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Introduction

Citizen science is a way for non-scientist, such as the general public, to participate in real scientific research with scientists. This study investigated the effects of participation in citizen science projects on students' science self-efficacy, connection to science, and science anxiety using pre and post surveys. In addition, students' attitudes concerning the perceived value of the citizen science projects was measured.

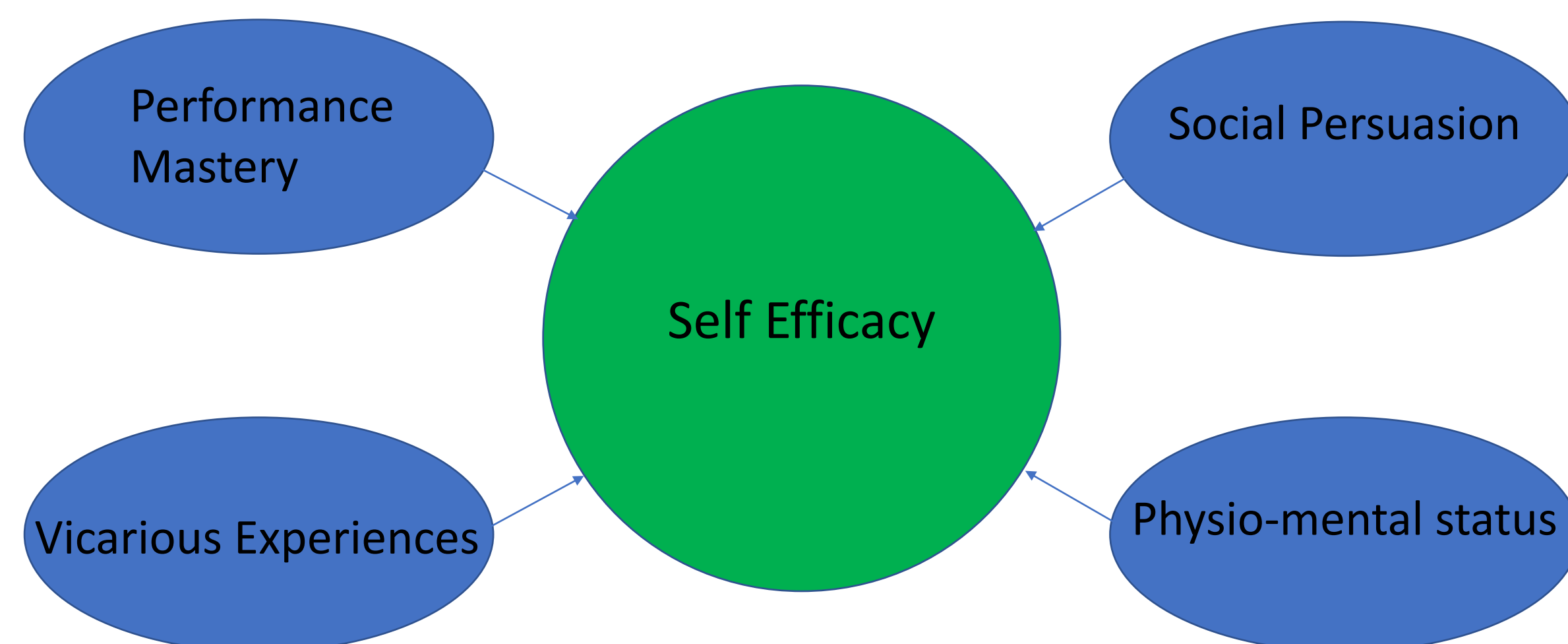
Research Questions

1. Can participation in a citizen science project increase students' science self-efficacy?
2. Can participation in a citizen science project decrease science anxiety?
3. Can participation in a citizen science project increase a students' feelings of connection to science?
4. Do students find value in participating in a citizen science project?

Theoretical Framework

This study used Bandura's (1977) Theory of Self-Efficacy. The organization chart below shows the factors that affect self-efficacy, which influences behavior and performance in a subject.

Figure 1: Bandura's Theory of Self-Efficacy



Methodology

This study was conducted at a small community college in central North Carolina. Students were enrolled in either a general chemistry or principles of science course in the spring semester of 2021. The demographics of the population can be seen in Figures 2 and 3 below. Data was collected using a mixed methods design (see Table 1).

Figure 2: Age of participants

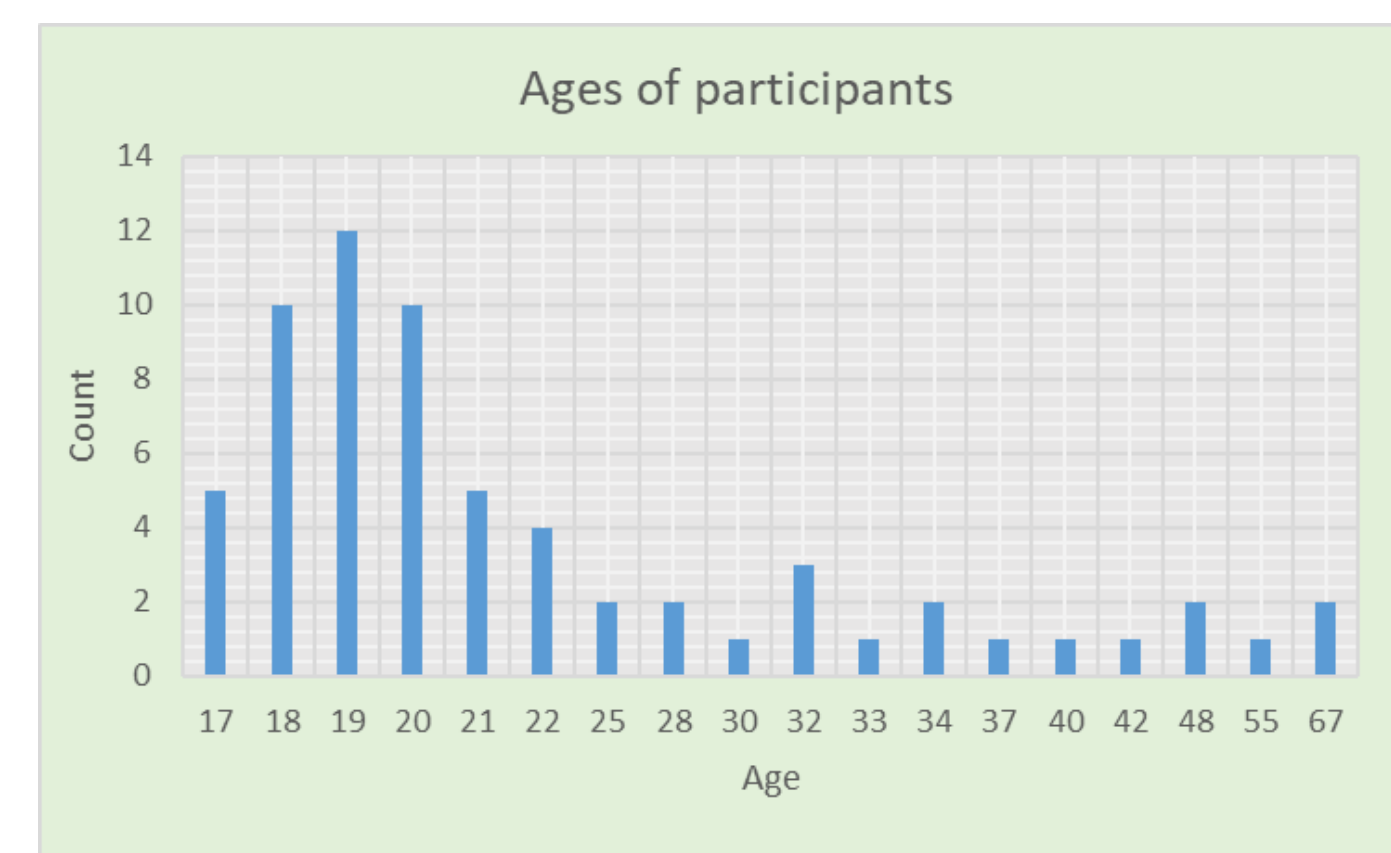
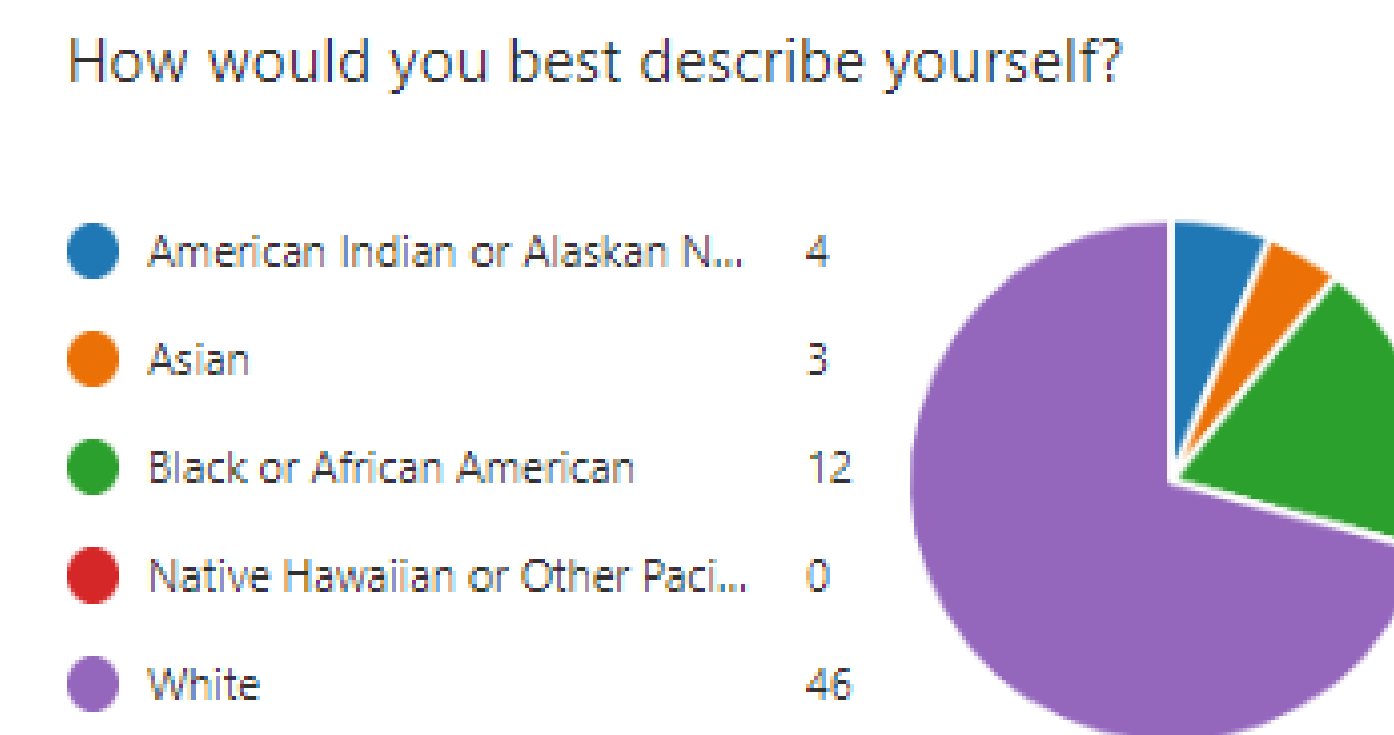
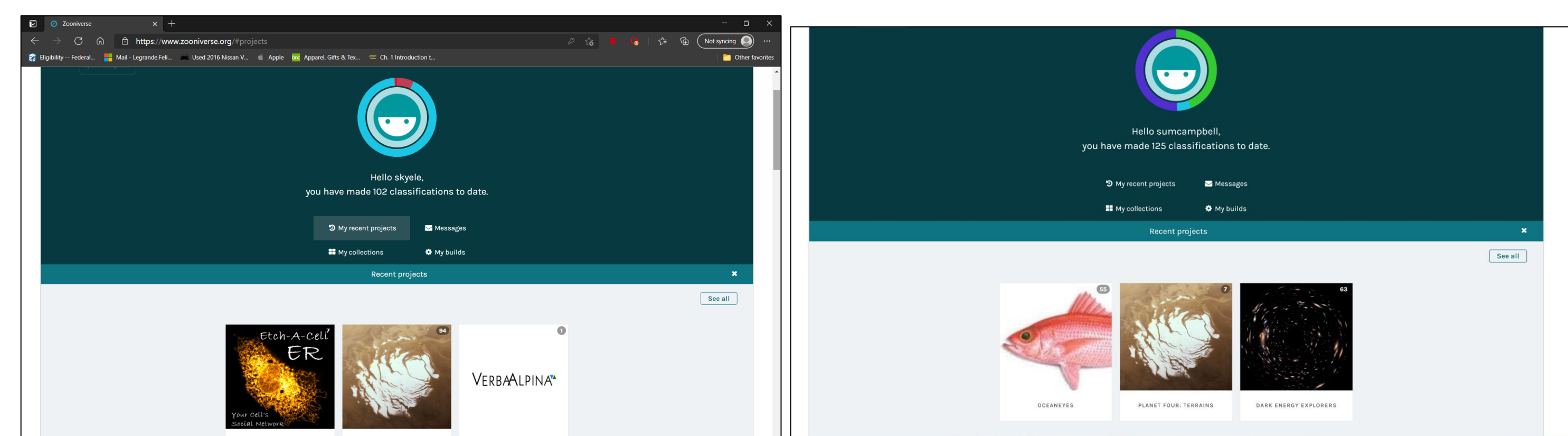


Figure 3: Demographics



Intervention

Figure 4: Sample student screenshots



1. Students viewed videos of the researcher explaining how to use the Zooniverse platform to participate in citizen science projects.
2. Students were to pick as many of the projects they liked to participate in. They had a two-week period to complete the project with an expectation of 100 classifications on the Zooniverse platform. They worked on the classifications at their leisure.
3. When completed, the students uploaded a screenshot to show what projects they worked on and provided proof of the target number of classifications.

Data Sources

Table 1: Data sources

| Data Source | Type | Research Question |
|---|------------------------------|---|
| Pre and post Science Self Efficacy Survey | Quantitative - Likert Survey | Can participation in a citizen science project increase a student's self-efficacy? |
| Pre and post Science Anxiety Survey | Qualitative | Can participation in a citizen science project decrease science anxiety? |
| Pre and Post Self in Science survey | Qualitative | Can participation in a citizen science project increase a student's feelings of connections to science? |
| Post project discussion questions | Qualitative | Do students find value in participating in citizen science projects? |

Results

The data did not show a correlation between participation in the project and effects on the behaviors or ideals represented by the first three research questions. The response questions from the post project survey indicated an overwhelmingly positive response. Out of the 49 respondents that filled out the post project survey, 38 of them (>75%) indicated that they would like to participate in future citizen science projects.

Do you see yourself participating in more citizen science projects?

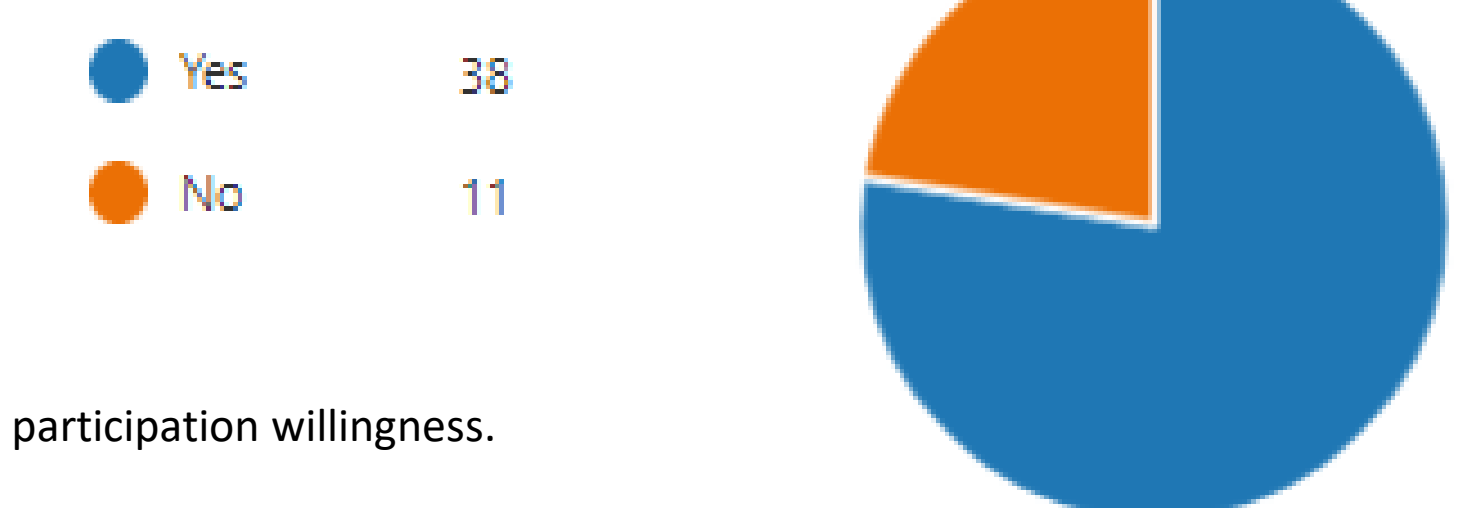


Figure 5: Response to future participation willingness.

Conclusion

The results indicated that participation in the citizen science project did not affect the students' science self-efficacy, science anxiety, or feelings of connectedness to science. This could be due to the short time period of the study. However, the enthusiasm showed by the students in the open response questions demonstrated that many did find value in the project. Most students indicated that they could see themselves participating in citizen science on their own time. As a result, the researcher believes that citizen science should be conducted over the course of an entire semester to gain a better understanding on the effects of citizen science on self-efficacy, science anxiety, and connectedness to science.