The development of an ultrasound guided cystocentesis model

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Background: In the curriculum at the University of Nottingham (UON) School of Veterinary Medicine and Science (SVMS) we encourage the early years learning of basic ultrasonography with a practical hands on approach, this begins in Year 1 of the course and continues throughout. To continue this theme we want to be able to push the students onto the next level by introducing more complex tasks involving ultrasonography whilst maintaining clinical relevance.

Summary of work: Using a previously described technique for making a model of this sort I adapted the bladder shape by using a party balloon to create a void in Eco flex 30, once this is complete the balloon is removed and a thin pre-set layer of Eco flex 30 is added to cover the hole and then Eco flex gel is then used to complete the model giving a flexible and self-sealing top to scan and place needles in.

Results: The models have now been used in 2 teaching sessions and have stood up well to multiple needle insertions and have has good feedback from teachers in these sessions and student as well.

Take home message: Teaching new clinical skills does not have to look like the real thing but has to outline the skill that is needed to be learnt using recognised steps. This will mean that when done in real life the steps can be repeated.

Poster 10

Development of an ear simulator for practice of otoscopic examination

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Background: Otoscopic examination is a skill senior veterinary student struggle with and often express the need for additional opportunities to practice. It is difficulty to find good opportunities for the students to practice this skill with clinical patients.

Summary of work: Our group has recently developed a dog's ear simulator for students to practice otoscopic examinations. The simulator development starts with a 3-D printing of a skull CT from a

normal dog, the 3-D printing is then used as a mold for a silicon-based final product. A color bead is placed at the level of the tympanic membrane for the students to identify during examination, the model is placed on an IKEA dog.
At our institution, the model is used for practice of otoscopic examination during the dermatology rotation, and it is available for students training with the use of a self-guided manual in the clinical skills laboratory. In the clinical skills laboratory, the practice is intended for a pair of students to be in the role of either a “dog holder” or “examiner”.

Poster 11

The Magna Charta: a low-cost canine dental charting simulation model

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Background: The Magna Charta is a low-cost canine dental charting simulation model that allows students to develop fundamental dental charting skills. The model is a representation of the full dental arcade created with 3D printed teeth. The model includes a full set of normal adult teeth and teeth with a number of pathologies. The pathologies currently include: missing teeth, crowding, simple, slab and complicated fractures, mobile teeth, worn teeth, stage 1 and 2 furcation’s, and gingival masses.

Summary of work: To 3D print the teeth, a micro CT scan was obtained from a canine cadaver specimen. The CT data was processed using Mimics by Materialise software to create 3D models of all 42 teeth of the canine arcade. Tinkercad software was used to create the pathologies. The teeth were 3D printed, fitted with a magnet, and displayed in a hinged metal box. Using a combination of different teeth results in a multitude of different simulated patients for students to chart. The models were designed to be used with pairs of students, one student sets up the Magna Charta based on instruction cards. Students swap Magna Charta boxes and chart the model using the Ohio State University Veterinary Medical Center dental charting form. Students pull from a bank of instruction cards that have been developed with different levels of complexity. In addition, students can develop their own set of pathologies for added challenges.

Results: Student performance data is being collected and will presented.

Poster 12

Dental extraction model: a low-cost canine dental extraction simulation model

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Background: The Dental Extraction model is a low-cost modular simulation that allows students to develop and practice fundamental dental extraction skills. Historically at the Ohio State University of Veterinary Medicine, students use canine cadavers for the dental extraction teaching lab. However, cadavers are becoming more difficult to source and can only be used once during the lab excluding any possibility for students to practice the skill outside lab time. The model allows students to perform flaps, section teeth and use elevators to extract teeth

Summary of work: The model includes a 3D printed maxilla and mandible base and modular inserts. The modular inserts are created using dense expandable foam simulating bone, resin 3D printed teeth including all teeth except for incisors. The skull and the teeth were created using micro-CT data. The periodontal ligament is made of silicone glue and the gum is made of Ecoflex silicone with power mesh.

Take home message: The modular approach allows students to quickly and easily replace the inserts for additional practice or to set up for the next student. Advantages include easy storage, multiple uses and multiple pathologies can be included.

Poster 13

Flexible foam asepsis models

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Background: A flexible foam model was created as an anatomically correct canine ventral body awall model in which students can practice surgical aseptic prep for spay and neuter surgeries. Historically, the Ohio State University College of Veterinary Medicine has used a silicone suturing pad attached to

an IKEA dog lacking anatomical landmarks and leading to deficiencies in student preparation. Additionally, significant wear was caused by th use of towel clamps.
Summary of work: The foal model was developed by first creating a lifecast from both a male and female canine cadaver using layers of Bodydouble Silk by Smooth-on and casting material. The lifecast mold and cast shell were then used as a form to pour FlexFoam-iT! 17. Grommets are added to the corners of the castings so that the models can be mounted on IKEA dogs or other stuffed animals.
Results: The models include important surgical landmarks, hold up well to both cleaning chemicals and towel clamps used in draping and have been used in teaching labs and OSCEs with great durability and minimal wear. The foam models also have the advantage of creating sufficient resistance for placing towel clamps whereas the silicone pads were too soft and forced students to use excess force to place the clamp.
Take home message: Lastly, this is a very cost-efficient model.

Poster 14

Utilizing flipped classroom for a simulation laboratory to teach lifelong learning of clinical skills
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Background: Self-directed lifelong learning is a crucial skill for success as a veterinarian, an AVMA clinical competency and RCVS day-1 competence.[1-2] However, there is a lack of evidence on how to teach this valuable skill.[3] Flipped classroom and simulation clinical skills teaching could effectively teach self-directed learning, while students gain confidence in a low-stakes simulation environment.[4-5]
Summary of work: Thirty year 3 (term 6) students enrolled in an emergency medicine course participated in a simulation laboratory for placing central venous catheters. In preparation, students completed a flipped classroom lesson consisting of an article, instructional video, and a short quiz. In the lab, students worked in pairs, utilizing model veins and donated MILA catheter kits. A student "expert" was identified (an experienced vet tech), and students helped each other perform the procedure. The student "expert" was consulted as needed. An instructor was present for safety but did not demonstrate the procedure.
Results: All 30 students successfully performed the skill in the time allotted via self-directed, peer-led, experiential learning, with no guidance by the instructor. In the low-stakes simulation environment, students learned the assigned skill and gained confidence in their ability to successfully perform a new procedure in a self-taught manner, without being shown by an instructor directly.
Take-home message: The design of this lesson models multiple best practices for simulation model teaching, including flipped classroom design, peer teaching, collaborative and experiential learning, and the low-stakes environment of a simulation laboratory.
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Poster 15

Virtual necropsy: an interactive simulated learning experience for veterinary students to prepare for postmortem examinations

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Background: Consistent availability of fresh animal tissues used for the training of students in gross pathology can be a limiting factor in veterinary education. The aim of this study is to evaluate a simulated learning activity designed to provide second-year veterinary students with contextual practice for postmortem investigations.

Summary of work: Students were provided with two computer-based virtual necropsy cases that required approximately one hour for completion. Assignments were created and completed within the TopHat® teaching software and each case contained dialogue, images, and formative assessment items with immediate feedback in the form of multiple-choice questions, short answer, and target identification. For short answer questions, students were requested to compose a concise morphologic diagnosis for an observed lesion. Interactive lessons included clinical history, physical exam findings, laboratory data, prognostic variables, and postmortem findings. Students were surveyed immediately upon completion of the virtual necropsy lesson.

Results: Student survey data indicated that the assignment was beneficial for learning gross pathology with 88.7% favorable responses. Additionally, the data indicated that the assignment was helpful for understanding disease pathogenesis (79.2%) and practicing the concept of morphologic diagnosis (92.5%). Finally, 81.1% of students responded that they would like to receive more of this type of learning experience in their veterinary education.

Take home message: Interactive simulated learning activities focused on necropsy are an effective approach for teaching gross pathology, pathogenesis, and morphological diagnosis. This type of simulation does not replace the importance of hands-on necropsy training that every veterinary student should receive, but it can provide additional helpful practice opportunities. This is particularly important if there are limited animal resources and/or limited necropsy cases in certain species available year-round.

Poster 16

Designing a structured approach to support flipped classroom learning in a clinical skills program

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Background: A new curriculum is being implemented at the Ohio State University College of Veterinary Medicine that aligns with a competency-based framework. Core course threads are designed to promote lifelong learning and prepare students academically, clinically, and professionally. The Clinical Skills curriculum utilizes the flipped classroom model to optimize contact time with instructors during laboratory sessions. Students review pre-laboratory content that introduces them to foundational knowledge associated with hands-on skills to be practiced in lab.

Summary of work: A stream-lined process for clinical skills content creation and delivery was developed and implemented for all laboratory sessions to ensure consistency and clarity and support student learning. Learning objectives and content for pre-laboratory materials were developed to guide novice learners and outline expectations. Laboratory manuals focused on the skills students would be performing during synchronous instruction. Lesson plans were created to ensure that the student learning experience was uniform across all sessions.

Results: Preliminary feedback from students regarding the course design and delivery is positive. It was noted that the flipped classroom had 'ample resources for student success', ensured lab time was for 'practicing' skills rather than learning or reviewing content', and 'focusing' on technique and getting questions answered rather than spending time learning how to do 'the skills'.

Take-home message: A flipped classroom model supports clinical skills instruction, allowing deeper learning of hands-on skills and more opportunities for feedback during synchronous instruction. To ensure its success, instructors must design their content in a way that outlines expectations and enables self-directed learning.

Poster 17

Playful learning trial in learning comparative anatomy

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Background: The aim of the study was to evaluate the usefulness of playful learning with use of crossword puzzles, colouring and labelling as a learning tool in the subject of anatomy at the level of undergraduate veterinary curriculum.

Summary of work: The survey was presented to all first-year students from the School of Veterinary Medicine, in the 2019–2020 academic period. After a Topographical Anatomy Practical, practical evaluation form was handed out to students. Out of 144 students, 125 completed half a page survey. %98 of the students that completed the survey said that they think having think having playful learning tools beneficial to their understanding of anatomy. Breakdown of common responses are presented in the below table.

Most common student responses	n
Enjotable way to learn	34
Consolidating knowledge whilst having fun	34
Great for visual learners	21
Promeotes interaction with peers and tutors	18
Allows to think differently	6
any other	10
It wasn't useful	2

Take home message: This preliminary study showed that that studying challenging subjects like comparative veterinary anatomy with the use of crossword puzzles, colourings and labelling's has proved to be an effective way of learning.

This session helped to create an environment for active learning, a process that motivates the students and increase their interest in the topic, which contributed towards the positive learning experience as perceived by the students in this study. Most of our students also agreed that crossword puzzles promoted peer discussion and that they would like to have more puzzles to be used in future teaching. Most students also positively commented to the background music.

Poster 18

Digitisation of practical examinations in veterinary undergraduate training

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Background: *Innovation* is one of the core values at Surrey Veterinary School, and as part of that we strive to constantly improve and modernise the way we do things. In 2018, we trialled digitisation of practical examinations and have successfully used Liftupp software to achieve this in subsequent years.

Summary of work: Checklists for objective structured clinical examinations (OSCEs) and other similar modes of assessment can be easily uploaded into a web-based portal and examinations can be scheduled in appropriate formats. A bank of OSCE rubrics is created for future use, or copies can be edited if the changes to the existing OSCE are minor.

Marking for OSCEs can then take place on Apple iPads, with little user training required. The potential for missing data is reduced, as indicators allow the examiner to know if marking is incomplete. Feedback can be added at the time by the assessor, which is stored on the iPad and automatically uploaded to a database when within Wi-Fi range.

Results: Results are collated over the day, meaning that analysis can be rapid. Data can be downloaded for a group of students over one or several days at any point, and enables a swift turnaround of results with little room for human administrative error. Students wanting to access

their results can do so easily, through the construct of an answer template, which can be emailed to review with their tutor.
Take home message: Digitisation of practical examinations has been received positively by students and academic staff.

Poster 19

Reflections and responses in clinical skills teaching and assessment to COVID-19: a global survey
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Background: Clinical skills are traditionally taught face-to-face with a focus on hands-on learning and are often assessed using OSCEs or DOPS. The COVID-19 pandemic forced institutions to adjust their teaching and assessment. This project investigated how veterinary schools adapted clinical skills teaching and assessment, and identified key innovations that will progress clinical skills teaching in the future.
Summary of work: An online survey was developed and disseminated using QuestionPro. The survey was written in English, and translated into French, Spanish and Chinese to encourage international participation. Data were analyzed descriptively and using thematic analysis.
Results: Responses came from 91 institutions from 48 countries in six continents. During COVID-19, most institutions (70.3%) used a combination of face-to-face and synchronous online classes. We identified three themes for beneficial changes to clinical skills teaching that will be kept – smaller group sizes where feasible, the use of the flipped classroom and sending equipment home for students to practice with. During COVID-19, 86.8% of institutions made changes to clinical skills assessments. The use of videos for assessments was a theme identified as a benefit that institutions would like to keep.
Take home messages: A shift to student-led learning via wider use of the flipped classroom, smaller group sizes and using videos for self-assessment are changes made during COVID-19 that were beneficial for clinical skills teaching and assessment, and these should be taken forward. Many challenges were experienced by teaching staff, including a high workload. These challenges are potential barriers to implementing change in the future.

Poster 20

Cardiac anatomy: assessment of the augmented reality education program IVALA and association with spatial awareness
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Background: Anatomy is the foundation of medical education regardless of species, specialty or geographic location. Specifically, cardiac anatomy is vital to understanding circulatory function, physiology, and disease. It is not uncommon for veterinary students at Ross University School of Veterinary Medicine (RUSVM) to complain about the challenges of understanding the anatomy of the heart. This should not be surprising, considering the complexities of cardiac anatomy are often difficult for even professional medical physicians to comprehend. Further complicating the study of anatomy is the general decline in academic resources made available by administration, and an overall decrease in credit hours dedicated to the field.
Summary of work: These facts drive exploration of new methods to facilitate learning about the heart and stimulates several questions. A cohort of Pre-veterinary participants (N=74) were test subjects in a double blinded, prospective study in effort to answer the following questions: Can Augmented Reality (AR) assist cardiac anatomy education? To what extent will students utilize this new technology? Is there a benefit to the utilization of AR learning compared to traditional study methods? Finally, is there a relationship between a student's spatial ability and with anatomic and augmented reality learning?
Results: Post experience survey data indicated that the IVALA© AR program was preferred over the other resources
Take home message: The fidelity, accuracy and use friendliness of IVALA© AR Heart program were reported to be consistently pleasing.

Poster 21

Teaching veterinary students how to perform lumbosacral epidural anesthesia in the dog using a combination of augmented reality (AR) and 3D printing

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Background: The goal of this simulation was to integrate the tactile experience of performing lumbosacral epidural anesthesia in the dog with a lifelike visualization of a dog positioned in sternal recumbency.

Summary of work: To provide a realistic tactile experience a CT scan of a dog was used to 3D print a 1:1 scale model of the pelvis, sacrum and L-7 and L-6 vertebra. Rubber tubing was inserted in the vertebral canal of the 3D printed model and can be attached to a source of vacuum to simulate the negative pressure present in the epidural space when pierced by an epidural needle. Liquid latex was added to the model to simulate the consistency of the ligament Flavum and artificial rubber skin was used to cover the model. A dog under general anesthesia and correctly positioned to receive an epidural injection was scanned and rendered in 3D using a Lidar camera allowing the resulting image to be viewed using an AR headset.

Results: Students learning how to perform epidural anesthesia would wear the AR headset to visualize the dog rendered in 3D, with the 3D printed model aligned with the image of the dog. Students upon reaching to feel the anatomical landmarks, would get the tactile feedback form the 3D printed model.

Take home message: Students will be able to learn landmarks and tactile feedback of those landmarks while fully immersed in a realistic simulated environment.

Poster 22

Reflections on a clinical skills journey: From a box in an office to the Educational Development Centre

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Background: Clinical skills laboratories (CSL) are excellent facilities for supporting student learning. A decade ago, our first CSL opened in a repurposed large animal operating theatre and integration of teaching and assessment into the curriculum began. The aim was to transform student skill development and their preparedness for workplace learning (extramural studies), rotations and graduation.

Summary of work: We started with a few models in a box in an office and have progressed to a multi-building 'Educational Development Centre' with a wide range of models and dedicated facilities for teaching animal handling and clinical skills and for running OSCE circuits. A lot has been learned along the way, leading to identification of best practices and improvements in teaching. Regular feedback has been gathered from students, instructors, and employers, and the CSL team have undertaken and published research studies.

Results: Top tips include having lots of space (more is always needed, especially for storage); using models that are cost-effective, multi-use and sustainable; having heavy equipment on wheels (e.g. large models, tables). An enthusiastic team has been crucial to success, in particular the skilled technical team who teach, assess, make models and create instruction booklets and flipped classroom resources to support student learning. Embedding a clinical skills theme throughout the curriculum has allowed students to practice skills on models in preparation for live animal experiences.

Take home message: A well-designed clinical skills laboratory, associated learning resources and curriculum-wide teaching and assessment will enhance student clinical skill acquisition. And have fun, we have!

Poster 23

A low-cost simulation model for teaching transrectal reproductive ultrasonography

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Background: Growing evidence suggests that simulation models facilitate student learning of clinical skills. However, the high cost of commercial simulation models can be a limiting factor. Home-made models offer a practical solution to this problem. This poster describes the development of a low-cost simulation model for teaching transrectal reproductive ultrasonography.

Summary of work: The simulation model consisted of a plastic storage box (40x55x33 cm) filled with water. Three rubber balloons, filled with either air or water or water and a toy cow were submerged in the box and scanned using a portable machine designed for transrectal ultrasonography in large animals. The idea was to demonstrate echotextures of different organs that are commonly observed during this procedure. For instance, the balloon filled with water simulated urinary bladder, an anatomical landmark for ultrasonography of the reproductive tract, and the balloon filled with water and the toy cow simulated amniotic vesicle, a definitive sign of pregnancy.

Results: The model was used in the Theriogenology course taught in Term 5 of the DVM curriculum. The technique was demonstrated by a faculty member at the beginning of the laboratory session. Each student had an opportunity to practice the skill on the model and later in the term on a live cow. A faculty member was available to supervise and assist in learning, if required. An anonymous, informal, clicker-based survey of students indicated that the model effectively facilitated their learning of transrectal reproductive ultrasonography.

Take home message: A low-cost and home-made simulation model successfully facilitated learning of transrectal reproductive ultrasonography by veterinary students.

Poster 24

Delivering a surgical skills practical supported by student created videos

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Background: Veterinary medicine students at the University of Cambridge rotate around ten different small group practical (SGP) teaching sessions per term during their clinical years. A 'surgical skills' themed session was reviewed and revamped following the 2019 delivery. Recent graduates had expressed concern for a lack of opportunity to practice small animal neutering procedures.

Summary of work: A three-hour SGP teaching session, for up to ten students was hosted in the small animal clinical skills centre and facilitated by a suitably qualified member of the clinical skills team. Each week a group of students were provided with the materials to build their own *SimSpay* model (Langebæk *et al*, 2015) at home before bringing to the SGP. Students were able to practice a range of surgical skills within a case-based scenario simulation. Videos were created by final year students in support of neutering the *SimSpay* model and for placing different encircling ligatures. Students accessed the resources using a smart device and worked through the surgery at their own pace, with guidance from the facilitator. Students were encouraged to complete an optional anonymous electronic evaluation questionnaire and the results of the last two years were reviewed.

Results: A 22% annual response rate was received. 89% strongly agreed that the SGP provided opportunities to practice and enhance their skills. Free text comments identified the videos, practicing surgical instrument dexterity and placing ligatures as the valuable aspects of the SGP. Students also reported that they would have liked longer with the model.

Take home message: Peer to peer video instruction allows the facilitator time and space to provide more focused individual instruction during the simulation.

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