

Student Learning Preference in Relation to Exam Results

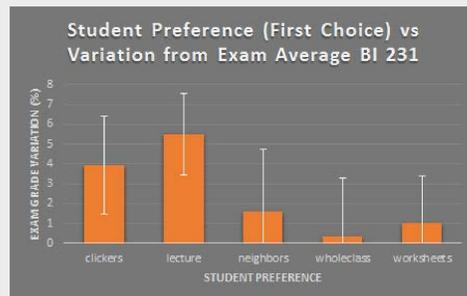


Figure 1

Shows the correlation for the first class (BI 231) between primary student preference for learning and their score above/below average for exam grades as percentage points. The average for the exam grade was 70.3%.

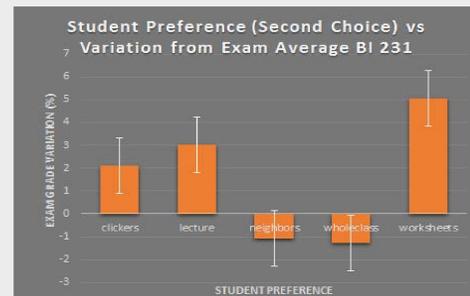


Figure 2

Shows the correlation for the first class (BI 231) between secondary student preference for learning and their score above/below average for exam grades as percentage points. The average for the exam grade was 70.3%.

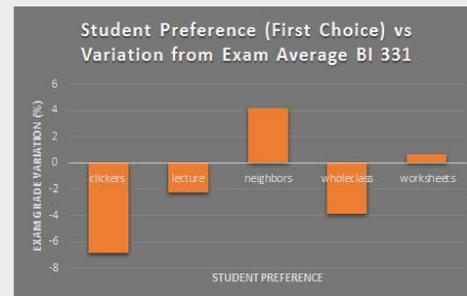


Figure 3

Shows the correlation for the second higher level class (BI 331) between primary student preference for learning and their score above/below average for exam grades as percentage points. The average for the exam grade was 82.0%.

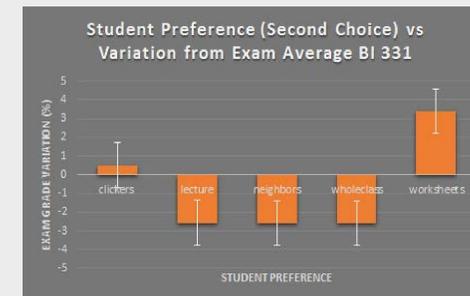


Figure 4

Shows the correlation for the second higher level class (BI 331) between secondary student preference for learning and their score above/below average for exam grades as percentage points. The average for the exam grade was 82.0%.

Topic

- We want to learn about the effect of teaching styles on student performance and perceived success. We surveyed students in two different learning environments to determine how these styles contribute to their performance on tests and how they felt about the knowledge they gained. Using a set of the standard questions, we were able to compare and contrast how students perceived the effectiveness of these methods in anatomy classes (BI 231, 331).

Context:

- Due to the recent popularity of active and progressive teaching methods in American education, it is important to understand if these methods are actually effective for students in practice.
- The book written by Handelsman, Miller, and Pfund stresses the importance of student interaction and discussion for critical thinking especially in science related fields.
- Both chapters on scientific teaching and active learning emphasize the necessity of engaging students in class to support critical thinking on course topics.
- Additionally, surveying for the perceived effectiveness from the point of view of the student relates to the formative assessment methods discussed by the NCTE statement. Monitoring how students are feeling about the methods used in class can be essential to creating strategies that will prove more effective.

Research Questions

- What are students' perceived effectiveness of different learning strategies?
- Is there a difference between the actual effectiveness of teaching methods and how students perceive this effectiveness?

Hypotheses

- Students will perceive active teaching methods as more effective than more traditional methods.
- The methods that students perceive most effective will be the methods that in practice are most effective.

References and Acknowledgements

- Handelsman, J., Miller, S., & Pfund, C. (2007). *Scientific teaching*. New York: Freeman.
- Tanner, K. D. (2012). Promoting Student Metacognition. *Cell Biology Education*, 11(2), 113-120.
- NCTE Executive Committee (2013). *Formative Assessment*. Urbana, Illinois: NCTE.

Data and Findings

- In addition to the data presented, there were several no responses from the surveys that are not presented in the graphs. It should be noted that the average scores for the students that didn't respond or complete the survey did several points lower on the exam than students who participated.
- For the higher level course, students whose first and second preferences of learning styles were either working with neighbors or worksheets (**Figures 3 and 4**).
- As a primary choice, students who preferred lecture showed the greatest average percentage points above average on the test, 5.5 points (**Figure 1**). However for the higher level class, working with neighbors proved most effective, earning about 4 points over average (**Figure 3**).
- In total, there were few statistical correlations between any of the learning styles present to student learning preference, despite trends shown in the various figures.
- There were two pieces of statistically significant data present only in BI 231. Students who selected lecture as their primary choice ($p = 0.008$) and those who selected worksheets as their secondary choice ($p = 0.04$) both correlate strongly to increasing exam performance (**Figures 1 and 2**).
- One additional piece of nearly statistically significant data was the negative correlation between exam scores and primary preference for clickers (BI 331), which should be considered (**Figure 3**).

Synthesis and Next Steps:

- Students who preferred lecture and worksheets in the lower level biology showed better performance on exams. No other inferences can be made from this, but a future experiment could look into if these students are not as focused when given the opportunity to talk to others.
- To further the investigation it would be necessary to collect data from more diverse sources. There may be different experiences when different topics are being taught.
- The data that has been collected may be analyzed by professors who wish to better their active learning environment.