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Cut Out the Scalpel : Anxiety Reduction Before the First Dissection Experience Using Multimodal Media

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Disclosures

The authors do not endorse or recommend any commercial products, processes, or services presented in this study. The findings expressed in this study are not used for advertising or product endorsement purposes.

Background

- Anatomical dissection causes significant anxiety among matriculating medical students (Romo-Barrientos et al., 2020) that <u>must be minimized</u>.
  - "Awe, gratitude, and **fear**"
  - "**Nausea and Palpitations**"
  - "I felt very **anxious** and **uncertain**. My mind kept racing. And, of course, I felt very **sad**."
  - "I felt nervous at the **thought of possibly fainting. Looking at the faces was unnerving** as well."

- Online education increased during Covid with broad retention post-Covid.
  - Prior to Covid, some schools had already discontinued human anatomical dissection.

- Return to Gross Anatomy dissection may require integration of online activities.

- **Hypothesis**: Online activities can be developed to reduce anatomical dissection anxiety.
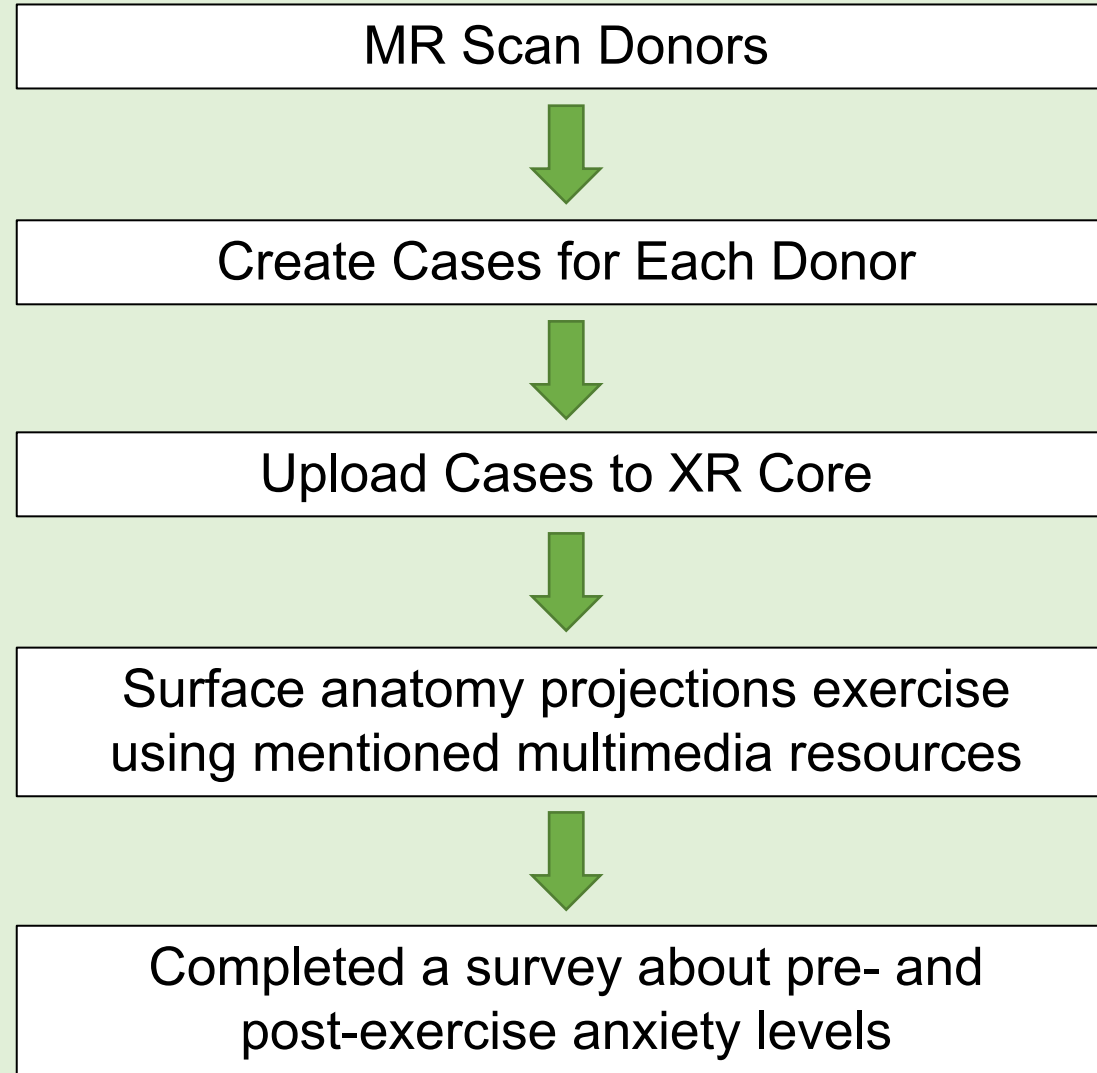
Objectives

- To reduce anxiety:

  - ***Create a case-based approach*** that personalizes and humanizes the donor.

  - Provide early and actionable exposure to magnetic resonance imaging (MRIs) **to *connect the student to the donor and create a sense of empathy***.

- Incorporate remote learning into the Gross Anatomy dissection experience.

- Motivate students to prepare prior to laboratory attendance.

Methods

MR Scan Donors

↓

Create Cases for Each Donor

↓

Upload Cases to XR Core

↓

Surface anatomy projections exercise using mentioned multimedia resources

↓

Completed a survey about pre- and post-exercise anxiety levels

Case Development

Subject

↓

Medical History

↓

Learning Objectives

↓

Exercises on Silent Teacher (review MR and observe organs, observe surface features, trace surface projections)
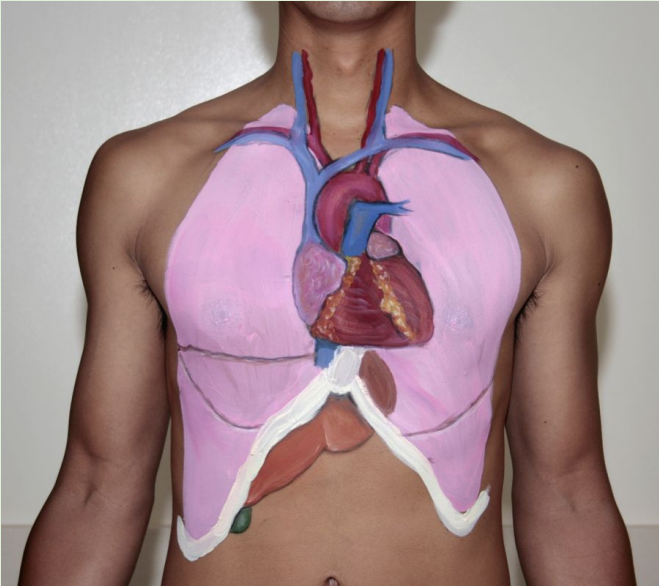
↓

Practice Questions

Online Case Access

Home   Ob/GYN   Introduction   Back   Abdomen   Head and Neck   Cases   Trial Cases   Contributors   Wiki   🔍

Case 2606   Home

Subject

90-y-o Mexican, female

Community Liason

COD: Dementia

Medical History

N/a

Learning Objectives

- Marking the surface projections of the clavicle, ribs, lungs, pleura, heart, and liver on your donor's anterior thorax wall
- Recognizing major anatomical landmarks on your donor's thorax MRI

Exercises on Silent Teacher

A. General examination

1. Visually examine the chest for the presence of a Chest tube, a Subclavian catheter, or a bulge of a subcutaneously implanted Pacemaker.
2. Look for the presence of a mid-sternal scar (indicative of surgery).
3. Palpate the right and left clavicles to where they nearly meet in the midline, at the suprasternal notch.
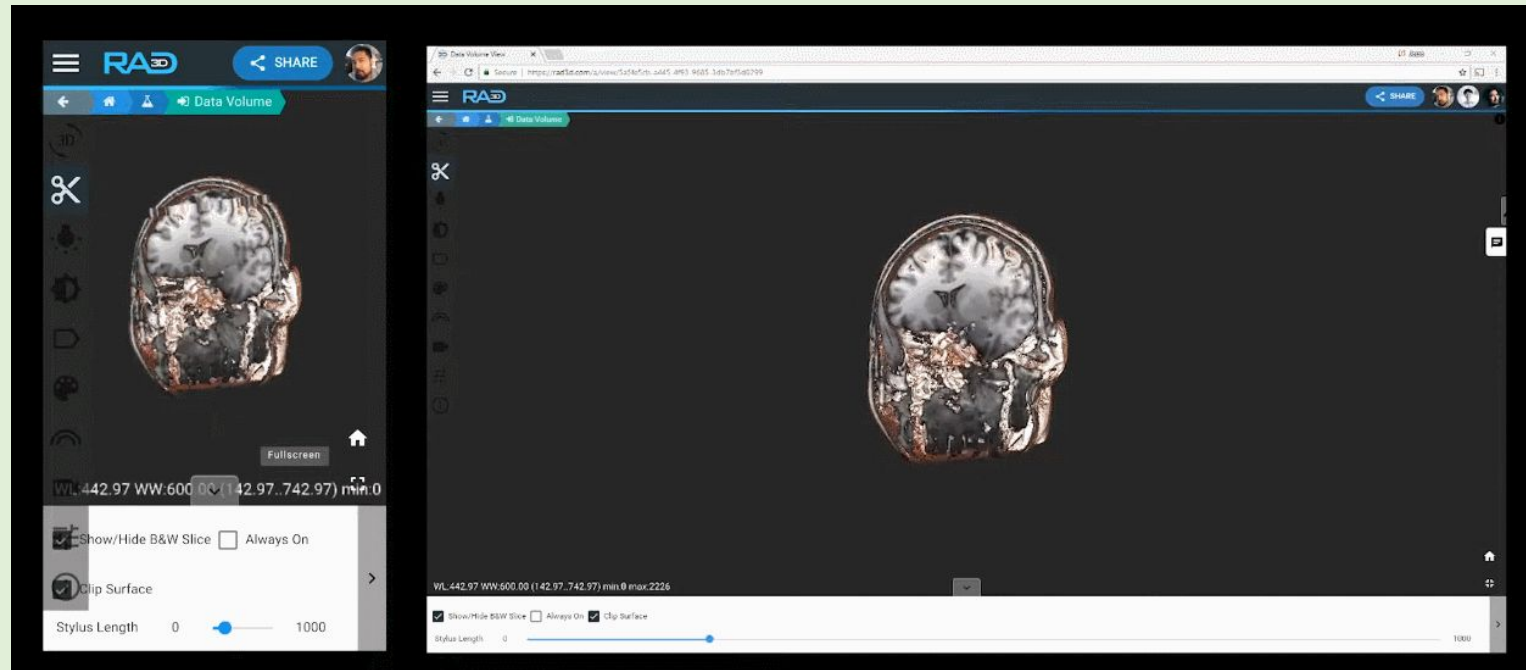
Scan me to see exercise!

In-lab visualization of Corresponding Donor

Z-space computers at each station enable students to view MR of donors with AR

Rad3D is your convenient next-gen 3D viewer for medical images.

Multimodal Media Enables Exploration without Incisions

Photogrammetry-created model of the thoracic and abdominal cavities

3D model of thoracic / upper abdominal viscera; Chilaiditi syndrome

Methods Continued

Survey Characteristics

- Respondents: 1st year medical students (Fall 2022): n=63; Response rate=81.8%.

- Experience Level
  - None (ND) n=40.
  - Some, either observed or performed (ED), n=23.

- Subsample group (n=44) reported pre/post exercise anxiety scale of 1-10 with 10 highest.

- Statistical analysis (stat sig, $p < .05$):
  - Fisher's exact test or Chi-squared test for categorical variables.
  - Wilcoxon rank sum test for continuous variables.
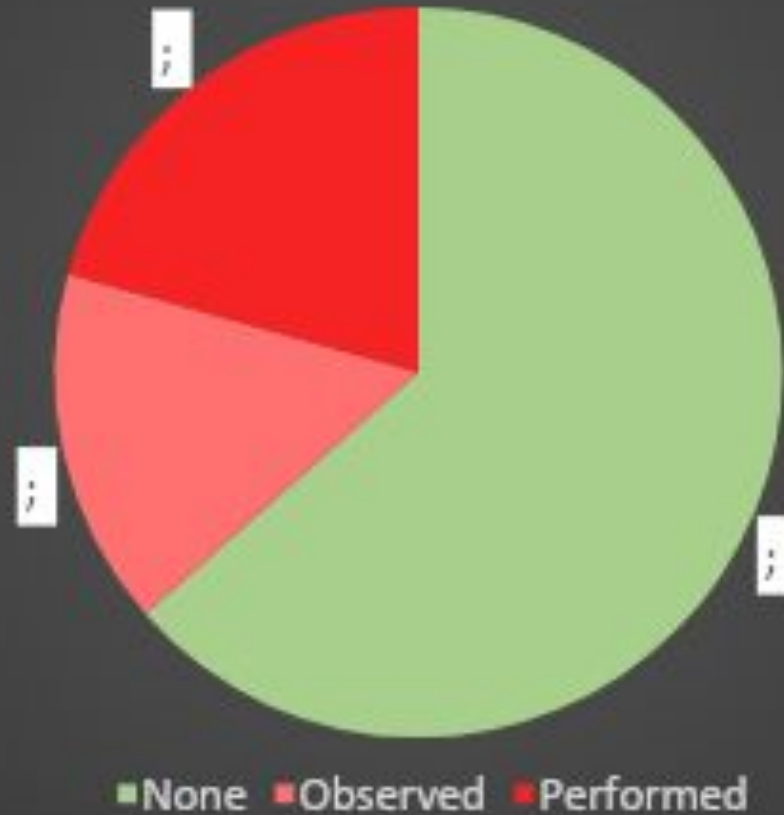 - Paired t test for pre- and post-exercise anxiety levels.

Results

Pie chart:
- Non-binary, 2%
- Male, 40%
- Female, 59%
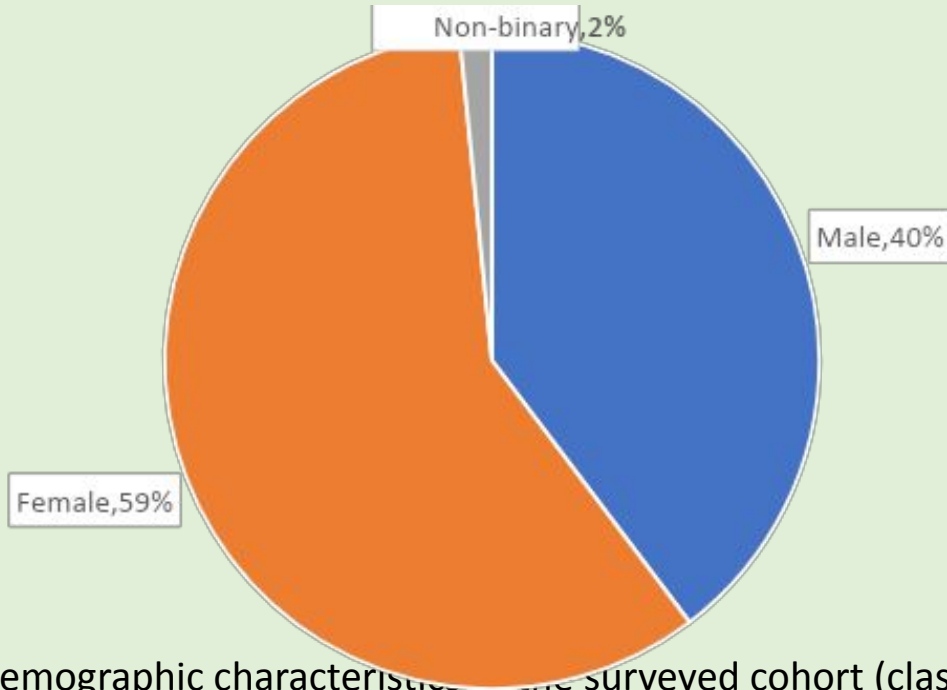
Table 1. Demographic characteristics of the surveyed cohort (class of 2026)

Age[1]	n = 63
Mean (SD)	25.3 (3.3)
Median (IQR)	24.0 (23.0, 26.0)
Range	21, 41
	[1] n (%)

Specialty of interest[1]	
Still Deciding	15 (23.8)
Internal Medicine	12 (19.0)
Emergency Medicine	4 (6.3)
Family Medicine	4 (6.3)
OB/GYN	4 (6.3)
Pediatrics	4 (6.3)
Anesthesiology or Pain Management	2 (3.2)
Dermatology	2 (3.2)
Endocrinology	2 (3.2)
Ophthalmology	2 (3.2)
Pathology	2 (3.2)
Surgery	2 (3.2)
Genetics	1 (1.6)
Cardiology	1 (1.6)
Gastroenterology	1 (1.6)
Neurosurgery	1 (1.6)
Orthopedics	1 (1.6)
Physiatry (Physical Medicine)	1 (1.6)
Psychiatry	1 (1.6)
Radiology	1 (1.6)
	[1] n (%)

Results

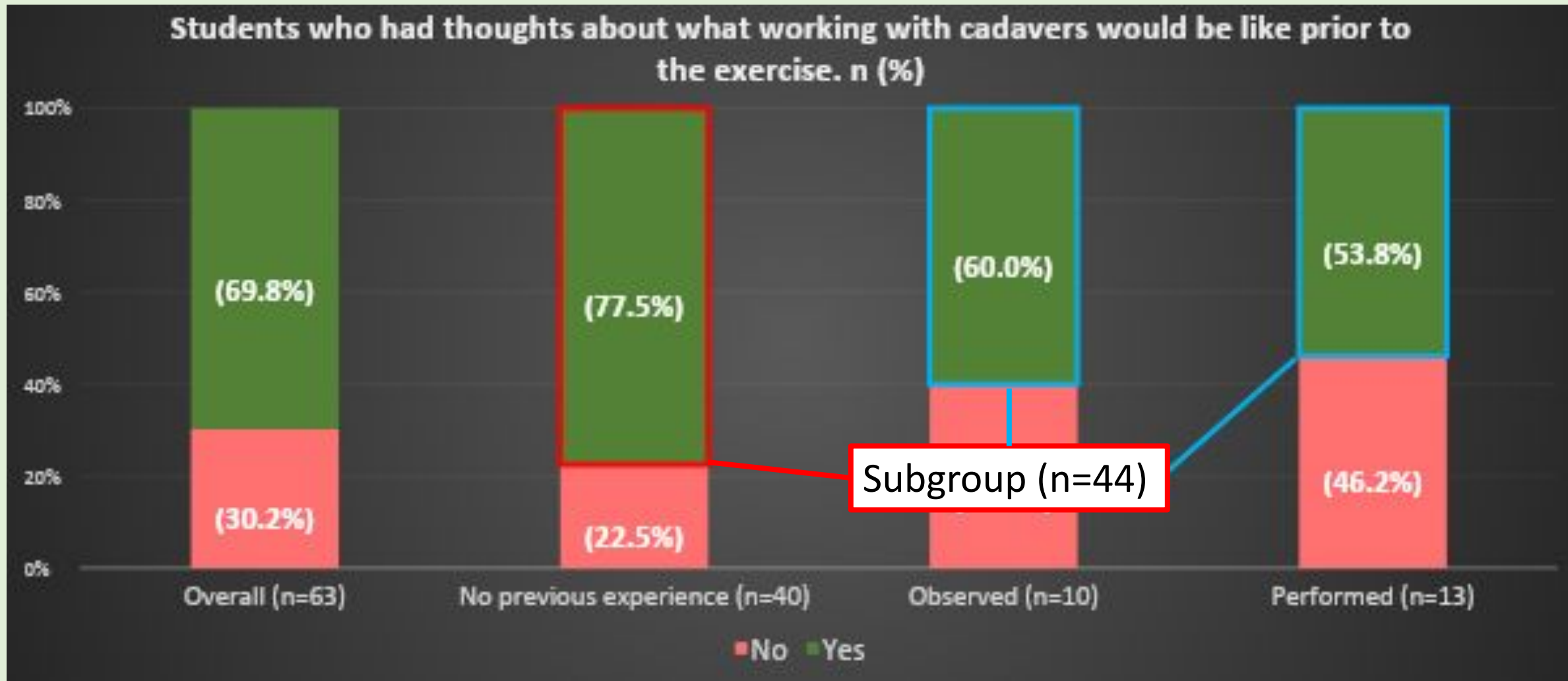What were your previous experiences in human anatomical dissection? 1

None   Observed   Performed

[1] n; (%)

Results

Students who had thoughts about what working with cadavers would be like prior to the exercise. n (%)

Results

Students who had thoughts about what working with cadavers would be like prior to the exercise. n (%)

Results

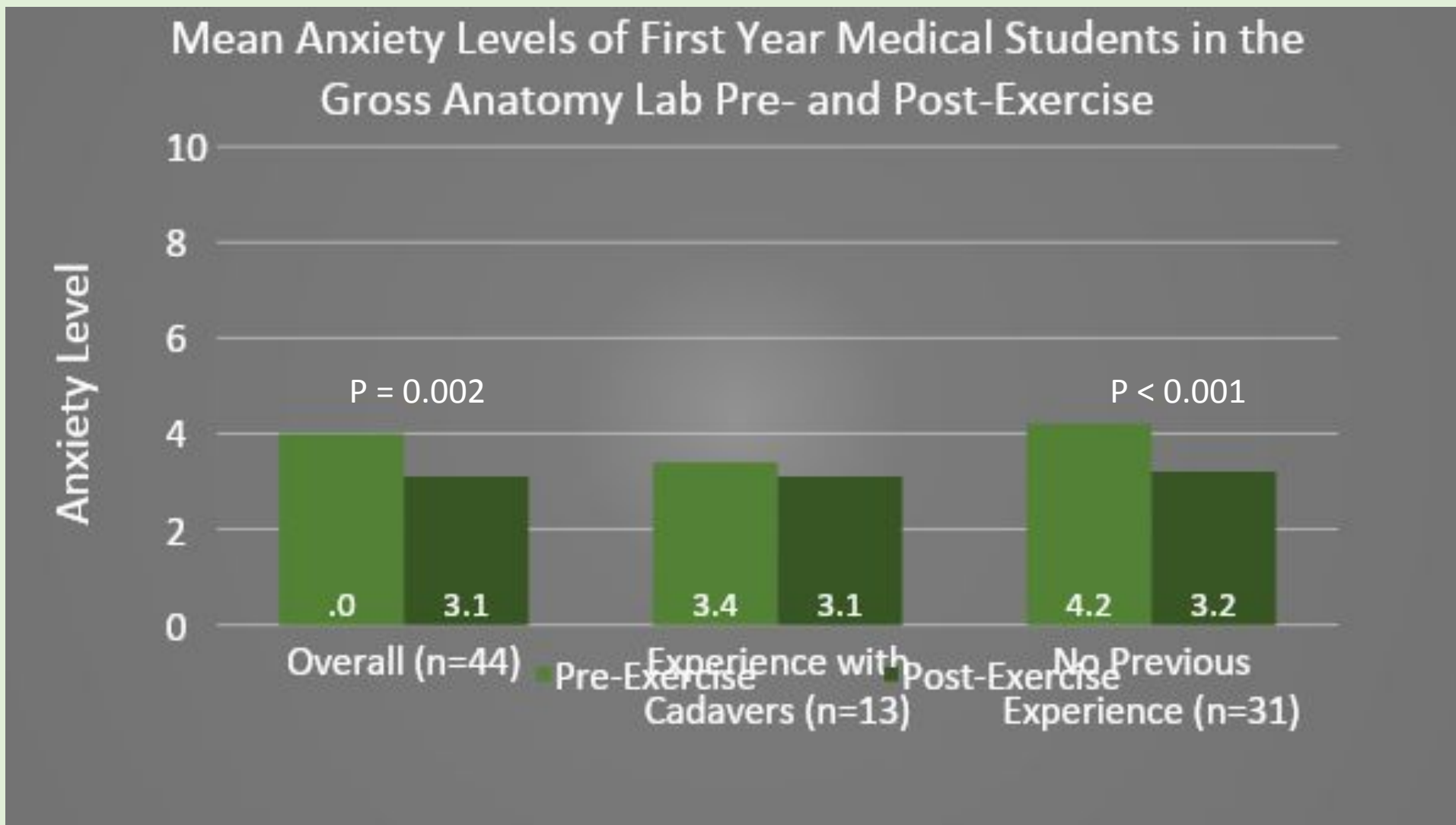Mean Anxiety Levels of First Year Medical Students in the Gross Anatomy Lab Pre- and Post-Exercise
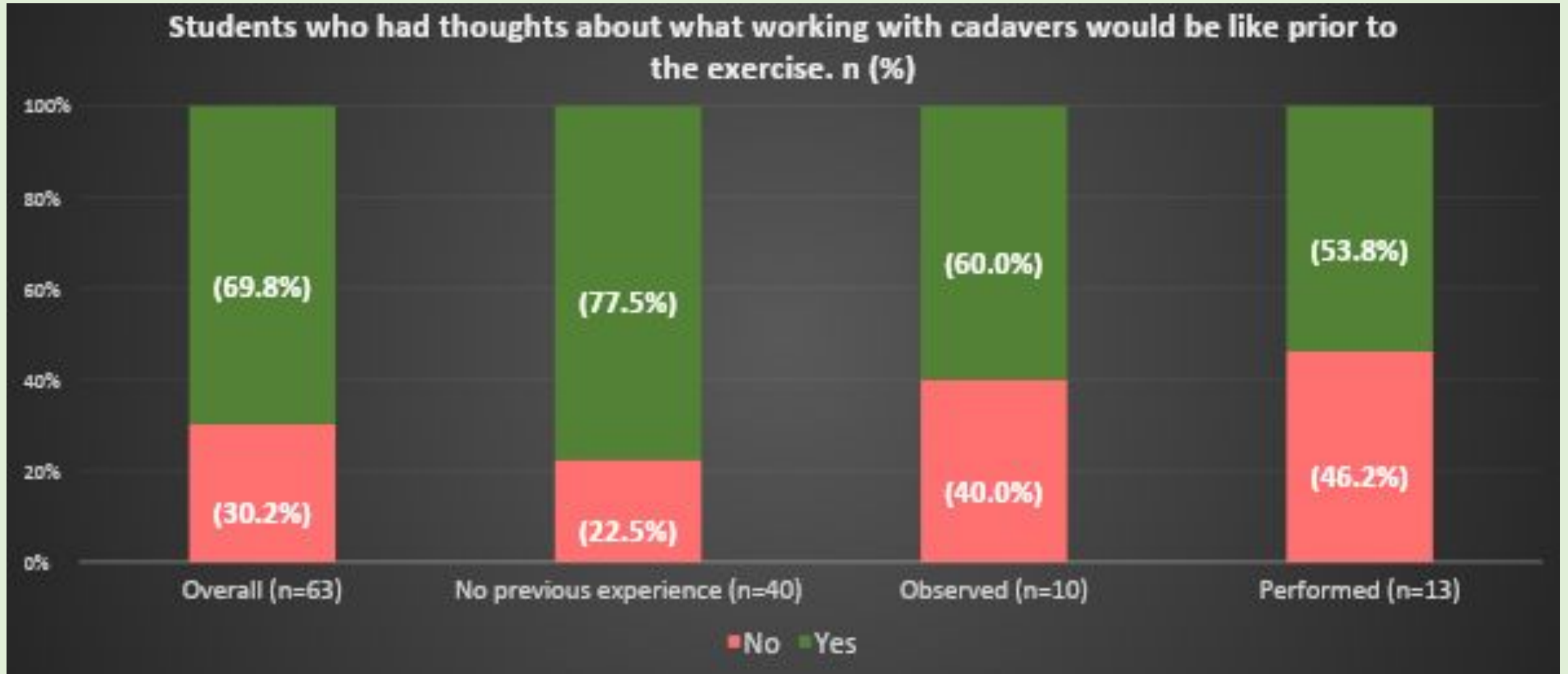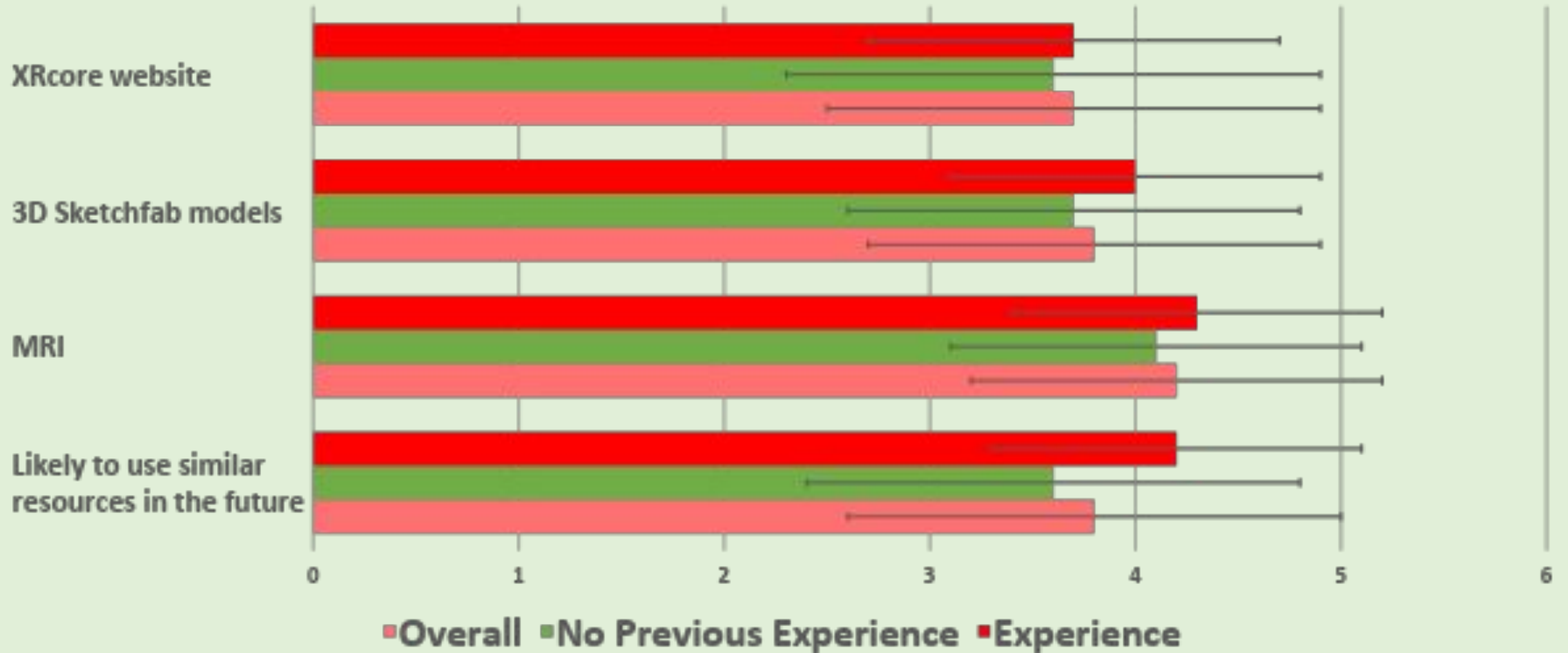
Results

Perceived Benefit of Multimedia Resources to Anatomical Education

Results

Table 2. Survey responses regarding the surveyed cohort's thoughts on the benefits of a pre-dissection exercise between the two groups.

	Overall, n = 63	No experience n = 40	Experienced n = 23	p-value[1]
The introductory session with your silent teacher prior to performing the first dissection was beneficial for your MD1 experience,[2] median (IQR)	5.0 (4.0, 5.0)	5.0 (4.0, 5.0)	5.0 (4.0, 5.0)	0.8
Did performing surface anatomy exercises on the silent teacher, e.g., outlining surface projections, helpful for initiating teamwork with your tablemates?, [2] n(%)				
No	3 (6.2)	3 (9.4)	0 (0.0)	0.5
Yes	45 (93.8)	29 (90.6)	16 (100.0)	
Missing	15	8	7	
Did the MR images provide a relevant exercise to understand spatial relationships?, n(%)				
No	3 (5.0)	2 (5.4)	1 (4.3)	>0.9
Yes	57 (95.0)	35 (94.6)	22 (95.7)	
Missing	3	3	0	

[1]P-value was obtained by Fisher's exact test or Pearson's Chi-squared test for categorical variables, and Wilcoxon rank sum test for continuous variables. [2] Likert scale (potential score 1-5: 1=Disagree 5=Agree).

Lessons Learned

More females than males; Most undecided concerning specialty, only 2 students were interested in surgery.

Majority of matriculating students lack any dissection experience.

Large majority of matriculating students contemplate their first cadaveric experience.

Pre-exercise anxiety level higher in the ND group than ED
- Significant post-exercise reduction in anxiety in the ND group
- No significant reduction in the ED group

Providing an exercise that familiarizes the students, especially those with no prior experience of human cadaveric dissection, to their cadavers decreases anxiety levels before holding a scalpel.

MRI and 3D models as complementary resources were perceived as favorable and should be continued in conjunction with gross dissection looking towards the future of anatomical education.

Limitations

- Small cohort size

- Only 1 class; difficult to generalize our findings

- Although the response rate was high, the survey was voluntary and may represent the most engaged students; may not represent the entire range of the anxiety level.

- New instruments and techniques to delivering anatomical education; room for growth and improvement

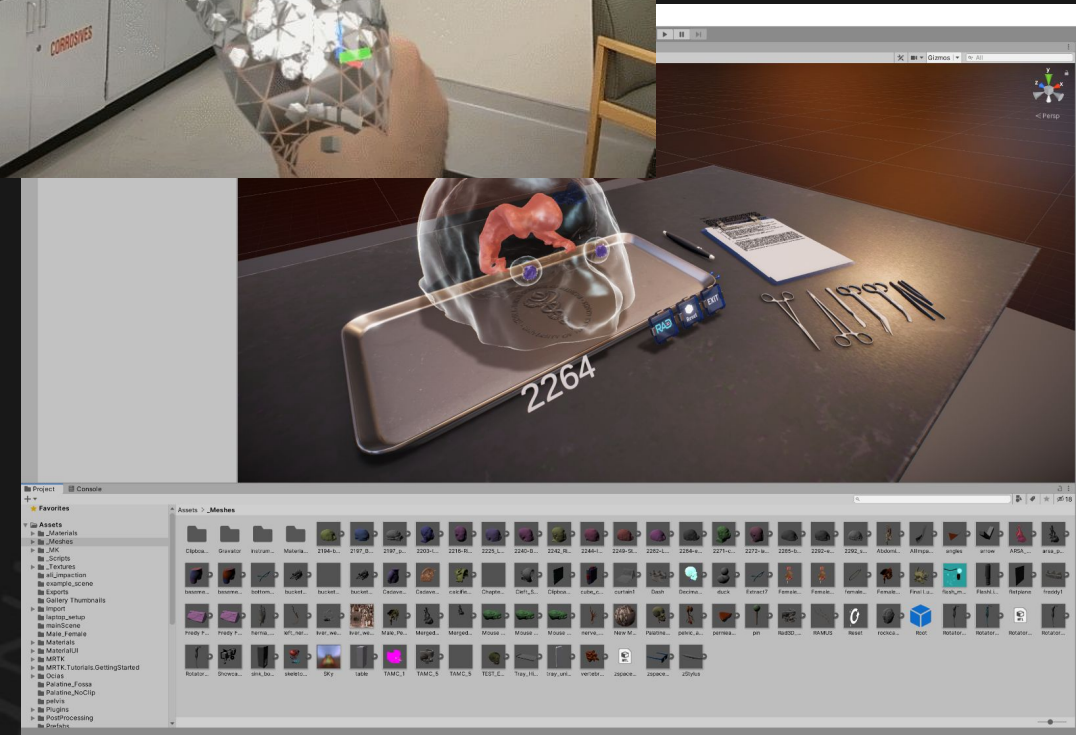- Pre- and post-exercise anxiety levels were asked/collected after students had completed the exercise; recall bias
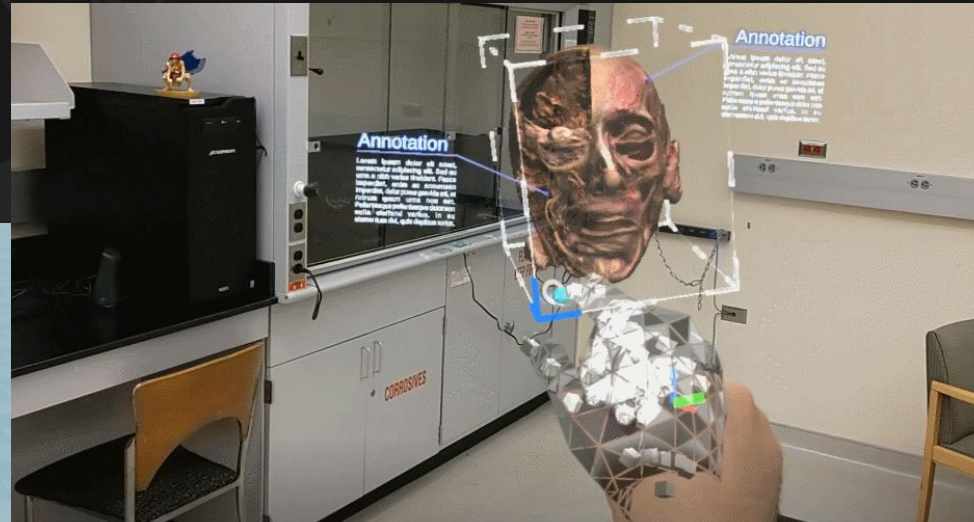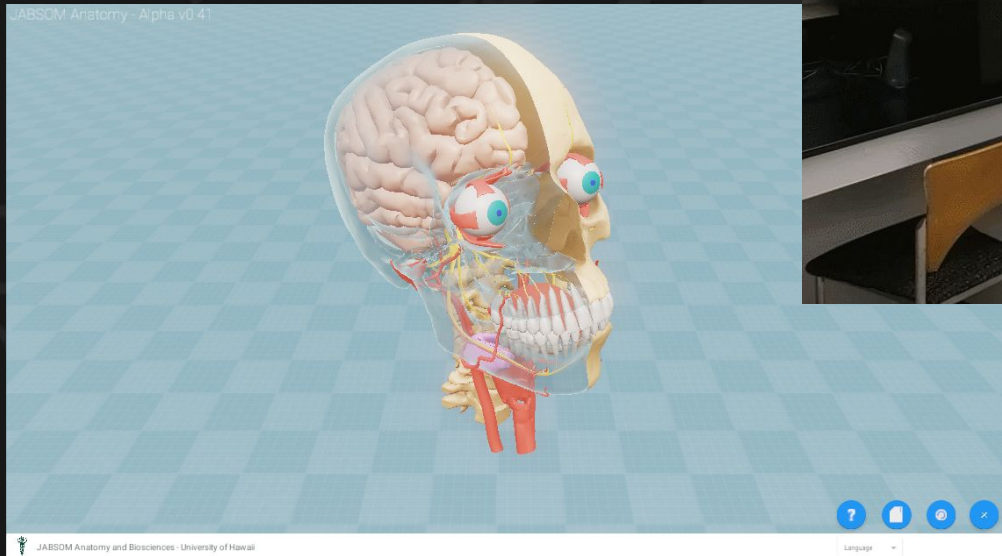
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Acknowledgements

Application Development

XR Development

- UH West Oahu
- Tripler Army Hospital
- Hawaii Pacific Health

MAXON   RealityCapture   Unity   Adobe   AUTODESK   EPIC GAMES

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