Using 3D Models and Virtual Reality to Foster Learning of Carcass Anatomy

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INTRODUCTION

- Challenges of teaching with fresh meats
  - Perishable
  - Costly
  - Food safety concerns
- Current classroom environment
  - Many students learn 3D spatial relationships through 2D medium
- Goal of researchers
  - Create free online library of 3D virtual animal carcass simulations

LEARNING MODES

- Multimodal learning
  - Integrates information into learning schema faster
  - Creates hybrid learning space
    - Students can study models both in and out of classroom
    - Ideal for traditional and distance education
  - Gives students control of their learning
    - Set their own pace based on their level of cognition, spatial reasoning, recognition, and recall

CREATING A MODEL

- Materials
  - High resolution Artec 3D scanner
  - High-performance computer with dedicated graphics card
  - Rotating turn table
  - Bacon comb
- Scanning
  - Place specimen on rotating table or hook (size dependent)
  - Use scanner to capture texture and geometry of anatomical object
  - Scan all faces of object
- Editing
  - Align all individual scans
  - Truncate unwanted objects or errors
  - Texture map
  - Upload to Sketchfab online database or to VR software
- Research team has created over 100 models in the last year

EXPERIMENT DESIGN

- Study participants will be students enrolled in ASCI 100 lab
  - Most participants have no prior knowledge of meat science
  - Approximately 100 students
- Total duration of experiment
  - 1.5 hours
- Evaluate using prequiz
  - Students identify labeled muscles and bones on fresh meat product
- Teach students carcass anatomy
  - The control group will use traditional 2D mediums like textbooks and videos
  - The experimental group will use 3D models and virtual reality
- Evaluate progress using post quiz
  - Identical to prequiz
- Hypothesis
  - The use of 3D models and virtual reality will improve student recognition and recall of carcass anatomy when compared to traditional teaching methods

OUR TEACHING METHODS

- Mobile phone app
  - Study retail cuts using 3D flashcards
  - Learn common name, scientific name, cooking method, original wholesale cut, and muscle and bone identification within a cut
- Sketchfab
  - Online 3D model library that includes whole carcasses, wholesale cuts, and retail cuts
  - Access to models on any device that has internet access
- Virtual Reality
  - Students can view any angle of a life sized model
  - Flashcards to learn common and scientific name of cut

NEXT STEPS

- IRB application approved on 3/7/2018
- Experiment to be completed during the Fall 2018 semester
- Models begin integration into class curriculum in Spring 2019
- Potential to expand to other curricular areas in the future