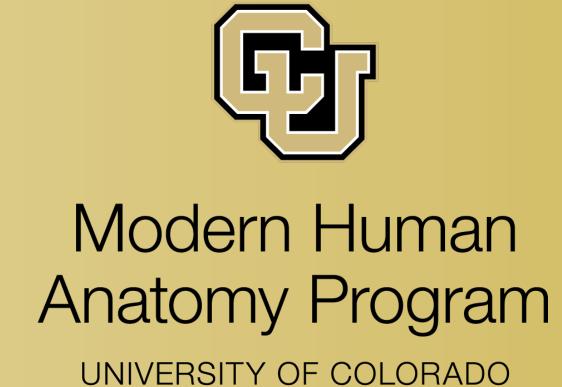


# One Does Not Simply Integrate: Assessing Integrated vs. "Silo-ed" Anatomical Sciences

Presentation in Online Learning Module Cory Buenting BS<sup>1</sup>, Janet Corral Ph.D.<sup>2</sup>, Todd Buenting<sup>3</sup>, Lisa M.J. Lee Ph.D.<sup>4</sup>

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## Introduction

- The anatomical sciences are a fundamental Figure 1: Peritoneal Cavity competency in health professional education, yet in-class hours have been drastically reduced<sup>1, 2</sup>
- There has been a substantial increase in the amount of adjunct online learning resources<sup>3</sup> Many resources lack integration, although it has
- been emphasized in medical curricular reform<sup>4</sup> Content, format, and accuracy vary as there are few evidence-based guidelines
- Student preferences have not been thoroughly evaluated to identify effective online learning module features and characteristics
- The peritoneal cavity is a historically difficult area (A) is a confined space with a for students to grasp

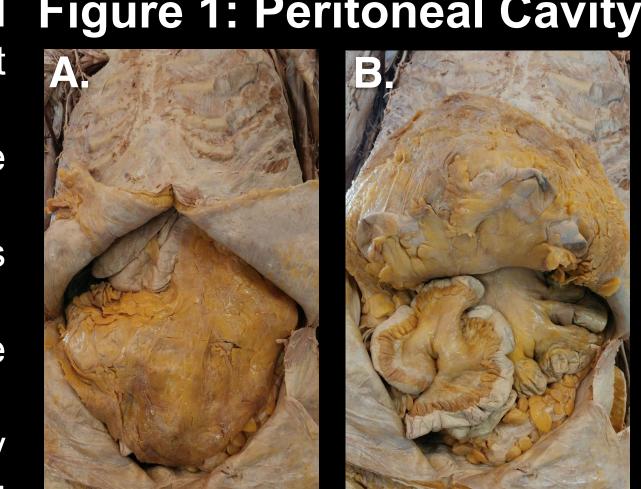


Figure 1: The peritoneal cavity number of abdominal organs (B).

Aim: To assess the educational value of two types of online resource presentation, integrated vs. discipline-based, in modules containing embryology, histology, and gross anatomy of the peritoneal cavity.

### Methods

#### **Learning Resource Development:**

Figure 2: Example of Module Content Organization B. Experimental Module A. Control Module

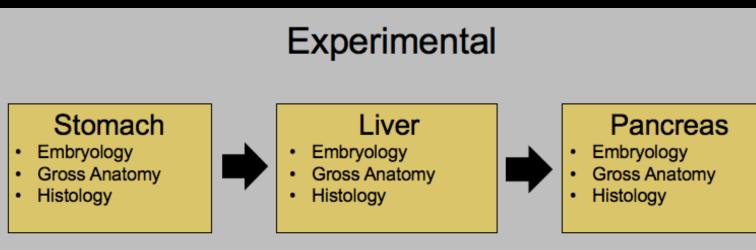


Figure 2: Two online learning modules on peritoneum were created using Articulate Storyline 360. Both contain identical embryology, histology, and gross anatomy subjects but organization differed (Figure 2). Presentation of control (A) vs. experimental (B) module content.

Figure 3: Interactive learning tools on both modules

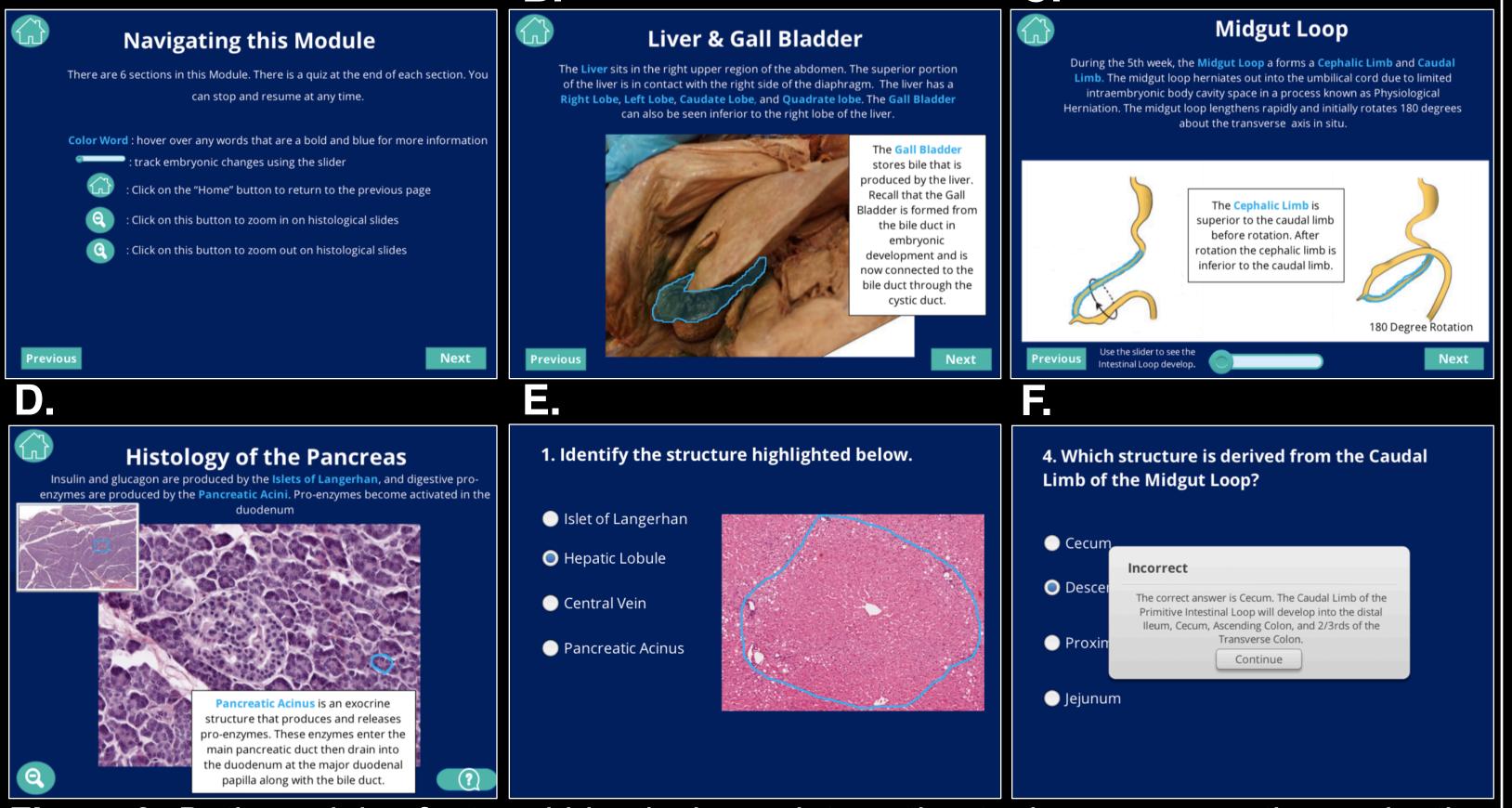
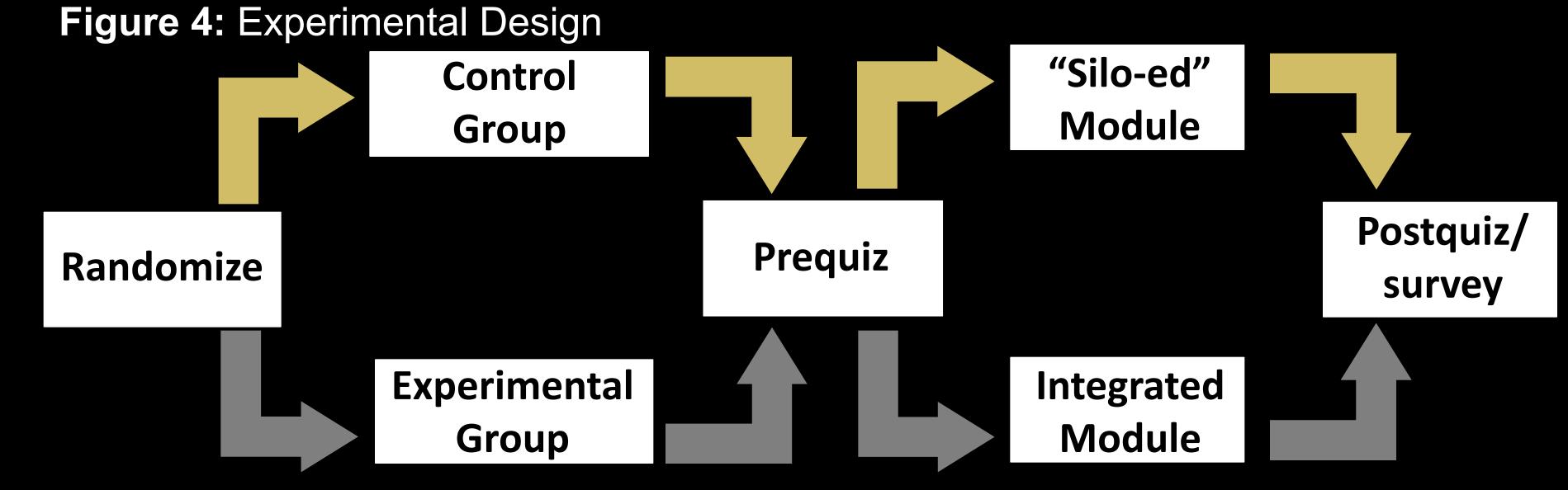


Figure 3: Both modules featured identical user interaction tools as seen on the navigation page (A), Specific features included highlight and reflect (B), magnification and highlight (C), and slider feature for time (D). Inter-module quiz questions were identical (E) and contained feedback for incorrect answers (F).

# **Experimental Design**

Experimental Design: Colorado Multiple Institutional Review Board Exemption #17-2357 (Figure 4)



■ Control (n=64)
■ Experimental (n=69)

Figure 4: Outline of the subject randomization and sequence of experimental tool exposure. After data collection, statistical analysis occurred with IBM SPSS Statistics Version 25 using Kruskall-wallis tests adjusted by Bonferonni correction and Wilcoxon Rank Sum test.

## **Quantitative Results**

Quantitative Analytics: A total of 133 first year students in their anatomical sciences courses completed the study (29 Medical, 79 dental, 26 graduate)

Figure 5: Control vs. Experimental Group Figure 6: Performances by the Cohort

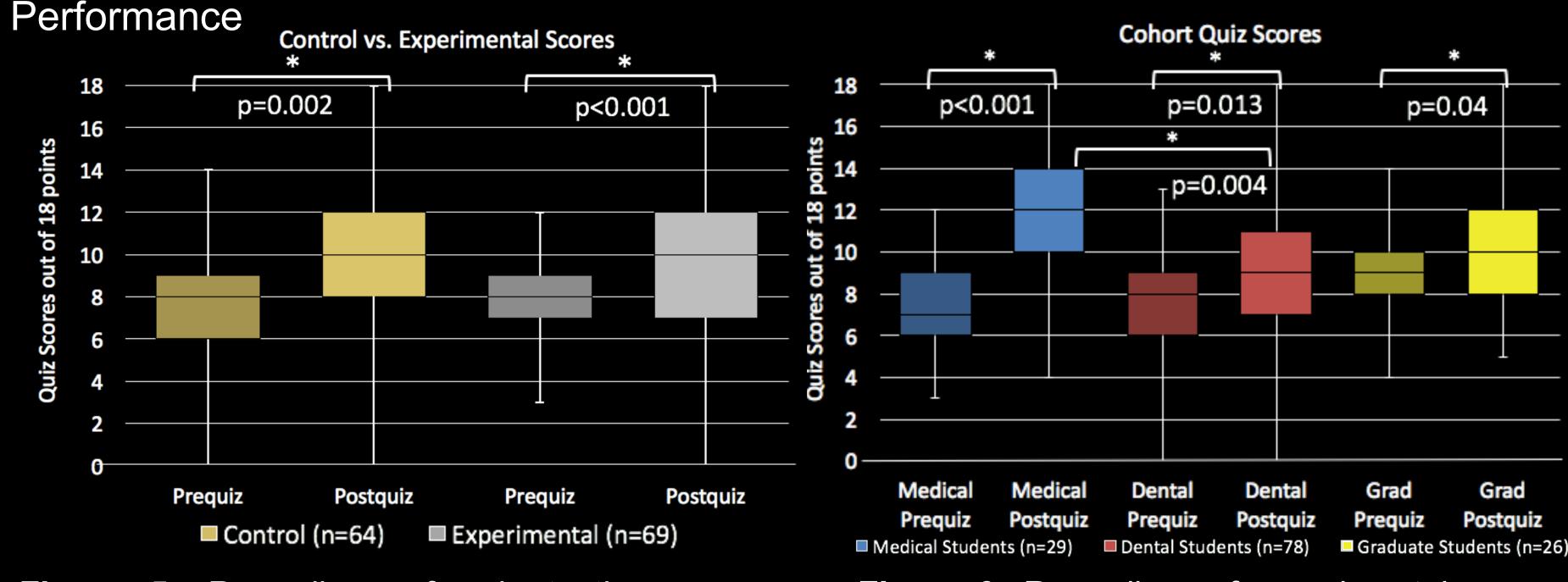


Figure 5: Regardless of cohort, there was a significant improvement from prequiz to postquiz scores in both groups. There was no difference in postquiz scores between groups.

Figure 6: Regardless of experimental group, all cohorts showed significant improvement from prequiz to postquiz, but medical postquiz scores were significantly higher than dental.

Figure 7: Likert survey response on the educational value of the modules

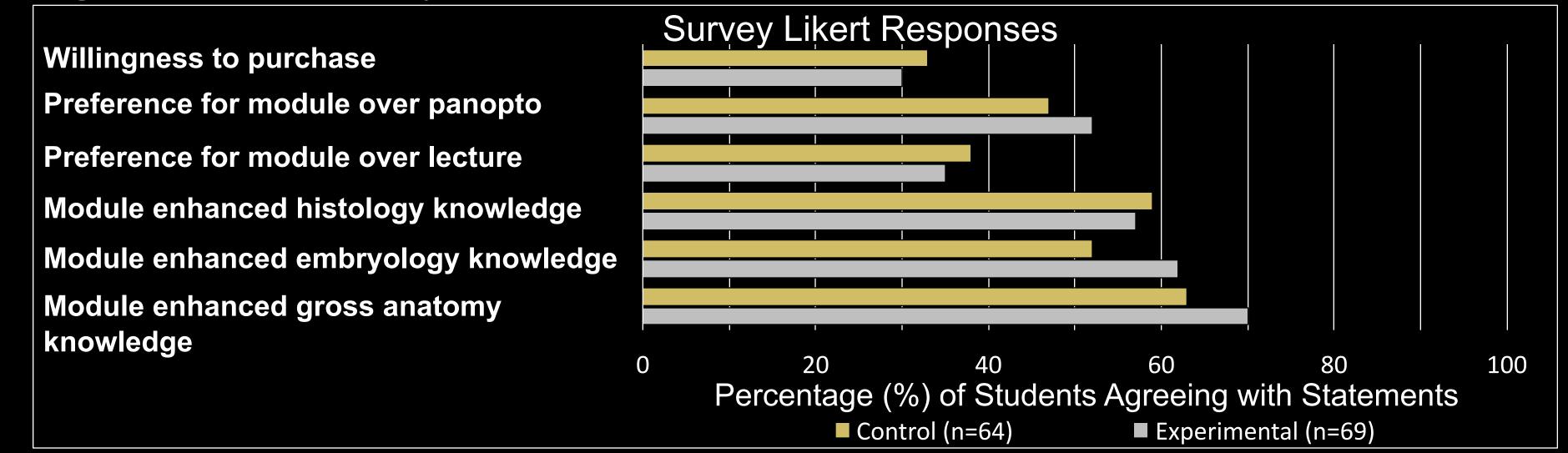


Figure 7: The percentage of participants that agreed (Likert rating of 4 or 5) with the comments stated in the survey compared across control and experimental groups.

## **Qualitative Results**

#### **Thematic Analysis of Survey Comments:**

- Both groups indicated interactive tools (the highlight and images) were positive aspects of module while the lack of video is a shortcoming (Table 1)
- Two groups differently identified other interactive features as negative (Table 1)

Table 1: Participant comments regarding module features

	Positive Feature	Negative Feature
Control	Highlight, Images, Hover	Bullets, Slider, Lack of video
Experimental	Highlight, Interactive, Images	Highlight, Hover, Lack of video, Not enough labels

Table 1: Most frequently mentioned interface tools identified in survey comments

Figure 8: Word Map of Participant Comments

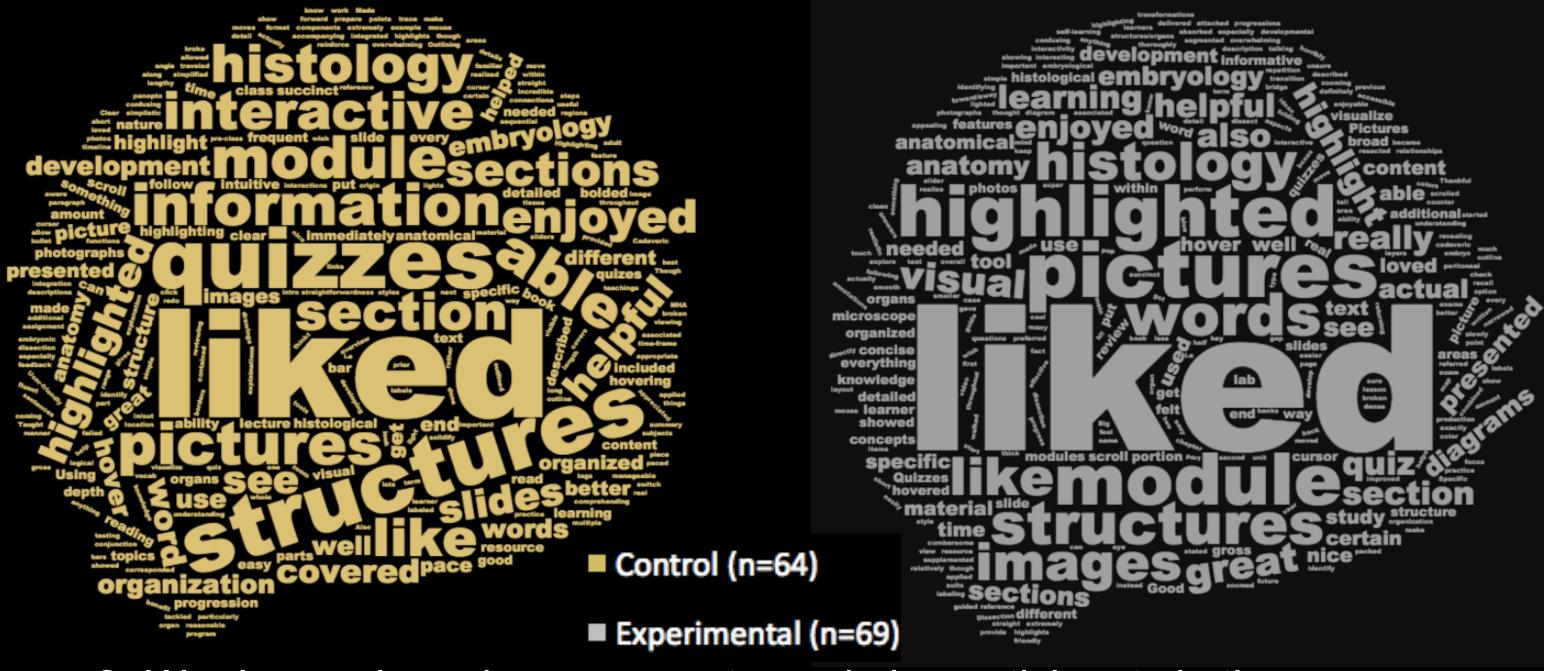


Figure 8: Word maps based on comments made by participants in the survey.

### Conclusions

- Interactive online learning modules can lead to measurable learning outcomes regardless of the content integration.
- While all participants reported the modules supported their learning, slightly more experimental group members reported the integrated module's value to be high for anatomy and embryology
- Majority of participants indicated the online modules are inadequate replacements for class lectures
- Participants in both groups highly valued some in-module interactive features
- Differences in negative comments suggest that order of content presentation may influence the effectiveness of certain in-module interactive features

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