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Course: BMED 3600 Physiology of Cellular and Molecular Systems
Professor: Dr. Manu Platt
Lesson: Neuroinflammation and Systems Biology
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Class Analysis

The purpose of this paper is to analyze and reflect on my teaching experience with feedback from my CTL capstone peers, Dr. Mallen, Dr. Platt, and the students.

Background. The main learning objectives for this lesson were to: 1) analyze the process of neuroinflammation from a systems-level perspective, 2) understand various methods used to gather data in systems biology, and 3) interpret multivariate data analysis of biological systems. All sub-objectives were discussed during class and one in-class multiple choice problem was presented to assess student understanding. Two “fill-in-the-slide” prompts were shown to introduce topics, encourage interaction, and gauge prior knowledge. I developed three multiple choice and two free response practice problems for the students to complete as a formative assessment, and solutions were provided in the form of text (appearing directly after the completion of the homework) and in a recorded video of the solutions and explanations. Quiz questions will be administered as a summative assessment on Friday, 10/23/20.

After the lesson, 12 students completed an online feedback form and gave answers on 1) what did the instructor do to help you learn, 2) what changes could the instructor make to improve your learning, and 3) is there anything else you would like us to know? I also received written comments from a CTL capstone peer and Dr. Mallen, who both observed the lesson.

Learning Objective 1. I feel the students successfully developed an understanding of the process of neuroinflammation. While discussing the formative assessment problems with students in office hours, most were able to apply their knowledge on cellular signaling pathways from earlier in the course to the novel system of inflammation in the brain. The students answered summative questions on this topic with a correct response rate averaging 95%, indicating successful learning of this objective.

Learning Objective 2. The students grasped the higher-level concepts of the three different methods discussed during this class: multiplexed ELISA, mass spectrometry, and RNAseq. Many students during office hours asked more specific questions about each method, and I think the inclusion of this content without more definitive learning objections (as written: “explain the purpose and basic principles of x technique”) caused much stress about the expectations for learning. During the formative assessment, however, students were able to accurately identify techniques that may be used to answer novel systems-level biological questions.

Learning Objective 3. Many students came to office hours to ask clarifying questions about the data analysis methods in the last learning objective. Generally, they did well on their formative assessment but it was clear that they were nervous about the types of formative questions they might receive on their quizzes. As with the previous learning objective, I will either seek to add clarity about the expectations of the learning objective (with more interactive content and clearer wording of objectives) or I will dedicate more time to this topic, as the students seemed very interested and asked thoughtful questions. The students successfully learned how to interpret a

principal component analysis (the focus of learning objective 3), indicated by a 98% correct response rate on the three related summative assessment questions on their quiz.

Positive Feedback (Sustain). The most ubiquitous positive feedback from the student comments was their appreciation of the interactive content. They appreciated being engaged and clarifying the learning expectations with an example problem. The class up to this point has not utilized much interactive content, and I aim to further improve this by using tools to allow for class-wide participation. In this lesson, I presented slides with questions for students to answer, and as they responded I wrote in their responses on the slide to encourage participation and ownership of the lesson. While students seemed to appreciate this, only a brave handful spoke out and gave answers. Next, I will use a platform like “Pear Deck” which allows all students to anonymously answer questions on their own devices and then display all responses on my main screen.

The students also seemed to appreciate the images and figures I selected for the slideshow. Dr. Mallen also gave positive feedback about the use of images rather than displaying text during the lecture, as it helps the students focus on the relevant content. To further improve this method, I will begin to write text descriptions of the slides in the PowerPoint “notes” section so students can review key concepts of each slide when going back through the slides after class. This will allow them to have access to a text description of the slides even though I choose not to show it during class.

Both the students and my CTL capstone peer mentioned that my interactions with the class were thoughtful and encouraging. I will continue to be open to questions and ensure the students feel safe participating in class.

Negative Feedback (Improve). Almost every student said the pace of the lesson was too fast. I was overly ambitious with the content I decided to cover in this lecture and was overly committed to ensuring I finished, failing to prioritize student understanding over coverage of concepts. In the future, I will incorporate more interactive content which allows the students to practice the concepts I introduce as well as give feedback to me on whether their understanding is where it should be to meet the learning objectives. I will also include time for questions and further explanations in my time estimation for each topic.

Dr. Mallen provided some useful tips to guide the focus of students when using complex figures on my slides. In the future, I will use transparency and circles to point out sections of each slide as I explain each figure in order to avoid overwhelming the students with overly complicated graphs and charts.