

PERCEPTIONS OF A FLIPPED HISTOLOGY CLASS: AS POLARIZED AS POLITICS?



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ABSTRACT

Incorporating flipped classrooms in the medical curriculum is gaining popularity, yet the perceived benefits by students are less well known. At the request of the course director, the author of this study developed a flipped class for the immune and lymphatic systems in a traditional semester-based medical-level histology course. During the lecture, groups completed three computer-based clinical cases. To emulate the process of diagnosis, cases were constructed as hyperlinked text documents permitting students to decide between choices before proceeding.

Students were invited to complete a survey regarding their experience. Most responded positively, however, they were divided about adding more flipped classes. Several students expressed dislike for the amount of preparation required to get the most benefit and some felt that flipped classes are a poor substitute for traditional lectures. This study indicates that some learners prefer the design of this particular flipped class while others are strongly opposed to deviating from traditional lecturing. The majority of students suggested incorporating a few flipped classes throughout the semester to supplement lecturing.

FLIPPED CLASS FORMAT

Course – 500-level Cell Biology and Histology

Class size – 41 students (36 medical, 5 graduate)

Mode of teaching – lecture and laboratory

Intervention – lymphatic system taught as a flipped class using a Team-Based Learning (TBL) model

Preparation – students were asked to:

- watch a podcast
- review a presentation of laboratory terms
- read an assigned chapter

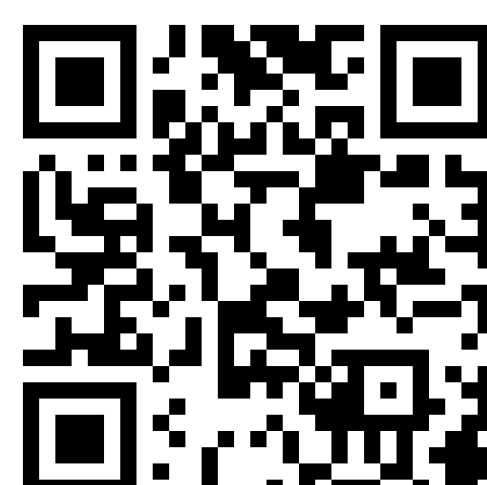
IRAT/GRAT – class began with a 5-question multiple-choice online quiz followed by small group discussions about the quiz questions

Interactive clinical cases – assigned groups completed one of three clinical cases. They were encouraged to start another case once finished with their own

Wrap up – final class-wide discussion of the cases and any other questions

WANT TO KNOW MORE?

- Visit mybrainonanatomy.com
- Find access to:
 - ✓ Pre-test
 - ✓ Clinical cases
 - ✓ Case references and more information about flipped classes



INTERACTIVE CLINICAL CASES

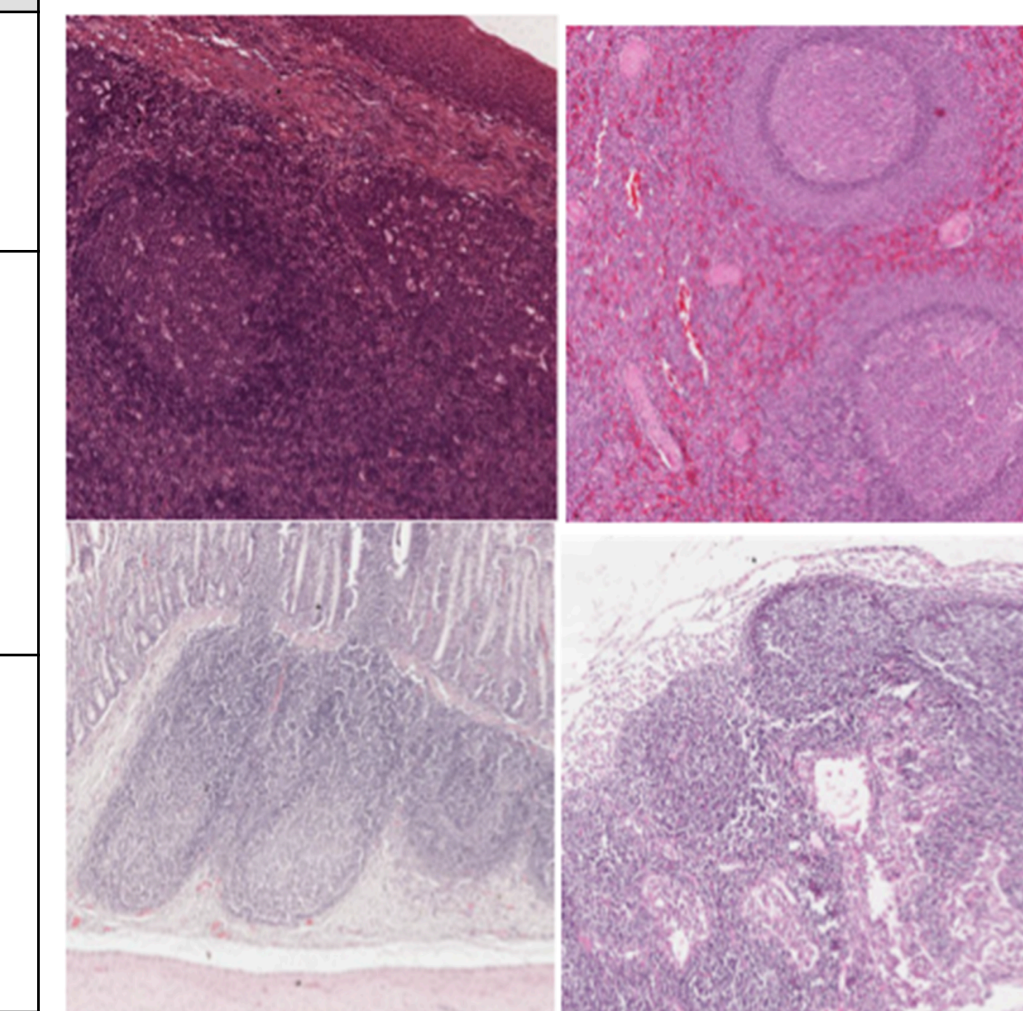
Three clinical cases were constructed based on learning objectives for the lymphatic system. The cases were designed as a “choose-your-own-adventure” quiz allowing students to make decisions before they proceeded, with their choices affecting what they subsequently encountered. Incorrect responses directed students to additional questions and an explanation to review concepts. Links allowed students to return to the previous step to try again.

| Clinical Case | Histology Concepts Assessed |
|---|---|
| “The Suspicious Lesion” <i>A 57-year-old female is evaluated for a mammogram with a suspicious lesion...</i> | <ul style="list-style-type: none"> • Major regions of a lymph node • Functions of each region • Roles of lymph and blood vasculature in lymph nodes |
| “A Night in the ER” <i>While working in the emergency room one evening, an unconscious 58-year-old male is rushed into the scene...</i> | <ul style="list-style-type: none"> • Major unencapsulated collection of lymphocytes in the mucosa-associated lymphoid tissue (MALT), including tonsils, Peyer’s patches, and appendix • Functions of MALT • Histological differences between white and red pulp • Functions of specific parts of the spleen |
| “A Mysterious Mass” <i>A 33-year-old male presents with an anterior mediastinal mass...</i> | <ul style="list-style-type: none"> • Lymphoid organs show a network of reticular fibers or epithelial tissue filled with lymphocytes and other cells • Structural features and regions of the thymus and their functional significance • Circulation through the thymus |

A Night in the ER

While working in the emergency room one evening, an unconscious 58-year-old male is rushed into the scene. You are informed he was in a car accident and has a laceration along the lateral margin of the upper left abdominal quadrant between the 10th and 11th ribs resulting in profuse bleeding.

Click on the histology slide below that depicts the organ injured.



PERCEPTIONS OF THE FLIPPED CLASS EXPERIENCE

An anonymous, voluntary 12-item questionnaire was developed using Survey Monkey Inc. and distributed to students via e-mail. The questionnaire included 6 Likert scale questions (each with an optional free response section), 3 Yes/No questions regarding the assigned material, and 3 open-ended response questions: what did you like most, dislike, and what to improve. Out of 41 students participating in the flip, 24 surveys were received (response rate = 58.5%).

The Good

- Most respondents enjoyed the interactive clinical cases, with 83% agreeing that they improved their learning
- Several commented that they enjoyed the investigative design of the cases and liked collaborating with classmates
- Learning from incorrect answers with additional questions and explanation was a popular feature of the cases

The Bad

- Frequent negative comments included:
- General dislike for anything other than traditional lectures
 - The amount of preparation required to obtain the most benefit from the flip
 - The length of the flipped class (~2.5 hours)

| Qualitative Response Code | | Positive | Neutral | Negative |
|---------------------------|-------------------------|--|--|--|
| # of Responses | | 6 | 13 | 5 |
| Exemplary Quote | | <i>“It was something different, better than being lectured at”</i> | <i>“I didn't really dislike anything, simply prefer traditional lectures.”</i> | <i>“it takes too much work/time to prepare for them”</i> |
| Preparation | Watched Podcast | 67% | 69% | 60% |
| | Read Chapter | 50% | 23% | 40% |
| | Viewed Lab Presentation | 67% | 69% | 80% |

EXAM PERFORMANCE

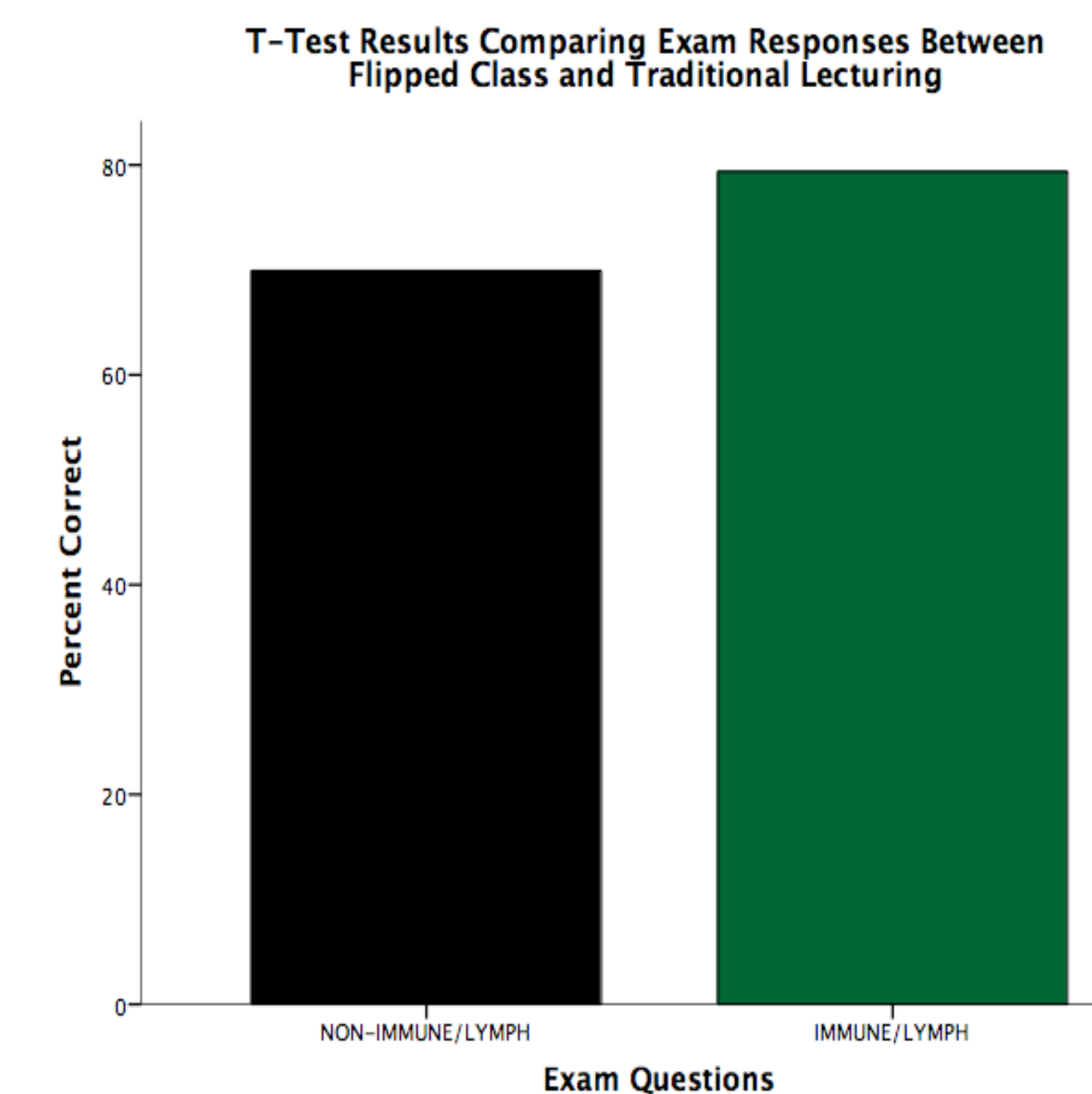
Exam scores indicate that students performed better on the questions taught through the flipped class compared with the rest of the exam questions taught with traditional lecturing, although there was no statistically significant difference in test scores based on an independent samples t-test ($p = .061$).

N = 41 (graduate + medical students)

Flipped Question Mean = 0.79
Non-flipped Question Mean = 0.70

Total Number of Exam Questions = 47

- 8 Immune/lymph questions
- 39 Non-immune/lymph questions



RECOMMENDATIONS FOR FLIPPING

This study aims to expand the current literature regarding student perceptions about flipped classrooms and to experiment incorporating an interactive, paperless team-based learning activity. The results of this study suggest that medical and graduate students desire a fun, creative activity while still being efficient.

Working Toward a Flipped Formula

- ✓ **Be transparent** – inform students about what a flipped class is and the reason you are incorporating this style of instruction
- ✓ **Provide a pre-class worksheet** – a pre-class assignment will focus students’ preparatory studying and aid in alleviating cognitive overload
- ✓ **Be efficient** – set time limits to complete activities to keep students on task
- ✓ **Incorporate mini-lectures** – to clarify confusing or complex topics
- ✓ **Give students freedom** – providing options for students and a sense of personal control is more likely to motivate them for learning
- ✓ **Add a graded component** – not too low-stakes so that students realize it doesn’t really count for much, however not too high-stakes preventing students from enjoying the flipped class and the discovery element of the learning process

ACKNOWLEDGEMENTS

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