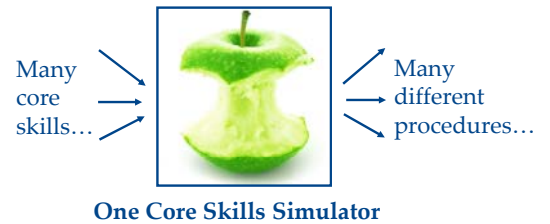


A Haptic Game-Based Learning Environment to Teach Veterinary Students Manual Skills

The Core Skills Simulator

- Most existing simulators provide training that is specific to a single procedure.
- An alternative approach is being taken by developing a single simulator to teach core palpation skills that act as the 'building blocks' for many different procedures.
- The simulator provides a series of virtual reality games using haptic (touch) technology enabling the player to feel a virtual 3D environment.

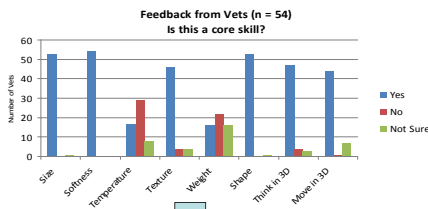


Level 1: Core Skills Games

First, players learn core manual skills that are common to many procedures...

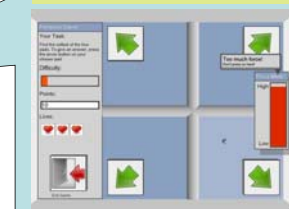
Identifying the Core Skills

- Gathered information from clinicians using interviews and questionnaires.



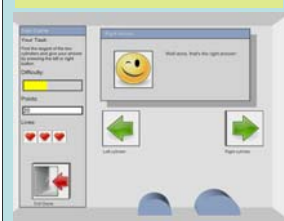
Many more: Texture, Shape, 3D Movement...

Softness Game



- Judging softness is used to identify types of lump e.g. abscess, cyst or tumour
- Force / pressure gauge encourages a **safe & effective** technique.

Size Game



- Feeling size differences is important when comparing normal organs with diseased e.g. prostate, liver, etc...
- Judging size is important for the diagnosis of pregnancy in the cow and other species.

Force Game



- The skills are taught using games to engage the current generation of learners.
- Many metaphors are borrowed from computer games:
 - Winning points / Losing lives
 - Levels of difficulty (adaptive, evolving & challenging)

Level 2: Procedural Simulations

Completing the core skills games unlocks procedural simulations that place the skills in context...

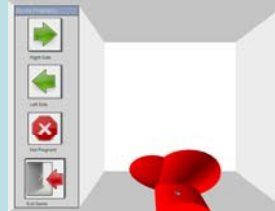
e.g...

Cat Simulator



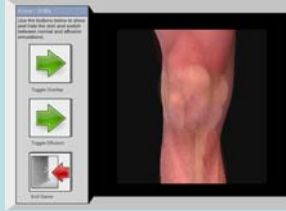
- Student practises palpating the feline abdomen.
- Uses Core Skills: Size, Softness, Texture and more.

Cow Simulator



- Student practises diagnosing pregnancy in the cow.
- Uses Core Skills: Size, Softness, 3D Movement and more.

Knee Simulator



- Level 2 may also be tailored for medical students as the core skills will be very similar.

Tracking Performance

- Game scores and other metrics are recorded for each student.
- These can be used to motivate students by providing high score tables.
- Tutors can also monitor students progression from novice to expert.

Player	Date	Lives	Score
Laura	06/02/08	2	250
Laura	06/02/08	2	210
Adam	06/02/08	2	210
Adam	06/02/08	2	200
Paul Shain	06/02/08	2	200
Neil	06/02/08	2	150
Neil	06/02/08	2	40
Neil	06/02/08	2	20

Delivering training for core skills in an engaging environment has potential to provide the 'building blocks' for many clinical tasks.