

No Reinvention Needed – Enhanced Flipped Class Histology Curriculum Shows Usefulness of Commercial Online Course



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Abstract #
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Background

- Histology, the study of tissues, is an important component to professional and graduate education
- Histology contact hours have reduced significantly in professional health sciences curricula and adjunct online resources are becoming increasingly important
- Active learning approach such as flipped classroom has shown benefits but requires significant preparation by students to be successful
- Most effective resource for preparing students for flipped class pedagogy is still unknown

HYPOTHESIS

Graduate students who are provided access to a commercial online histology (COH) course will perform better than students given traditional preparatory resources in a histology course run on a flipped classroom curriculum

Materials & Methods

STUDY DESIGN

- In 2020, in addition to textbook reading assignments and the learning objectives, COH (DaVinci Academy, LLC) was provided to graduate students as preparatory resource in a graduate flipped histology curriculum
- In a retrospective study, learning outcomes from 2020 were compared to those from 2019, the control cohort (figure 2)
- Surveys were conducted at 2020 midterm and end of course on perception of the COH

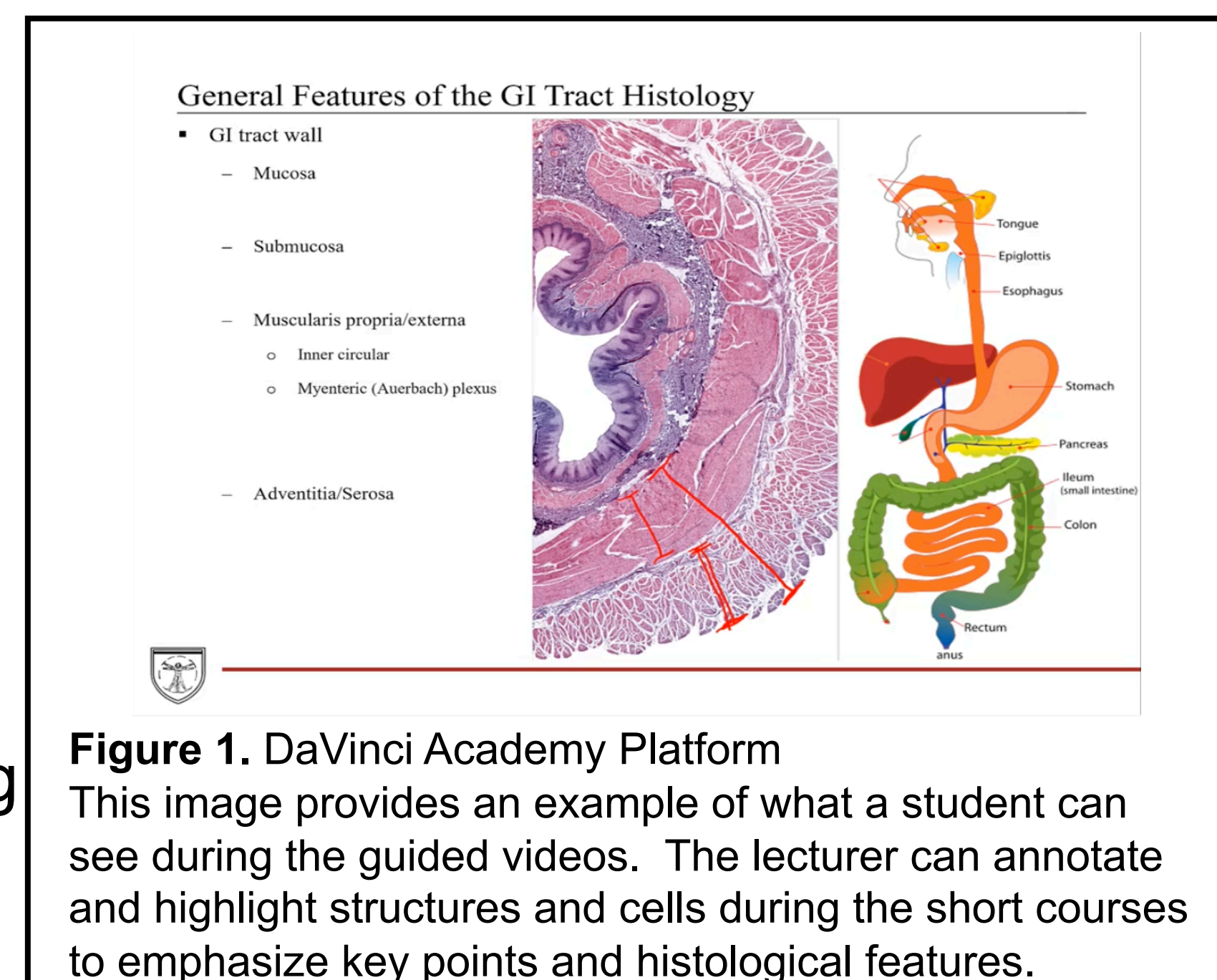


Figure 1. DaVinci Academy Platform
This image provides an example of what a student can see during the guided videos. The lecturer can annotate and highlight structures and cells during the short courses to emphasize key points and histological features.

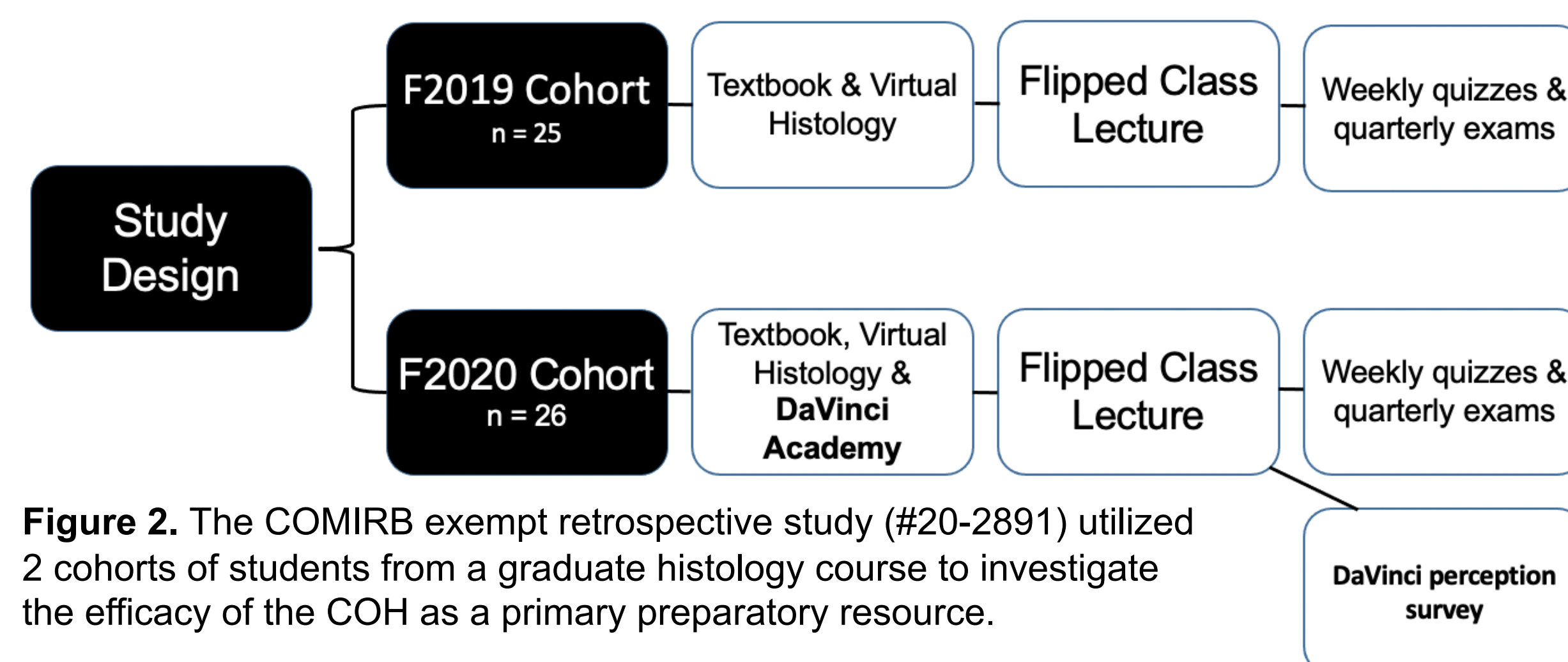


Figure 2. The COMIRB exempt retrospective study (#20-2891) utilized 2 cohorts of students from a graduate histology course to investigate the efficacy of the COH as a primary preparatory resource.

STATISTICAL ANALYSIS

- Quantitative data were analyzed with a repeated measures ANOVA
- Thematic analysis was performed on survey comments

Results

Learning Outcomes were COH Independent

- There was no significant increase in test scores in the experimental cohort compared to the control cohort (figure 3)
- There was no significant increase in quiz scores in the experimental cohort compared to the control cohort (figure 4)

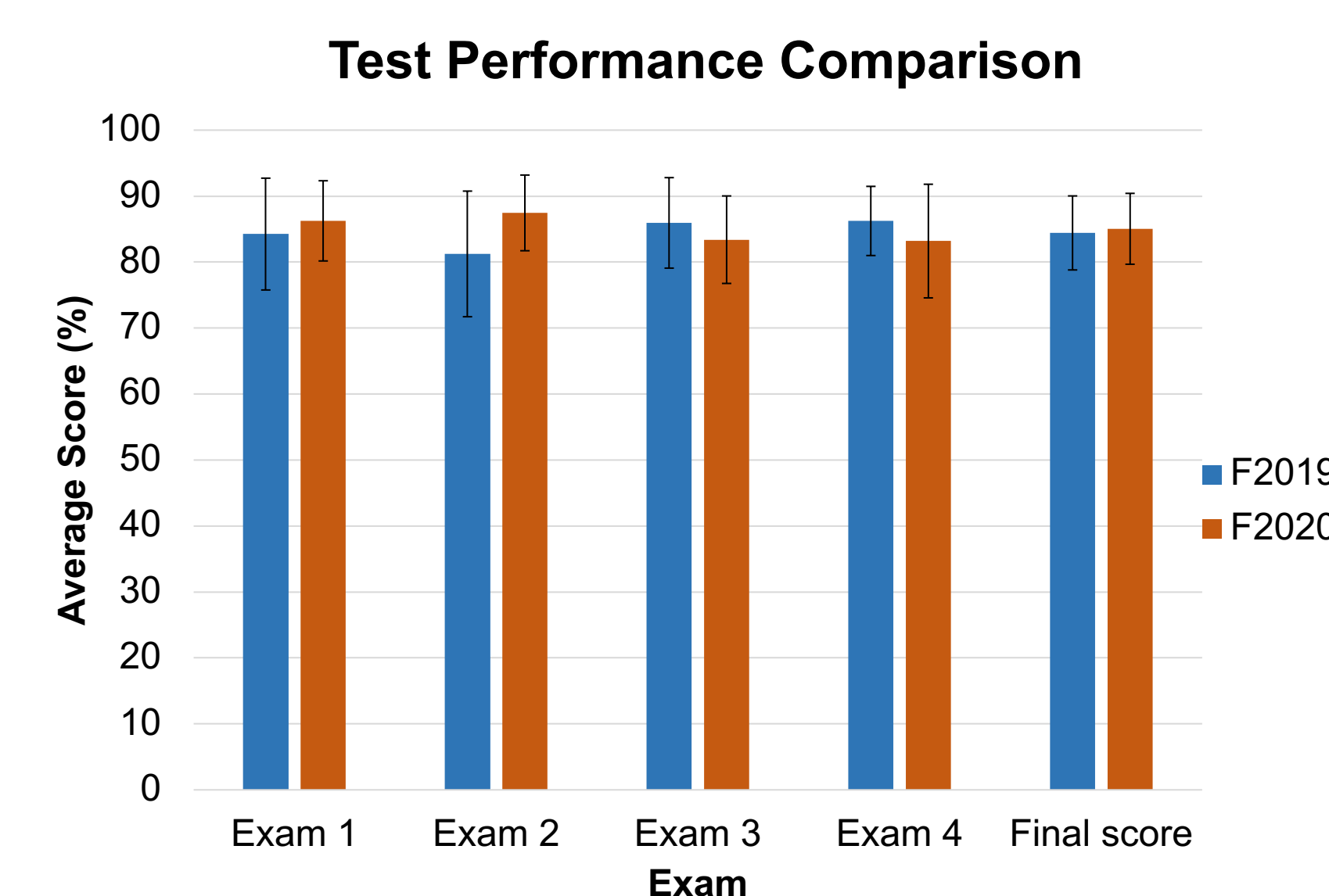


Figure 3. Average exam performance (%) by students reported for both 2019 and 2020 cohorts showing no significant difference (all $p > 0.05$) between cohorts. Note the final course score is a reporting of all exam and quiz performances.

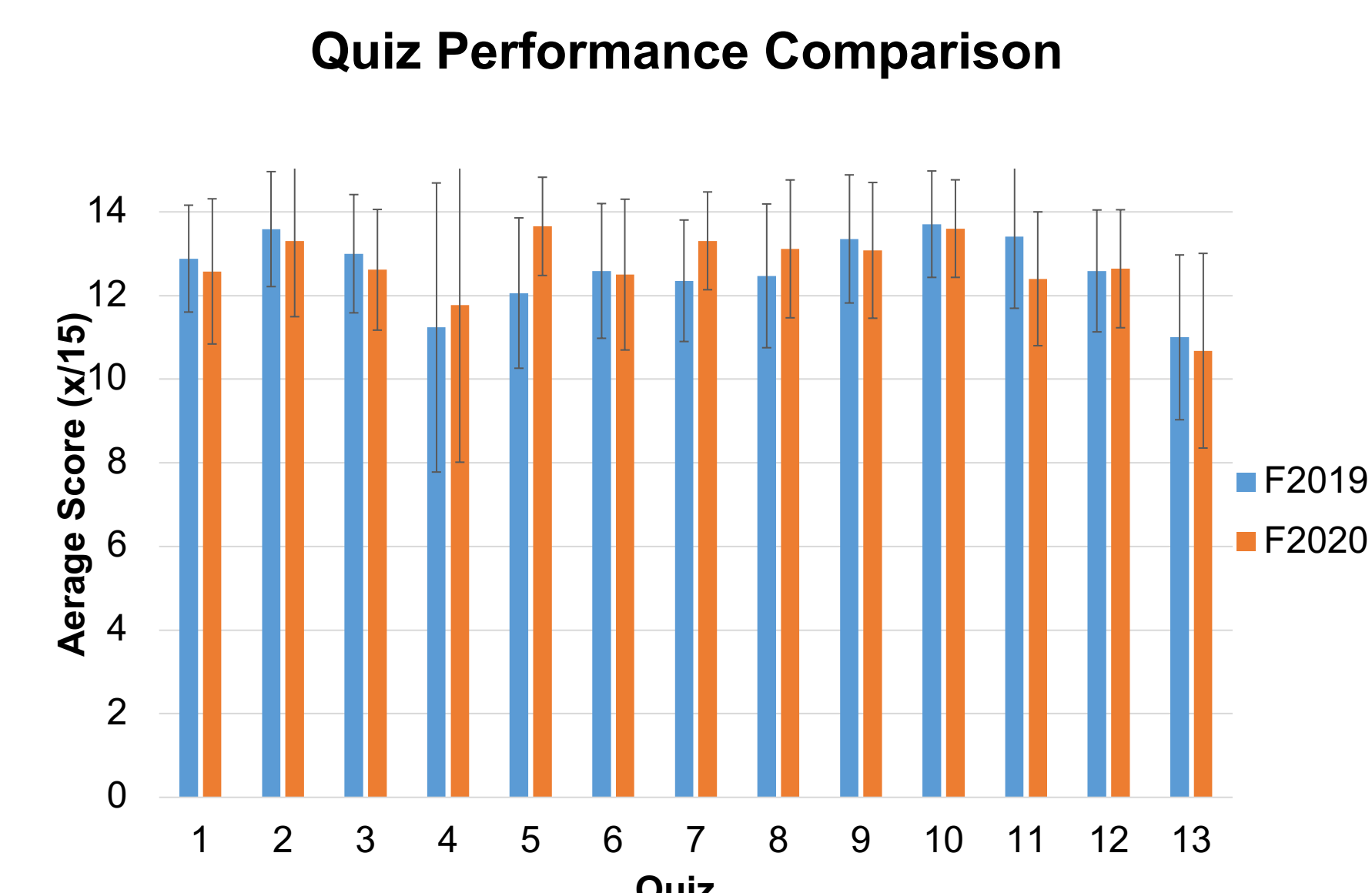


Figure 4. Average performance by students during required weekly quizzes. Quizzes included 10 questions regarding lecture content along with 5 images requires histological identification. No significant difference was seen between cohort quiz performance.

Survey Analytics

- Majority of students perceived COH videos to be helpful or enhance their learning (figure 5)
- Few students preferred traditional didactic lectures (figure 5)
- Preference for textbook increased over time (figure 5)
- Students rated quality of COH highly (figure 6)
- Students highly rated ability to recommend COH resource (figure 6)

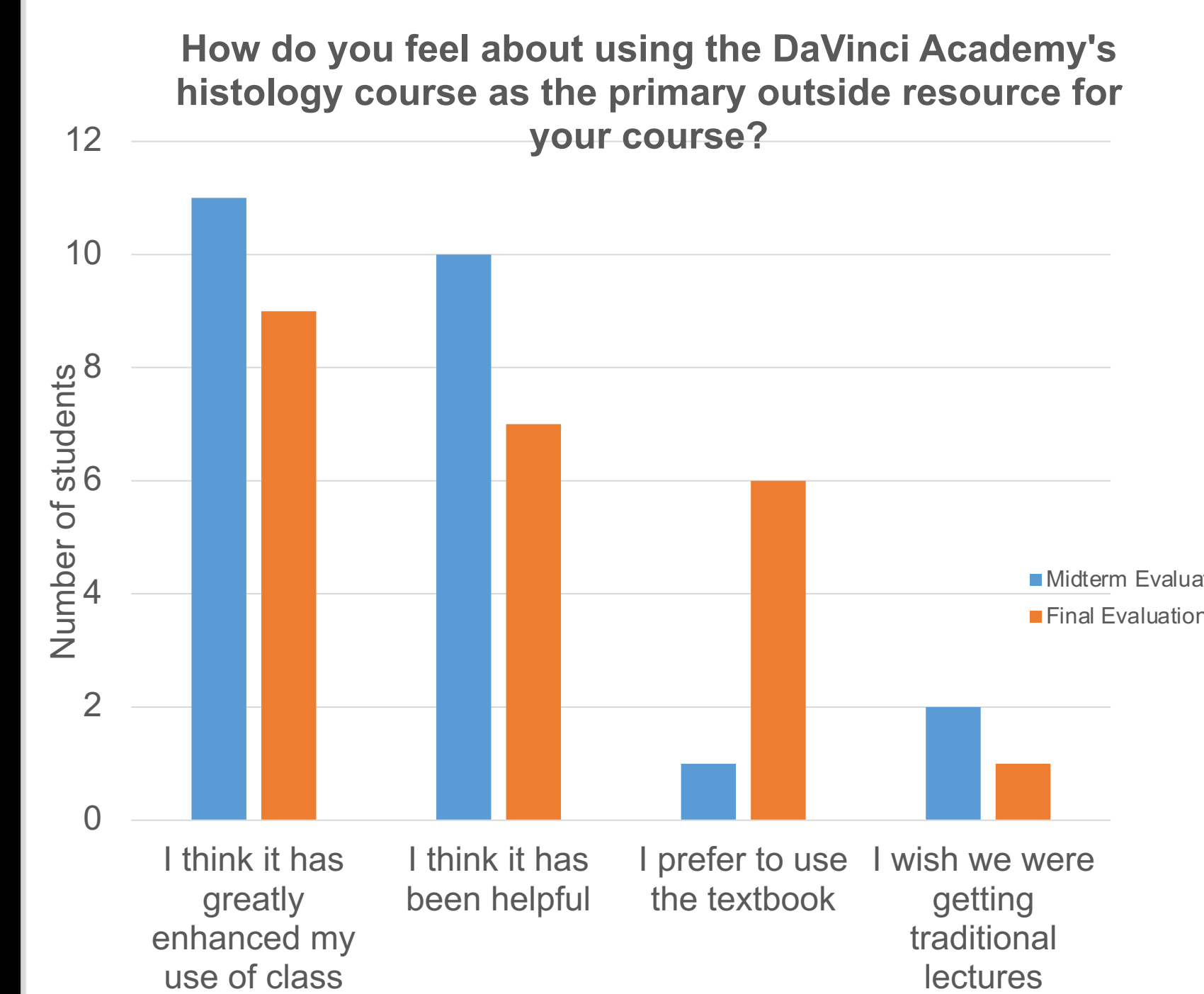


Figure 5: Percentage of subjects agreeing to the Likert survey items measuring students' perceptions of educational value of the resources. No significant differences exist in students' rankings of their assigned resources.

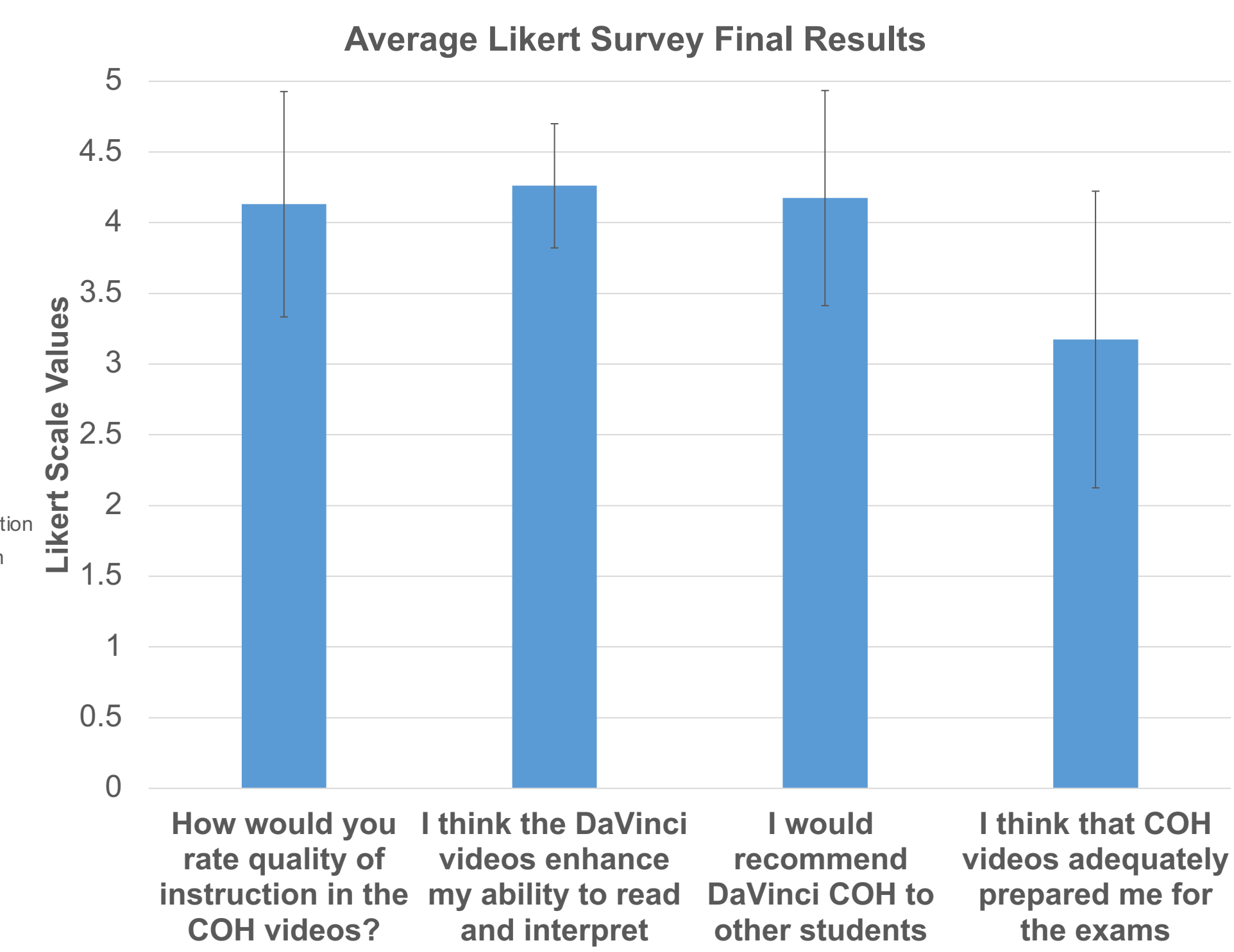


Figure 6: Responses from final course survey. All questions were scored using a Likert scale from 1 – 5 (1=strongly disagree; 5=strongly agree).

Results Cont'd

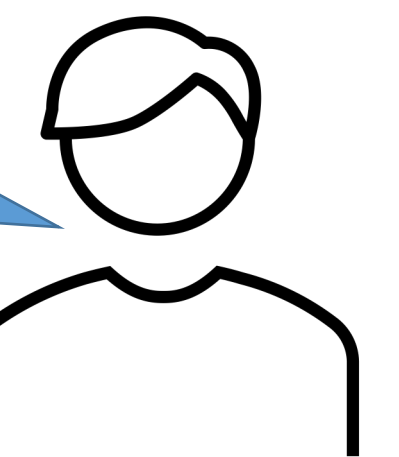
Thematic Analysis on Survey Comments

- Positive & negative themes



'I think the Davinci videos have been greatly beneficial to my learning as I get a lot more out of seeing the material and hearing explanations of the topics compared to reading the textbook'

'I think the videos are helpful but [instructors] focus on different aspects of Histology which makes it hard to determine what material we really need to know'



COMMON STRENGTHS	COMMON WEAKNESSES
<ul style="list-style-type: none">• Resource was helpful• Students enjoyed integration of histological slides	<ul style="list-style-type: none">• Videos did not match course 'Learning Objectives'• Videos were not always available early enough• Multiple lecturers was confusing

CONCLUSIONS & DISCUSSION

- DaVinci COH course can be helpful for histology curriculum an active learning pedagogy emphasizing self-directed learning
- COH is perceived to be highly effective for learning content and pattern recognition skills in histology
- Thematic analysis showed students especially enjoyed the incorporation of histological slides in the COH videos
- Thematic analysis revealed students have preference for COH videos to be delivered by same instructor as course
- COH courses can prepare students for flipped class active learning exercises
- Potential confounds: course lectures delivered in a partial virtual format due to pandemic, small cohort size

Acknowledgements

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