THE USE OF WRITING PORTFOLIOS IN PLACE OF TRADITIONAL EXAMS IN HIGH SCHOOL BIOLOGY

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Background and Conceptual Framework

The desire for metrics of student ability remains high even as emphasis changes from content and memorization to procedural awareness and communication skills.

The pursuit of assessment strategies maintaining academic rigor while fostering resilience and digital citizenship lead to the use of writing portfolios based on lab investigations and coursework in place of exams.

Reflective writing portfolios built around lab activities have potential to remedy some of the common grievances with traditional testing. They can help students engage in critical thought while finding a sense of purpose in the creative application of their studies to their lives

Methodology

This investigation used six data collection instruments to address one primary and two secondary questions.

Data Collection Instruments

- Short Answer Test Scores
- Writing Portfolio Scores
- Multiple Choice Test Scores
- Course Engagement Questionnaire
- SAT Science Subject Test
- Student/Teacher Dialogues

Research Questions

- What is the effectiveness of using writing portfolios in place of traditional exams?
- Were effects of writing portfolios consistent across students of different incoming ability?
- How does the use of writing portfolios affect student motivation and engagement with the course?

Data and Analysis

Student demonstration of conceptual understanding was higher on writing portfolios compared to short answer tests. Simultaneous measurements of content knowledge showed no drop in student performance, there were actually signs of increased performance in expressing understanding. Benefits of writing portfolios were more pronounced in students with below-average incoming test scores. Over 50% of students in the treatment group said they were “more confident in writing in science” after five units of study.

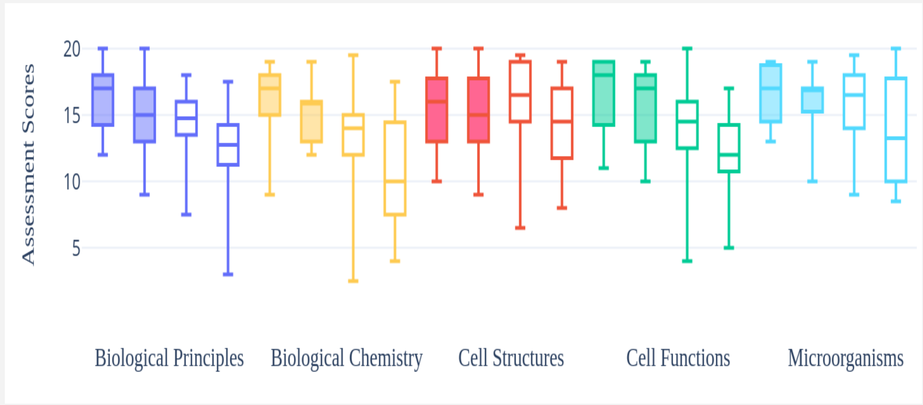

Figure 1. Comparison of writing portfolios (shaded) vs short answer (open) test scores by unit. Within each assessment group above-average SAT group is on left, and below-average SAT group is on right, (*N*=88).

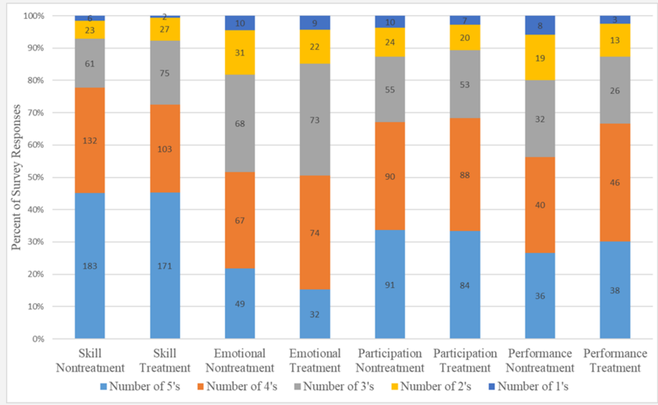

Figure 2. Course Engagement Questionnaire responses by Factor Groups, (*N*=88). Numbers in bars indicate total number of student responses in each category.

- Writing portfolio scores were significantly higher than short answer scores in 80% of unit assessments. (t-test, $p < 0.05$)
- Significant decrease in variance in 40% of writing portfolios compared to short-answer exams within units of study. (f-test, $p < 0.05$)
- Comparison between above-average SAT and below-average SAT students in the treatment group did not show significant differences on 40% of multiple-choice tests, and 60% of writing portfolios. (t-test, $p > 0.05$)
- Students had the highest average Likert responses regarding self-perception of skills engagement, with a mean of 4.1 in both groups.

Value

The pressure to score high marks on standardized tests can detract from understanding material in depth. Many science teachers lament the lack of hands on science practice in their courses, citing the lack of instructional time, with the implicit assumption that lab investigations are less efficient at imparting factual knowledge than direct instruction. Yet the results of this classroom research indicate lab-based portfolios had a neutral or slightly positive effect on tests of factual knowledge. Furthermore, the hidden opportunity costs of the time spent prepping and scheming for tests could be more effectively spent on thought and reflection on written expressions of understanding.