

Introduction

"If you want to go quickly, go alone. If you want to go far, go together."
~a contemporary proverb

Collaboration can be a powerful experience for students to learn from themselves and from one another. Collaborative learning activities must be chosen purposefully and crafted carefully. My project was to enlist my students' help to hone a collaborative learning activity, the collaborative 2-stage test.

In **collaborative 2-stage tests**, students complete a test as individuals and then immediately complete the same, or very similar, test in groups of three to five. During the group stage, students are encouraged to discuss the questions and come to a consensus on their answers.

This testing method is an example of *assessment as learning*. Collaborative 2-stage testing has been shown to improve individual student learning for undergraduate students, as evidenced by improved individual scores on follow-up tests.

The Research Question

What are the effects of collaborative 2-stage testing on Grade 11 and 12 boys' performance in Environmental Studies?

Research Context and Participants

Founded in 1930, St. George's School is an all-boys university preparatory school with 1,150 students, 109 of whom are boarders. The participants were part of one of my Advanced Placement Environmental Science classes that consisted of 17 grade 11 and 12 students.

The Research Action

1. Students wrote one traditional test on course material then, as the course progressed, one collaborative 2-stage test.
2. Students advised me (via a survey and guided discussion) on ways to improve the test format for engagement, equity, and learning.
3. Students wrote the refined collaborative 2-stage test for the next unit, then reflected on the outcomes in a guided discussion.

Data Collection and Analysis

My data sources included:

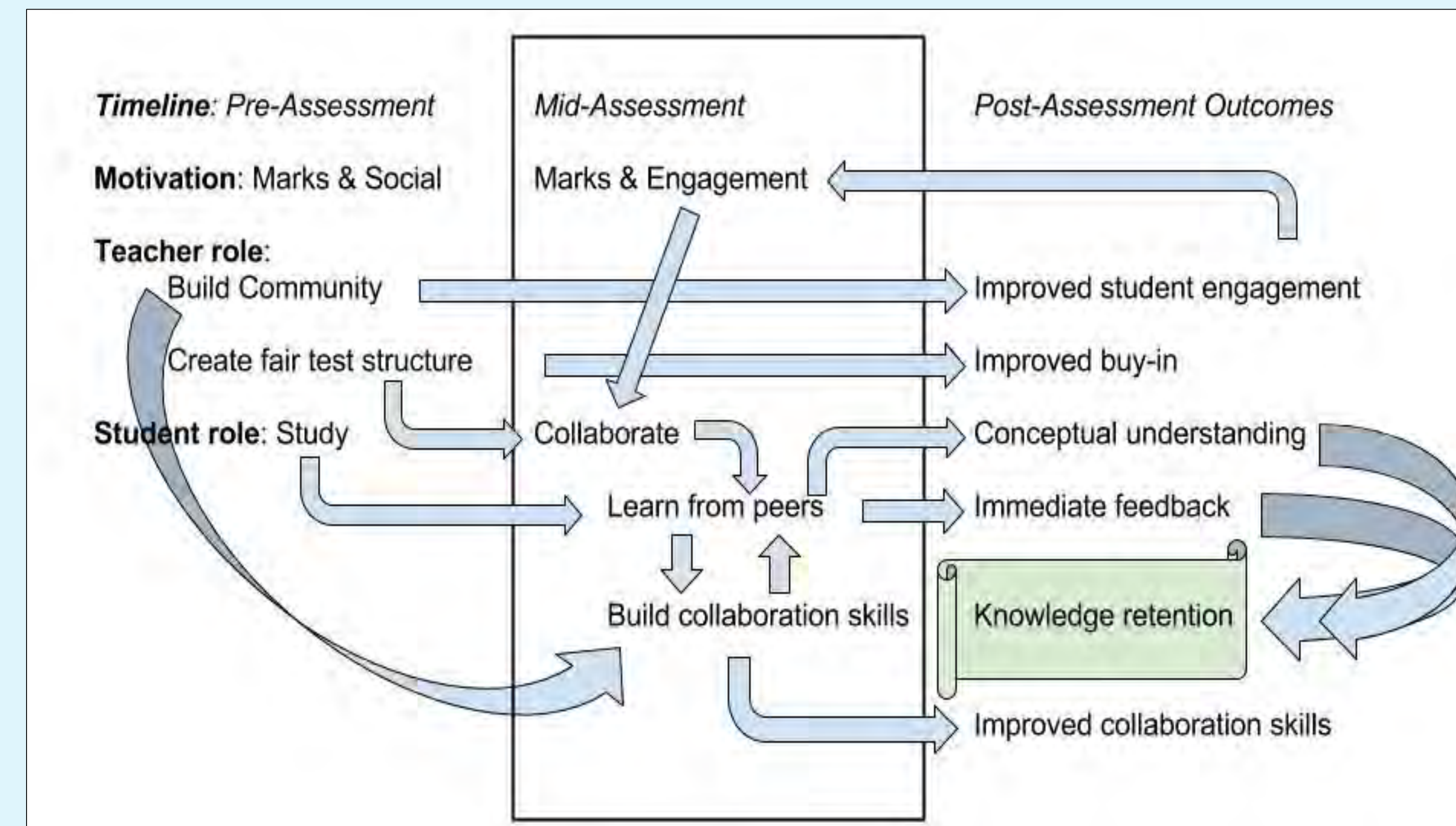
1. Mid-action video, photos, and observations
2. Post-action guided group discussion transcript
3. Post-action online survey
4. Post-second action guided group discussion transcript

Data from transcripts and surveys were coded in a spreadsheet, categorized by theme, and then organized into relationships.

Key Findings and Discussion

In this study, I found that:

- student *engagement increased*;
- students gained a *deeper level of understanding*;
- students experienced a *stronger feeling of accountability* and appreciation for one another; and
- 2-tier collaborative testing works *best with conceptual or problem-based questions*.



Conclusions

In this collaboration, I found increased engagement, deeper understanding, and more accountability between students. The success of collaborations hinged on student buy-in. My results suggest that I must:

- cultivate a sense of community and trust in the classroom;
- create a fair and transparent collaborative test structure; and
- create a fun, engaging space for the students to play and interact - even on tests.

Future studies might include:

- verifying the long-term memory recall from collaborative 2-tier tests vs. individual tests;
- extending this testing method to younger grades or other senior science subjects;
- pre-assigning groups based on personality indicators (e.g. True Colours) or learning preferences;
- pre-loading students with explicitly taught collaboration skills; and
- examining the "saving face" phenomenon of conflict avoidance in group consensus-building.

Key Readings

Gilley, B., & Clarkson, B. (2014) Collaborative Testing: Evidence of Learning in a Controlled In-Class Study of Undergraduate Students. *Research and Teaching*. 43(3), 83-91.

Stringer, E. (2007). *Action Research*. (Third ed.). Thousand Oaks: SAGE Publications, Inc.

Wieman, C., Rieger, G., & Heiner, C. (2014). Physics Exams that Promote Collaborative Learning. *The Physics Teacher*, 52, 51-53.



"Allows us to learn from our mistakes and gives us a better understanding of the topic."

"Improves discussions and debates [leading to] deeper understanding."