Exam Ease: Investigating the Impact of Question Dissection

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Introduction

Students grapple with understanding assessment queries due to complex terminology. They may be **challenged by complex terms impacting their performance in assessments.** To address this, implementing question dissection and annotating can benefit overall performance. Learner-generated explanations for complex STEM concepts is a powerful learning tool and likely enhances spatial thinking skills[1]. A study surrounding the effects of annotation on learning science indicates that this skill pushes students to focus closely on structure and content, thus becoming more actively engaged in material. This study further recognized that student annotation, including identifying main ideas and defining scientific terminology, is directly correlated with overall high achievement[3]. Through analysis, students must learn how to effectively break down questions and determine inter-relationships within material[2]. Integration of question dissection and annotation into student exam practices serve as effective methods to enhance understanding, spatial thinking skills, and overall mastery of challenging STEM concepts.

Methodology

An initial survey was given around week four following the students' first exam, using the Likert scale ranging from 1-4. This survey assessed their competency and understanding with the questions on the exam. After the initial survey, facilitators introduced their students to question dissection through annotation. This includes rewording difficult terminology, rewriting questions, and highlighting key words. During each class period, students practiced dissection with the worksheets. As question dissection was adopted, facilitators encouraged students to incorporate annotation of questions on their exams. Towards the end of the semester, a final survey was administered with the same Likert scale to assess new competency and understanding levels since implementation of question dissection. Measurements were taken of the students' understanding of questions both before and after practicing annotations.

Acknowledgments

We would like to thank PAL faculty, especially Dr. Lundmark for advising us with the project, and Dr. Wright for guidance with our data analysis.

References

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Results

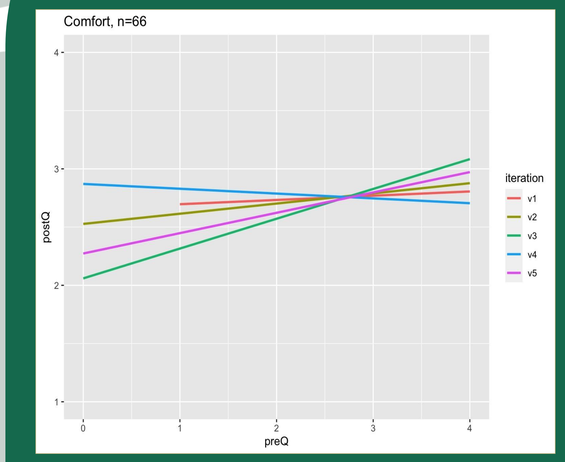

Figure. 1a: Upward trend with increased comfort with exam questions and words following implementation

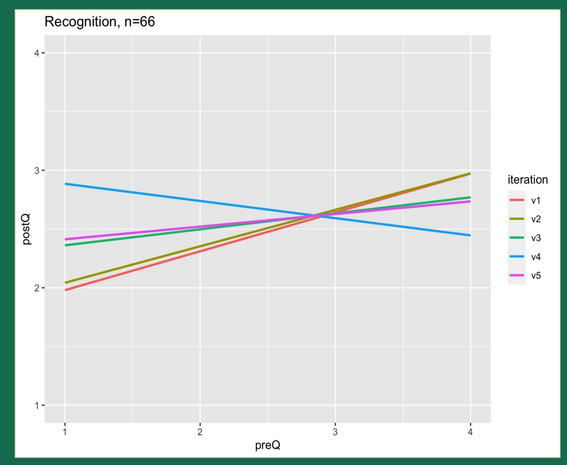

Figure. 1b: Upward trend with question/terminology recognition, being able to recognize more questions and words following implementation

- Data taken from a population of 66 individual student survey answers
- Answers for the pre-survey were randomly matched to post-survey answers
- Both data sets show one negatively correlated randomization, whereas there are five positively associated
- Conclusion: question dissection had a positive impact on student ability to recognize terms and the underlying question, and increased comfort with exam questions

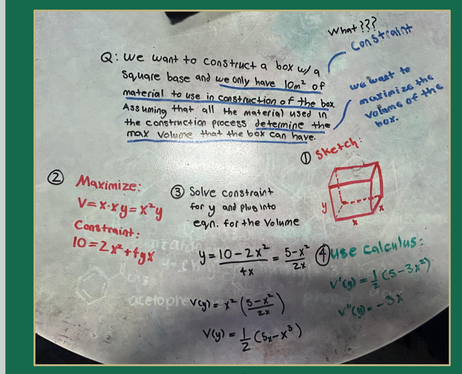

Figure. 2a: example from MATH 30

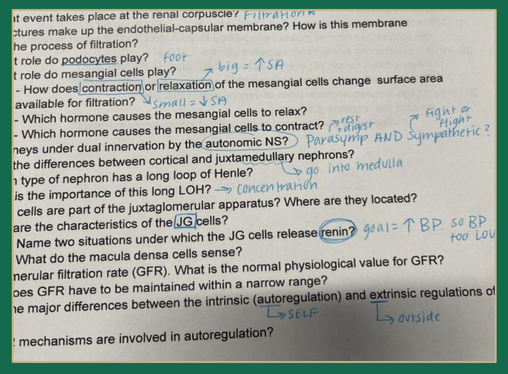

Figure. 2b: example from BIO 26

Student Quotes:

"I wrote all over my exam...I took apart the function and figured out the result. This allowed me to get the question correct."

"I tried to split up the words into categories so I can understand what is being asked."

"...I did a lot of dissection methods and it helped a lot because it got me to the right answers."

Discussion

The project involved evaluating PAL Anatomy & Physiology, Calculus 1, and Genetics classes. The hypothesis predicted that through integrating question dissection and annotation into student practices, students would feel more comfortable and increase recognition with exams. To analyze the data, we randomized and matched responses for both the pre and post intervention surveys. Based on our analysis, the hypothesis was supported. We see an upward trend as students demonstrated a higher level of comfort after implementing question dissection (Fig. 1a). A positive upward trend is also present as students reported being able to recognize difficult terminology more easily (Fig. 1b). It is important to acknowledge some data demonstrated a neutral effect. Data based on the ability to understand questions before and after intervention did not fully support the hypothesis. This could be due to some limitations. We had more students take the pre-survey than the post survey and some students did not give responses. Some sessions could not always implement question dissection because it was not needed or did not apply. PAL worksheets were not always used, and there was a variety of exam formats that limited question dissection accessibility. All the surveys were anonymous, so we could not analyze the effectiveness of question dissection in different subjects. Figures 2a and 2b show examples of question dissection methods.