

Impact of a combined inquiry-based approach and Harkness style approach on students' attitude and confidence

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Background

This project focuses on whether using inquiry-based lab exercises along with Harkness style of discussion will help students' attitude and confidence. The goal for my project is to help my students take more ownership of their learning, and I believe if their attitudes and confidence improve, so will their willingness to take ownership of their learning. The goal of my treatment is to force myself to abandon the typical lecture style of teaching which I have used for many years in order to help my students take more control of their own learning. While I would like to think that it was my students who weren't taking ownership, I think the way I have been teaching has allowed them to take this approach. One of my goals this year for our faculty evaluation program is to let my students struggle more on their own during in-class exercises and to not be too quick to help them.

Methodology

- 2 major changes in classroom
- First change was to replace "cookbook" lab exercises with inquiry-based lab exercises
 - Students gain better understanding of what exactly the purpose of the exercise is and how to prove it through the data collected
 - Having to figure out how to perform experiment makes them take more ownership of their learning
- Second change was replacing any lectures with Harkness style discussions
 - Harkness style discussions are student-centered discussions similar to Socratic seminar approach
 - Students encounter new material on their own in a reading or video assigned for homework
 - Class discussions include covering new concepts, addressing misconceptions, and tackling challenging problems and hearing a variety of approaches
- These changes aim to shift the class from teacher-centered to student-centered activities. "Guide on the side instead of sage on the stage."
- Aim is to help students realize they are more than capable of digesting new material on their own and performing experiments on their own, hence improving confidence and attitude
- By students taking more ownership of their learning, they should be able to be more successful in all of their classes

Student Population

My sample consists of 48 ninth grade boys taking my conceptual physics class. Woodberry Forest School is an all-boys boarding school and many of my students are on some sort of financial aid and hence very motivated to do well. Many students come from upper-middle class backgrounds but we do have some students from economically weaker backgrounds. In my sample 41 students are White, 4 students are Black, 2 are Asian and 1 is Hispanic.

Research Matrix

Research Questions	Data Sources		
	1	2	3
1. What is the impact of implementing inquiry-based lab exercises and replacing lectures with Harkness style class discussions on students' attitude and confidence?	Likert Survey	HW, Quiz & Test Performance	Teacher Journal
2. How does the implementation of these approaches affect students' willingness to take ownership of their learning?	Ownership Score	Likert Survey	HW, Quiz & Test Performance
3. How does the implementation of these approaches affect student performance?	HW, Quiz & Test Performance	Ownership Score	Teacher Journal

Primary and Secondary Questions

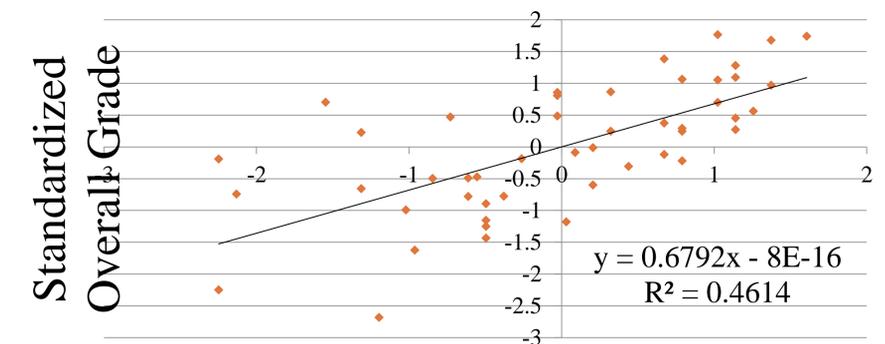
Primary Research Question: "What is the impact of a combined inquiry-based approach and Harkness style approach on students' attitude and confidence?"

Secondary Questions:

- "How does the implementation of these approaches affect students' willingness to take ownership of their learning?"
- "How does the implementation of these approaches affect student performance?"

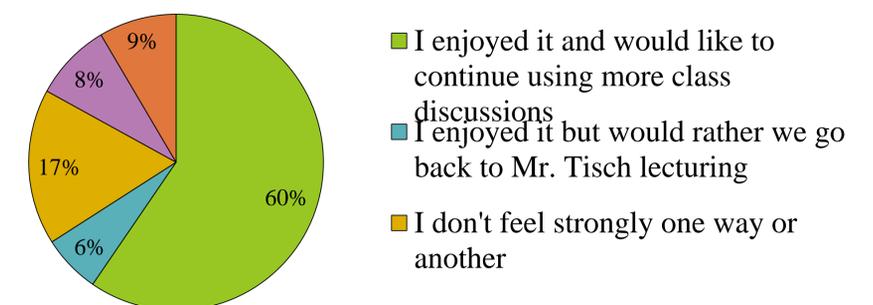
Results

Below is a comparison of students' standardized overall grade to their standardized ownership score. It's abundantly clear that those who took more ownership of their learning earned higher grades, with a few outliers of course.



Standardized Ownership Score

Although much of the survey data was statistically insignificant, student responses to an additional post survey question asking them whether or not they enjoyed the treatment showed a clear pattern. The majority of my students enjoyed the use of class discussions and inquiry-based lab exercises and said they'd like to continue using these approaches throughout the remainder of the year.



Interpretation of Results

- Survey results indicated a drop in confidence and attitude because students were uncomfortable with new approach
- Students enjoyed new approach however, and saw benefit in putting more of the learning in their own hands and hearing a variety of approaches and explanations from peers
- Throughout treatment, students took more ownership of their learning and gained confidence encountering material on their own
- Post treatment, weaker students began taking more ownership of learning and generally improved their overall grade
- Overall performance improved and ultimately their confidence improved for the remainder of the year