Optimizing Course Resources: What do Biology Students Really Want?

Paary Balakumar
McGill University (B.Sc. Anatomy and Cell Biology)

undergraduate poster showcase

Introduction

- PRIMERs are a series of short documents distributed to students before each course module that intend to bring all students to the same base level knowledge.
- PRIMERs are important as some students taking this course have a non-science background.
- The survey contains quantitative data in the form of Likert scale questions, yes/no questions, and qualitative data in the form of open-ended questions.

Purpose

1. Find what students liked and disliked
2. Propose improvements
3. Implement changes for Winter 2021 semester

Methodology

Overall Plan

1. Midterm survey given in Winter 2020 containing quantitative and open-ended questions
2. Quantitative questions analyzed with Microsoft Excel
3. Open-ended question analyzed with MAXQDA

Qualitative Data Analysis

Inductive approach: Describe data then look for patterns to reduce researcher bias

Code: A phrase that summarizes the intent of an open-ended response

Steps:

1. Specific Codes (no generalization)
2. Group similar codes
3. Categorization of code groups

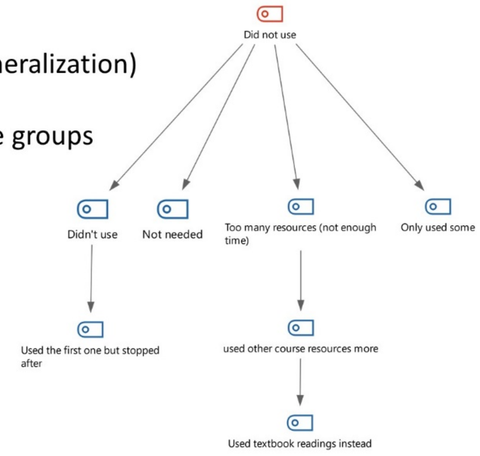

Fig. 1: *Visualization of code hierarchy within the "Did not use" category. Blue tabs represent groups of codes (i.e. Step 2). The red tab represents the category.*

Results

Quantitative Data Analysis:

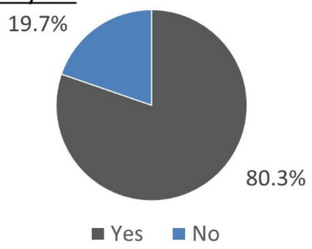

Fig. 2*: Frequency of responses in a yes/no question asking if the student believed PRIMERs support their learning of lecture material. (n=700)*

Qualitative Data Analysis:

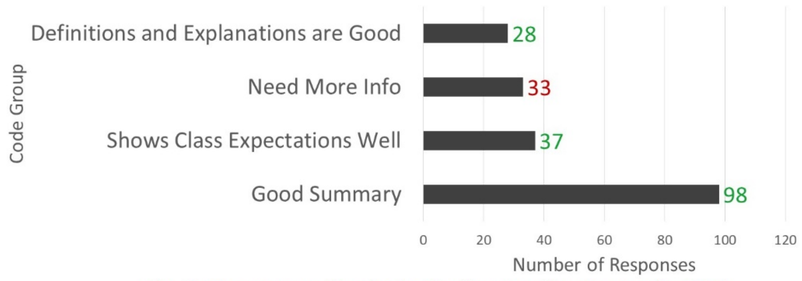

Fig. 3*: Frequency of codes in the "content" category. (n=511)*

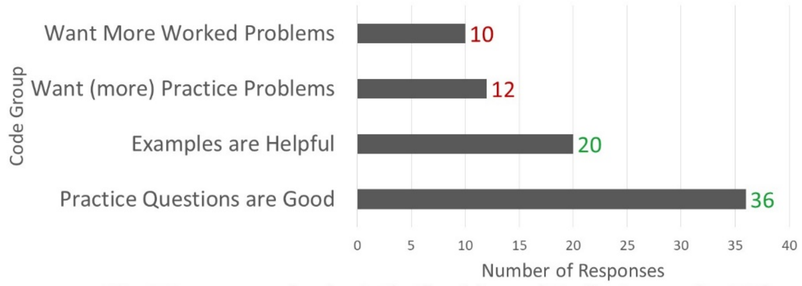

Fig. 4*: Frequency of codes in the "problem solving" category. (n=511)*

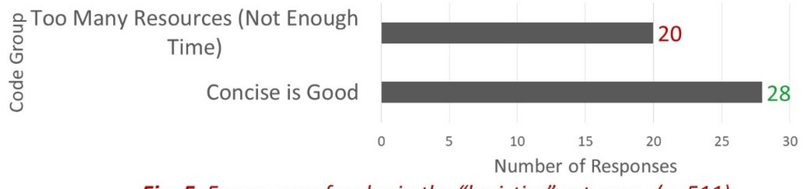

Fig. 5*: Frequency of codes in the "logistics" category. (n=511)*

Key Takeaways

- PRIMERs are well used and liked (80% of students found them helpful)
- Students want:
  - Concise Summaries and Explanations
  - More in-depth content
  - More Practice Problems + Worked Examples

Conclusion

- Problem-based learning (PBL) results in **better student performance** when tested at higher levels of Bloom's Taxonomy and similar performance at lower levels (1)
- Students should be encouraged to try every resource since **greater utilization** of online resources results in **higher grades** (2-4)
- The main limitation is the **ambiguity** that results from **vague responses**. This introduces researcher bias (i.e., confirmation bias) especially since only one researcher analyzed the data.

References

1. Gijbels et al., *Review of Educational Research*. 2005;*75*(1):27-61.
2. Guru-Gharana et al., *Journal of Economics and Economic Education Research*. 2012;*13*(3):59-79.
3. Calafiore et al., *The Journal of Economic Education*. 2011;42(3):209-23.
4. Damianov et al., *Journal of Economics and Finance Education*. 2009;*8*(2):11-22.

Acknowledgements

I would like to thank Dr. Western for her guidance during data analysis and presentations. Additionally, I would like to thank the Office of Science Education, and University Advancement at McGill University for this opportunity.