

Interventions Based on “Near Peer” Insights to Improve Medical Histology Exam Scores

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Background

First year medical students often struggle with how to prepare for the first Medical Histology exam, resulting in a first exam score significantly below 70% and a great deal of stress as they attempt to raise their course grade

Rather than rely on a “teacher knows best” approach, we surveyed previous Medical Histology tutors to get “near peer” insight on developing and implementing supplemental materials

We predicted that early implementation of these materials would proactively provide students with guidance on effective study strategies specific to the Medical Histology course and improve exam performance with fewer failures on the first exam

Methods

Student tutors from the 2021 Medical Histology course were surveyed anonymously using Qualtrics to get their perspective on why students were struggling with the first exam and what materials would have been most helpful to those students.

Based on the survey results, interventions/resources were developed to help students develop effective study habits

Success of these interventions was assessed through comparison of aggregate class exam scores from the 2021 and 2022 courses (before and after implementation)

Survey questions included:

1. What methods did you find most beneficial to your own learning while taking the Medical Histology course?
2. What advice did you give first-year students in your tutoring sessions before the first exam?
3. What did students struggle with on the first exam, and what did they need to do differently following the first exam?
4. What activities would you suggest instructors/students add or do more of in the course to help students succeed?
5. From student feedback, what did they want more of in the tutor sessions or from the course as a whole?

Interventions: Based on tutor feedback, we developed these additional resources:

- Advice on when to begin preparing for the exam – tutors reported that students didn’t start early enough, tutors and faculty repeatedly emphasized the importance of this to students
- Side-by-side comparison images – this was mentioned frequently by tutors, new materials included similar looking images with descriptions (Figure 1)
- Additional practice questions with answers to why each incorrect answer is wrong (Figure 2)
- New resources were presented during lecture and available for students to download for self-study

Results

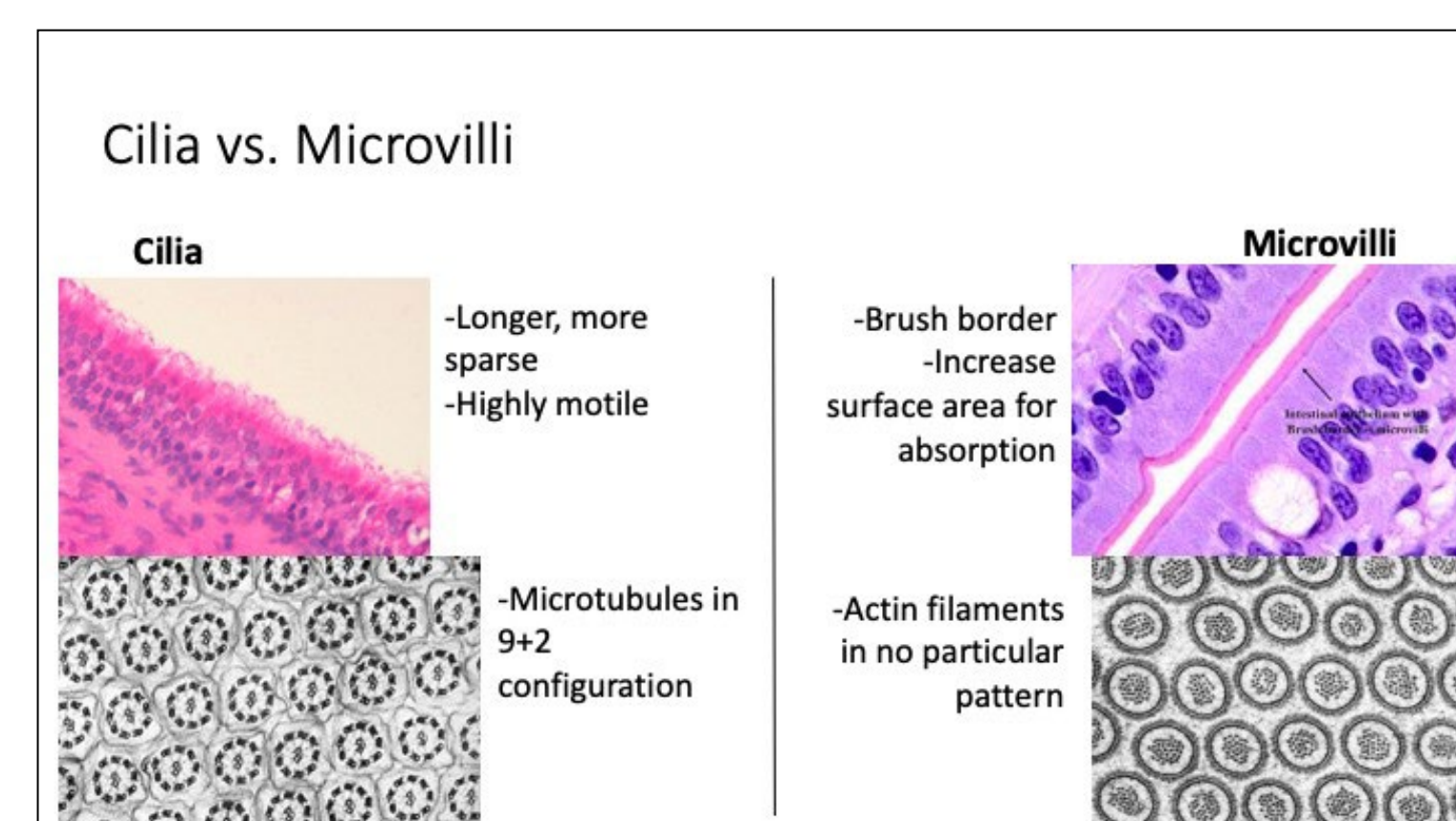


Figure 1: Example of Comparison images with detailed descriptions of notable differences between similar looking structures.

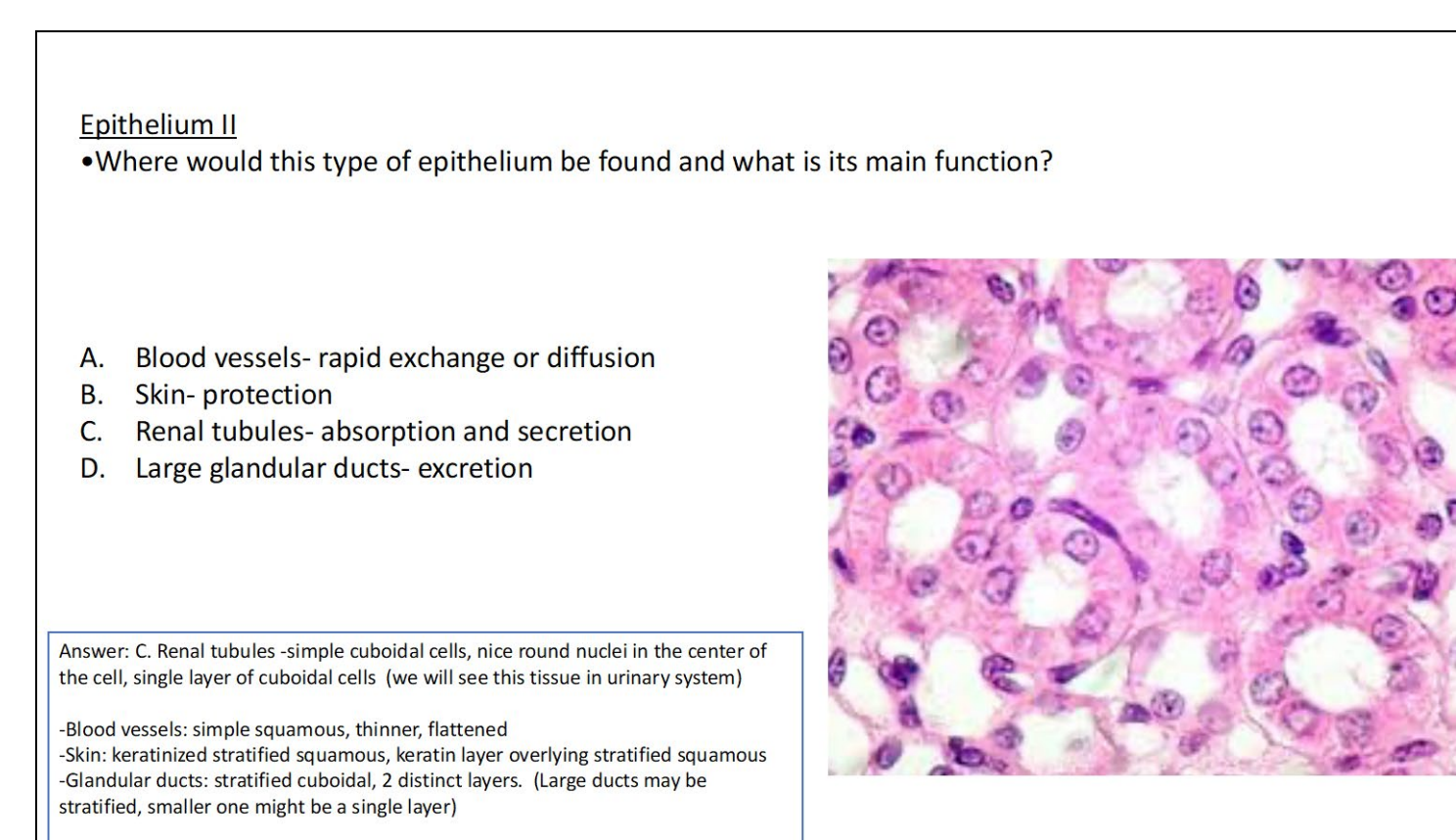


Figure 2: Additional practice questions to prepare students for exam-style questions with detailed descriptions of incorrect answers.

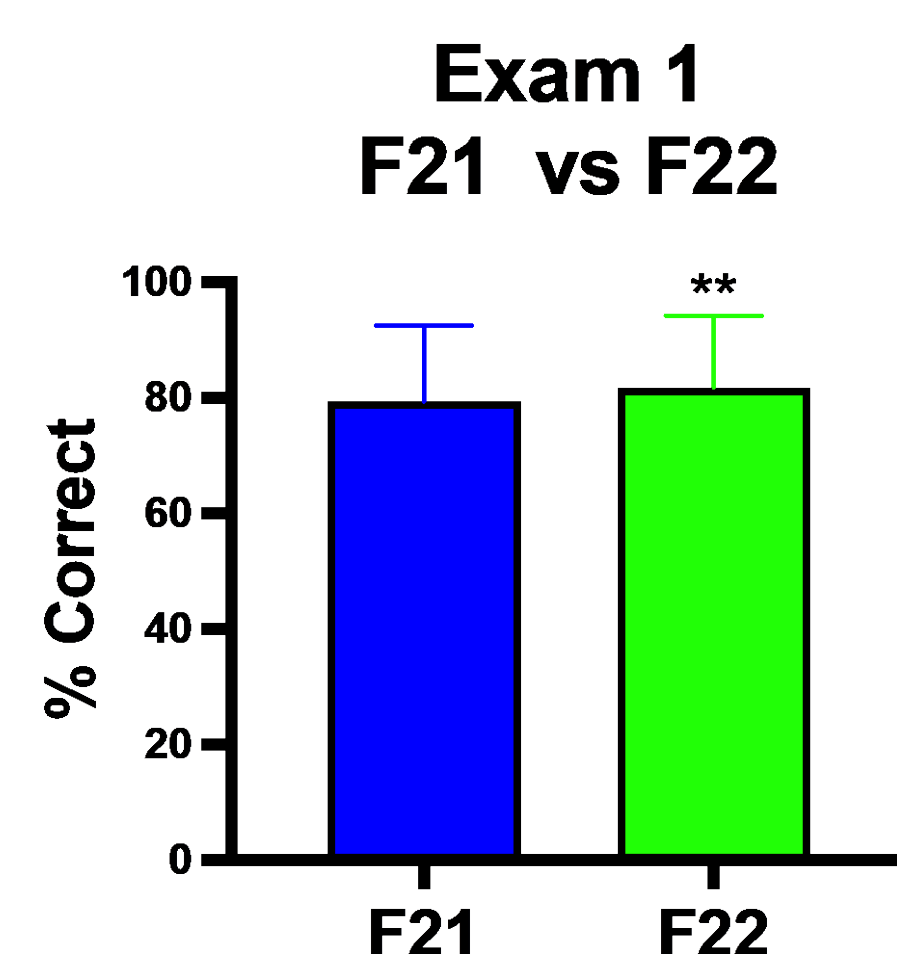


Figure 3: Exam 1 performance 2021 vs 2022
Following the course interventions in 2022. There was a significant increase in the class mean (**p< 0.005, two tailed t test), and a large decrease in the number of students failing exam 1.
2021: Exam mean 79.39%.
111 of 416 students failed the first exam (26.86%)
2022: Exam mean 81.86%
60 of 429 students failed the first exam (13.99%)

Mean Exam 1 Scores F22 Viewed Supplements vs Did Not View

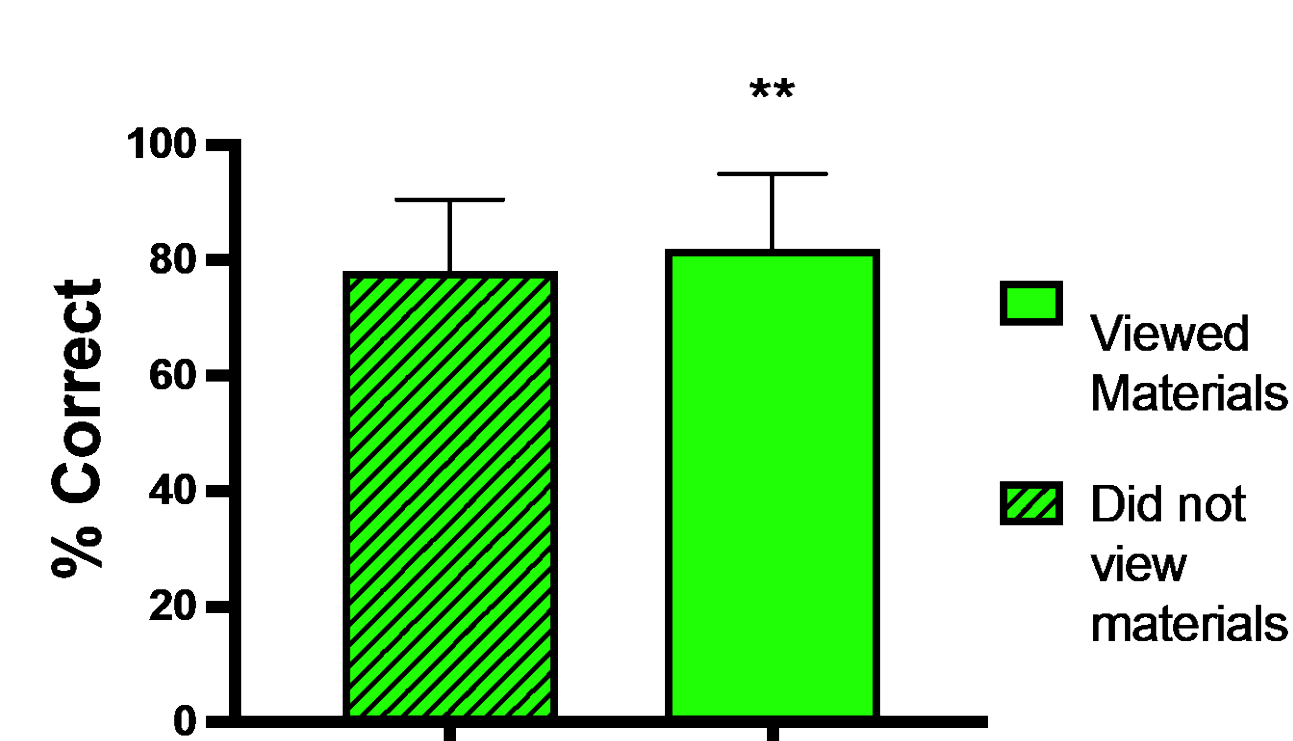
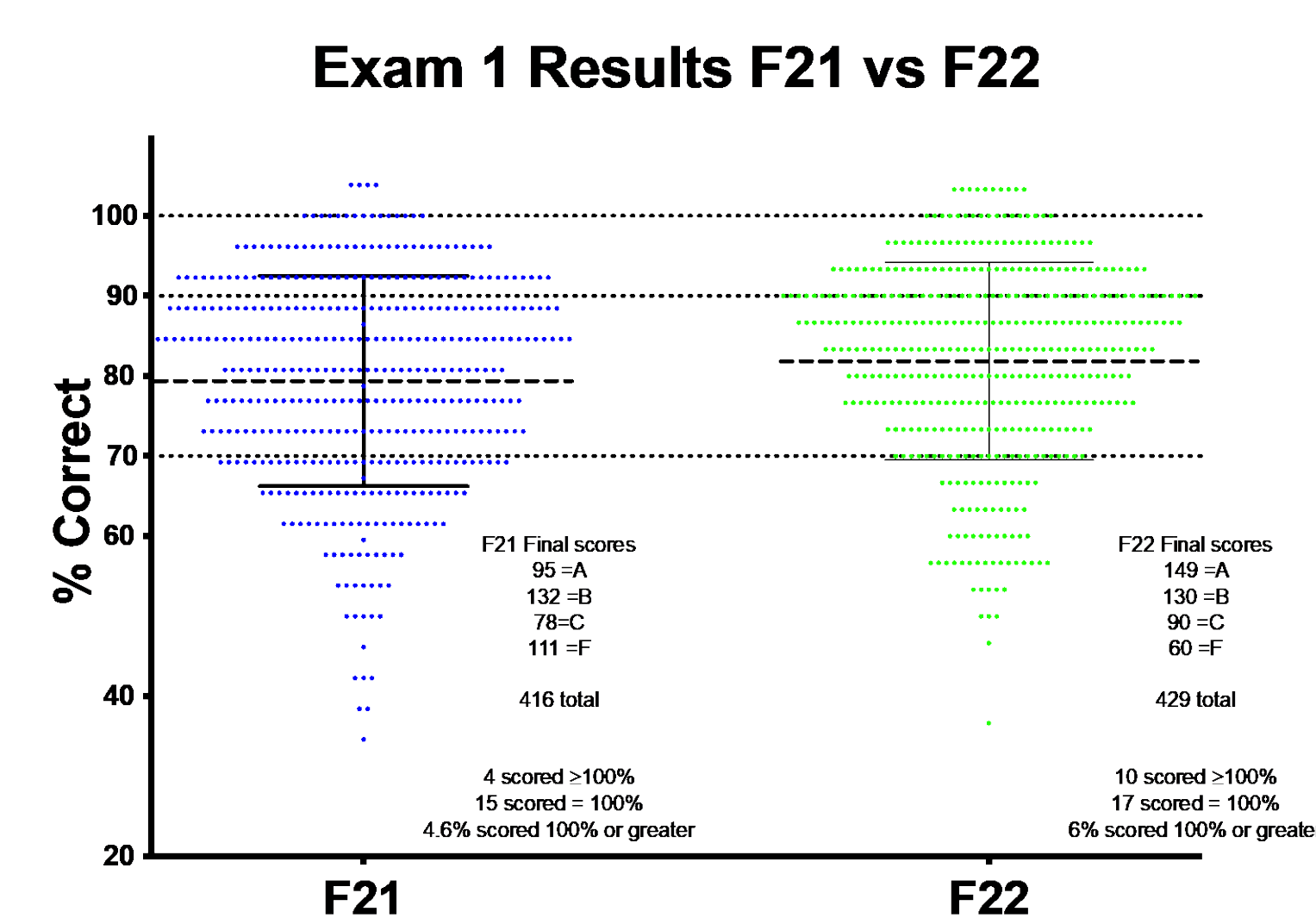
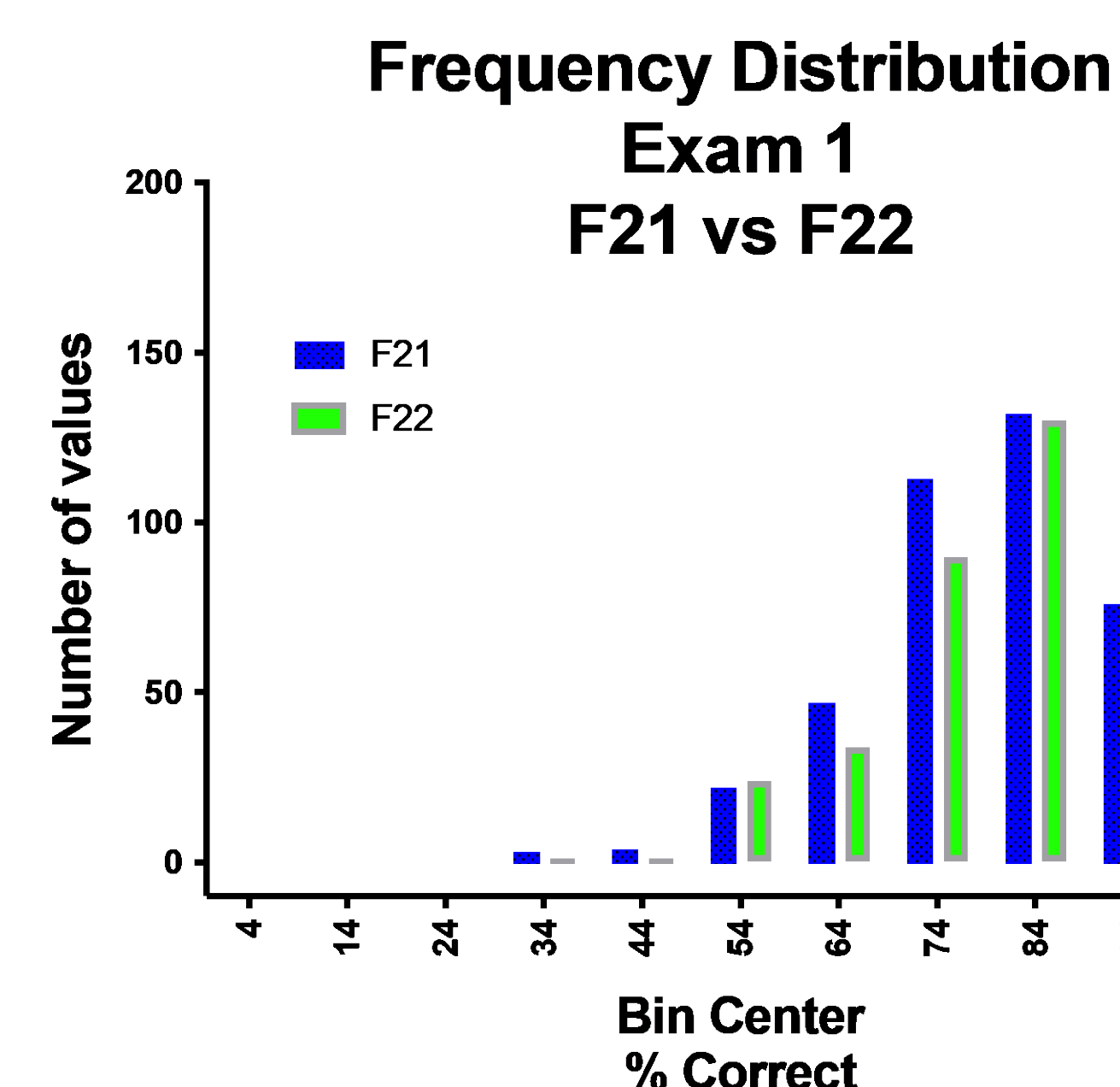


Figure 4: Mean exam score comparison of students who viewed materials vs those who did not view the materials.
Students who downloaded the supplemental materials had higher exam scores compared to students who did not. p< 0.01 two tailed t test, mean scores 82.06% vs 78.22%, difference of means 3.839 ± 1.468.



Figures 5 & 6: Distribution of Exam 1 scores for 2021 and 2022.
Figure 5 (left) shows the scores in bins of 10. Figure 6 (right) shows a scatter plot of all scores with mean and standard deviation. Overall, there was a 2.47% increase in the mean exam score (*p<0.01) in 2022 as compared to 2021. While this is a small improvement, it was enough to decrease the percentage of students failing the first exam in 2022 by 12.87%, compared to 2021.

Discussion

- Course tutors may be an underappreciated “near peer” resource for developing supplemental course materials to improve student exam performance
- This approach significantly increased exam 1 scores and reduced the number of students failing exam 1
- This approach can be applied to many courses in medical school to improve student success
- The Student Assessment Team for the Medical Histology Course made multiple comments indicating students liked the additional side by side comparisons and the additional practice questions. They would like to have more of both.

Limitations: This study was only done over a single year comparison and should be followed over multiple classes to further evaluate the success of the interventions. There were changes to the exam schedules that impacted how many subjects were tested at once on a block exam, this should be standardized going forward to reduce confounding factors. Additionally, the class of 2021 was the first year back to in person classes following the COVID19 pandemic, which may play a factor.

Future Studies:

Future studies will further assess the impact of creating additional comparison images and more practice questions for student use. Additionally, we will continue to develop new resources based on near peer feedback and assess the impact this has on student grades.

Support:

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