



# Giving Students Choices in the Science Classroom: Impact on Student Performance and Attitude



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## Question:

Will giving students choices enhance engagement, knowledge of content, and sense of ownership in the science classroom?

## Hypothesis:

I think that by giving students choices, they will be more motivated to perform. Giving students choices allows them to take an active role in their education thereby increasing engagement and productivity.

## Quantitative Data:

Comparison of Survey Averages\* (N=24)

| Statement  | Control |      |            | Treatment |      |            |
|--|---------|------|------------|-----------|------|------------|
|  | Pre     | Post | Difference | Pre       | Post | Difference |
| I like science   | 3.2     | 3.0  | ↓ 0.2      | 3.1       | 3.3  | ↑ 0.2      |
| I complete my science assignments                          | 4.3     | 3.9  | ↓ 0.4      | 4.0       | 3.9  | ↓ 0.1      |
| I think science class is interesting                       | 3.1     | 3.0  | ↓ 0.1      | 3.4       | 3.8  | ↑ 0.4      |
| I'm allowed to take an active role in my science education | 3.2     | 4.0  | ↑ 0.8      | 3.0       | 4.1  | ↑ 1.1      |
| ** My average science quiz/exam grades are:                | 4.0     | 4.0  | N/A        | 4.0       | 4.0  | N/A        |

\* Compiled from individual answers based on a scale of 1-5 (Never → Always)

\*\* Statement result was reported based on mode of answer: 4.0 = (81-90)

## Analysis of Data:

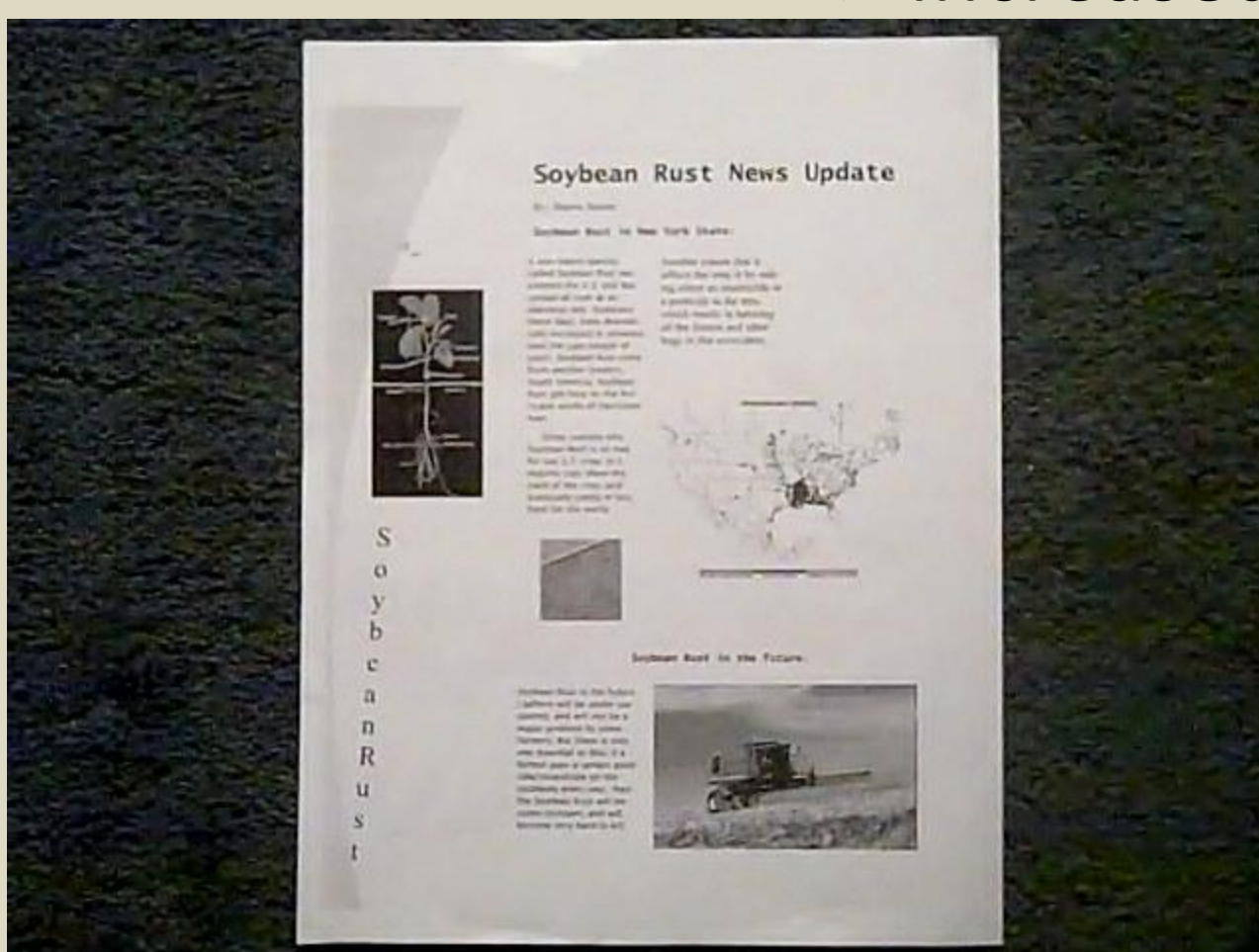
Quantitative:

- ❖ Control group decreased average opinion for statements 1-3
- ❖ Treatment group increased in each category except statement 2 (decrease was negligible)
- ❖ Both groups increased for statement 2 with treatment showing greatest gain (see Pie Charts)
- ❖ No change in mode of response referencing science average

Qualitative:

- ❖ Positive student feedback
- ❖ Active pursuit of knowledge (seek out additional resources)
- ❖ Increased creativity/originality

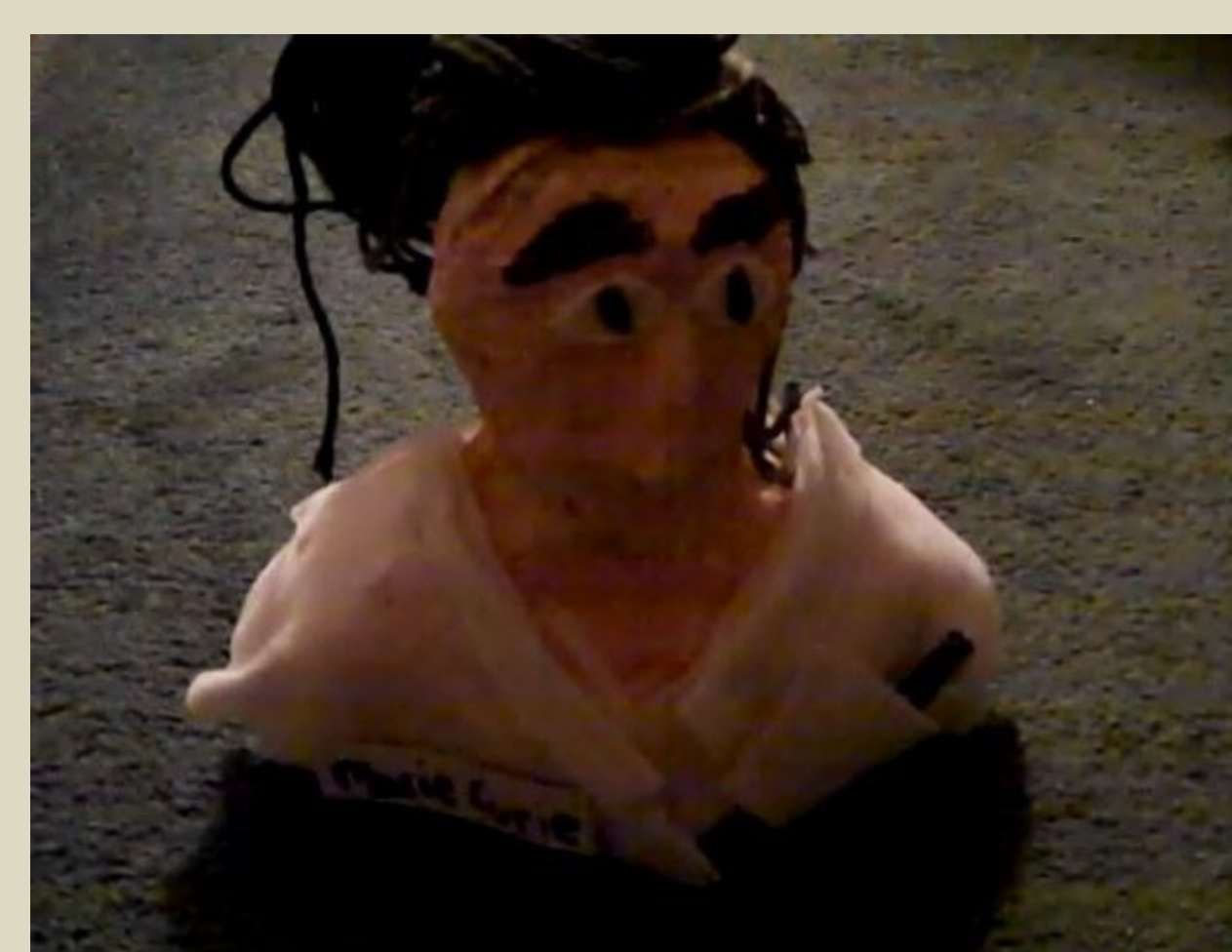
Fig. b



Samples of 'Choice' Student Work:

- Brochure of important abiotic factors in a deciduous forest ecosystem; Trading cards from a sample deciduous forest (Adirondacks).
- News report depicting an invasive species known as Soybean Rust.
- Sculpture of Marie Curie

Fig. c



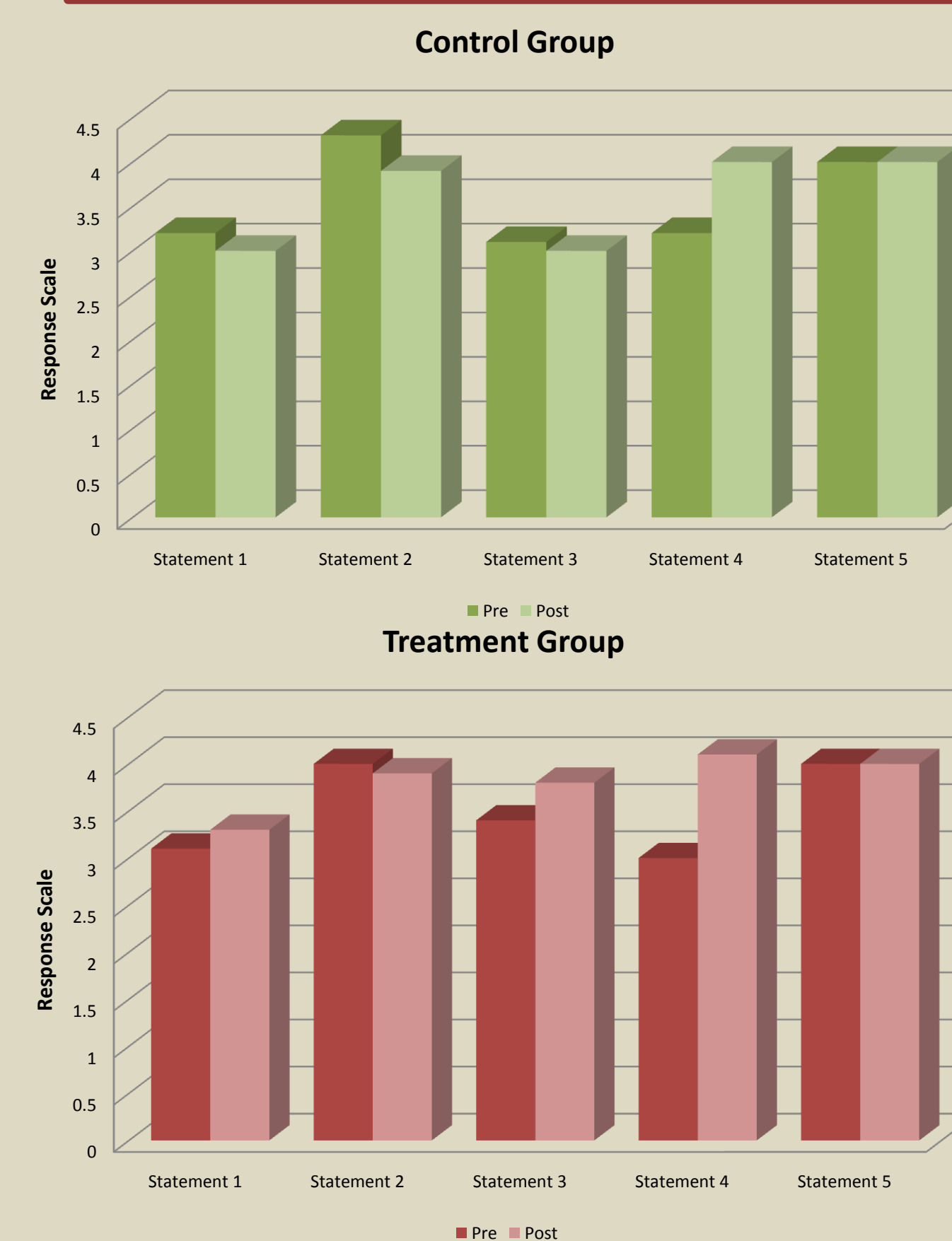
## Method:

- ❖ Perform study over 12 week student teaching experience.
- ❖ Establish 1 class as control group and 1 class as treatment group.
- ❖ Issue Pre Survey prior to beginning instruction.
- ❖ Control: Mandate structured projects; same rubric.
- ❖ Treatment: Choose from a variety of project components that add up to a hundred points; differentiate due dates; same rubric.
- ❖ Issue Post Survey at end of placement.
- ❖ Record observations in reflective journal.
- ❖ Interview student opinion using standard questions.

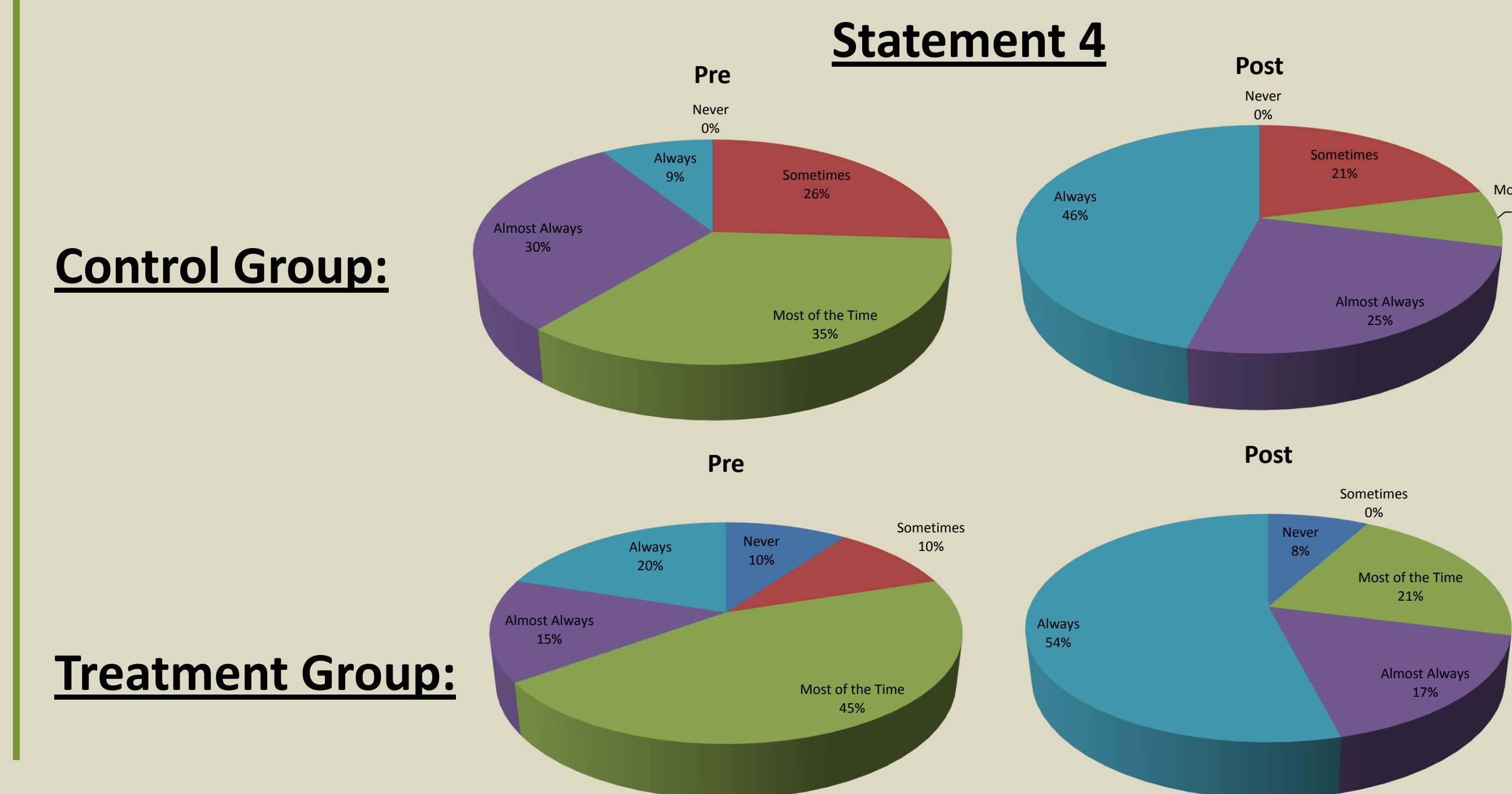


Fig. a

Pre and Post Survey Differences



Shift in Student Mode of Response



## Conclusion:

Students themselves are an excellent resource for teachers to utilize in an effort to increase engagement and productivity in the science classroom. If students are given choices that can be implemented into everyday instruction and assessment, their level of interest and performance will increase due to their enhanced sense of ownership over their education. Choices allow teachers to democratically differentiate instruction and students to express themselves creatively. Students feel proud about the work they complete, while acknowledging the benefit of being able to actively construct a higher level of understanding of the content.

## Follow Up Questions:

- ❖ Where else can choices be incorporated into instruction?
- ❖ Would results vary with increased longevity of study?
- ❖ How does giving choices benefit students with accommodations?