

SoTL Inquiry into Students Making Meaningful Connections to the Geosciences

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Abstract

Wisconsin K-12 students have few opportunities to study geoscience outside of required units in fourth and eighth grade, resulting in a lack of understanding about educational and career opportunities available regardless of ethnicity, gender, etc. Although we are training new geologists every year, the deficit for the geoscience workforce will be approximately 130,000 by 2029 (Gonzales and Keane, 2020). Also, students are looking for altruistic careers, something geoscience can fill. To address assumptions of perception such as presented in Brookfield (2017), students played Geology Bingo, which consists of 25 activities about the discipline, employment opportunities, and meaningful careers to help their communities. Activities were selected and arranged so all students had a path to completion regardless of internet access, transportation, or money. Geology students completed a pretest and post-test covering questions about their understanding of the science of geology, career opportunities in geology, and their satisfaction with their current majors.

Introduction

Many students taking introductory geoscience classes do so to satisfy general education credits for their degrees. However, traditional ways of presenting career opportunities in the geosciences as part of lectures or class discussions seem to have little effect in recruiting students to the major. Additionally, according to research conducted by Carter et al. (2021), incoming geoscience students are rating concerns about helping their communities and helping their environments more highly than careers focused on spending time outdoors.

Research Statement

This project aims to increase student understanding of the geosciences, career opportunities, and opportunities for altruism using geoscience by allowing them to choose the aspects of the discipline most important to them through the use of a Geology Bingo card.

Methodology

- Pre-test
- Geology Bingo project
- Post-test
- Repeated in Fall and Spring semesters

Incorporation of Equity and Social Justice

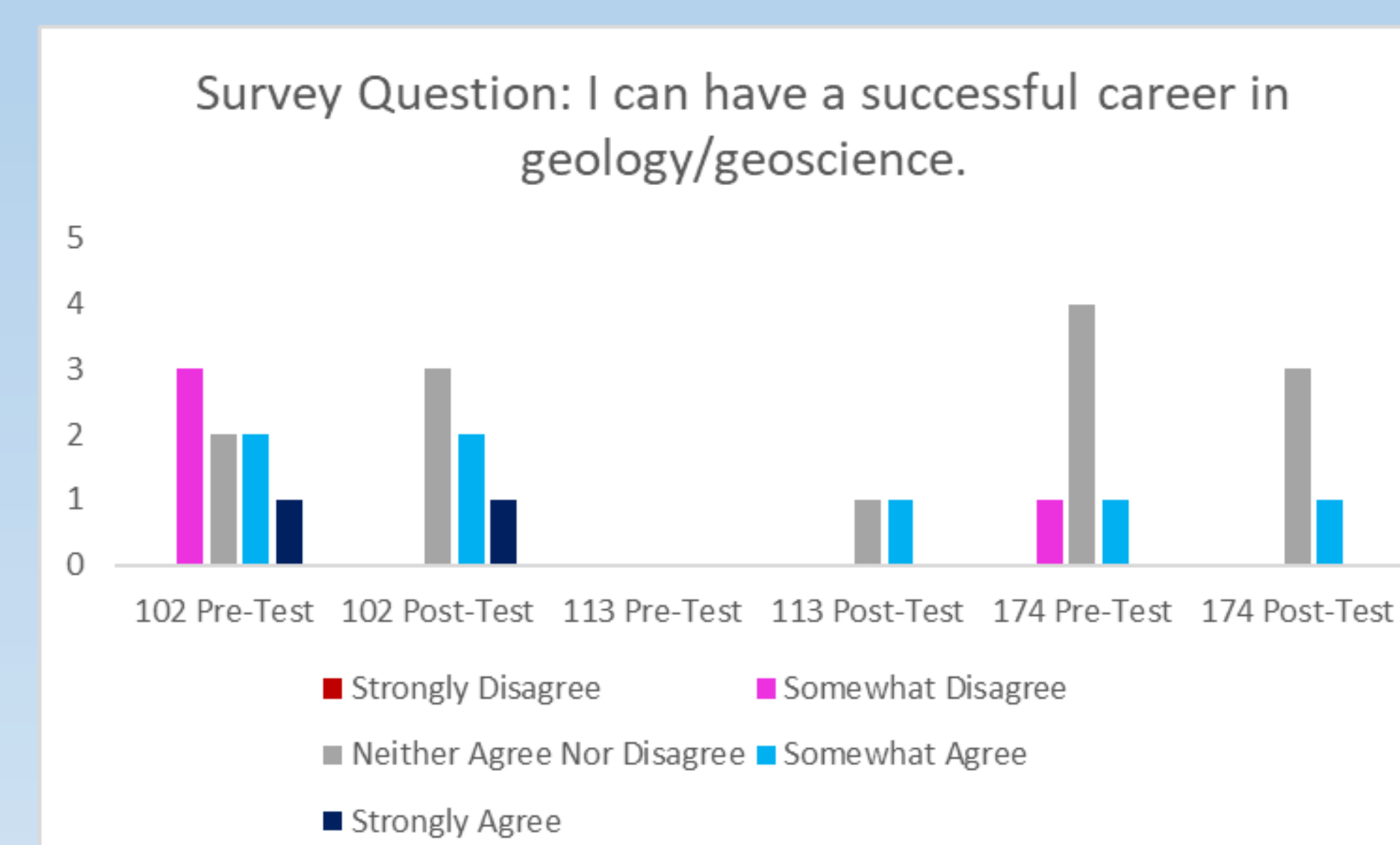
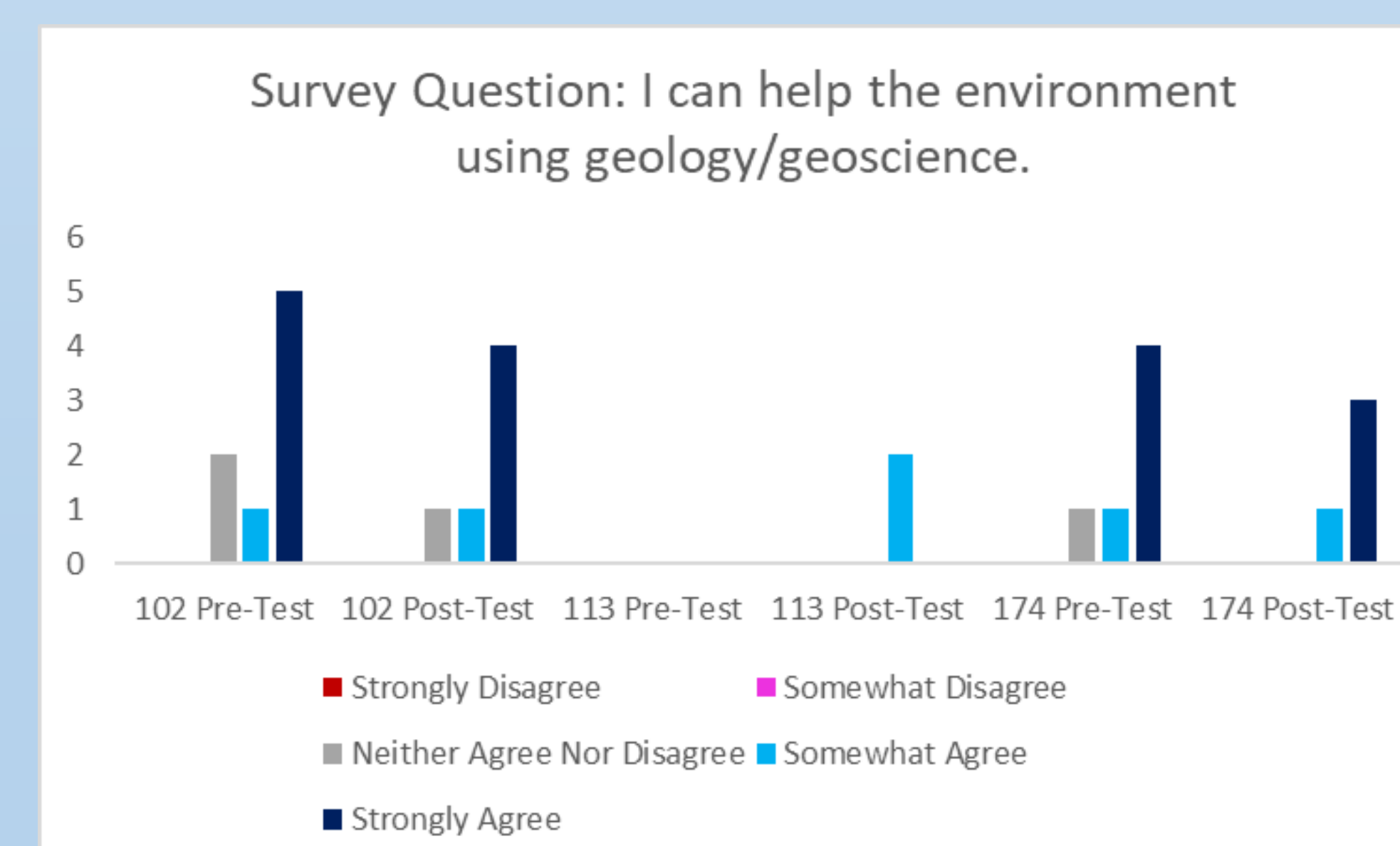
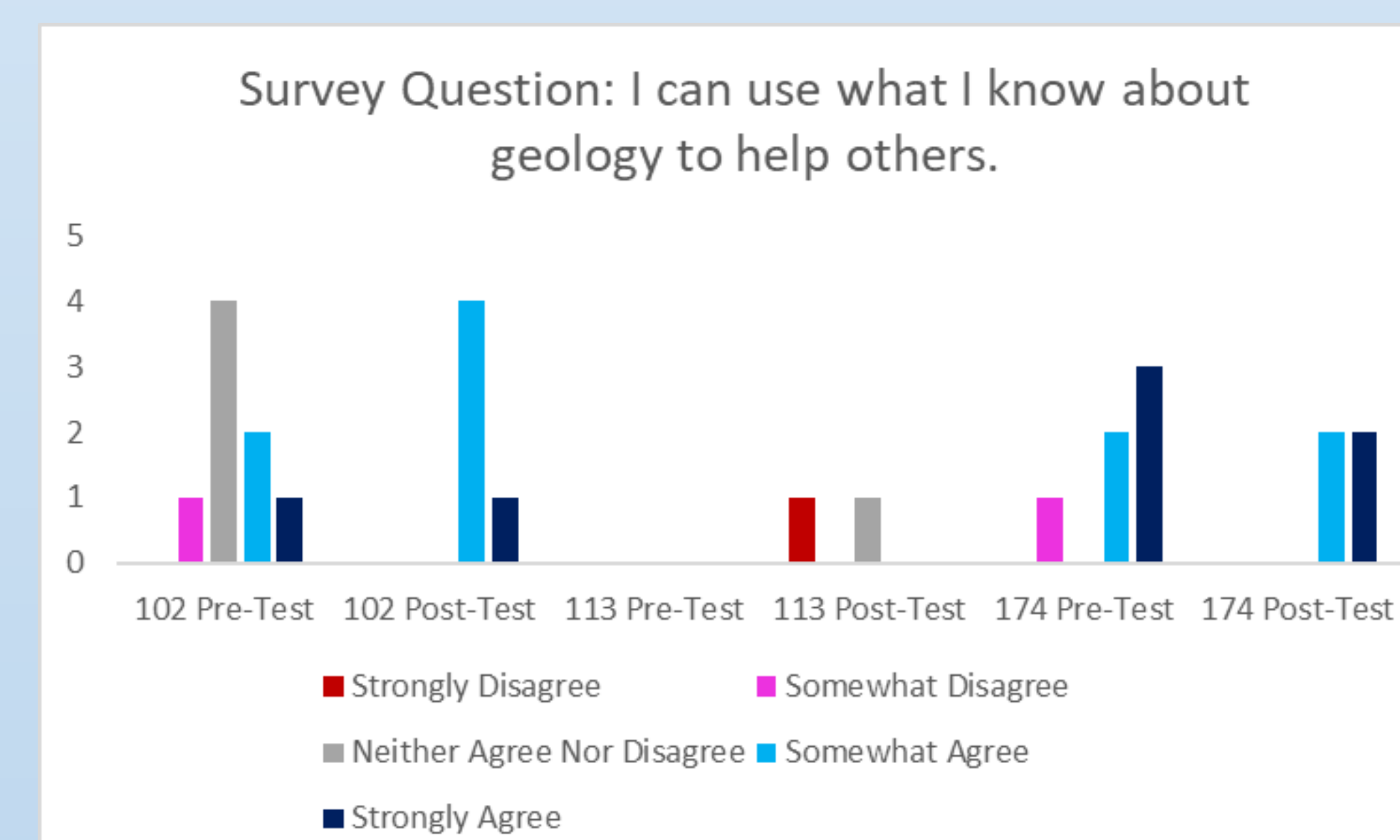
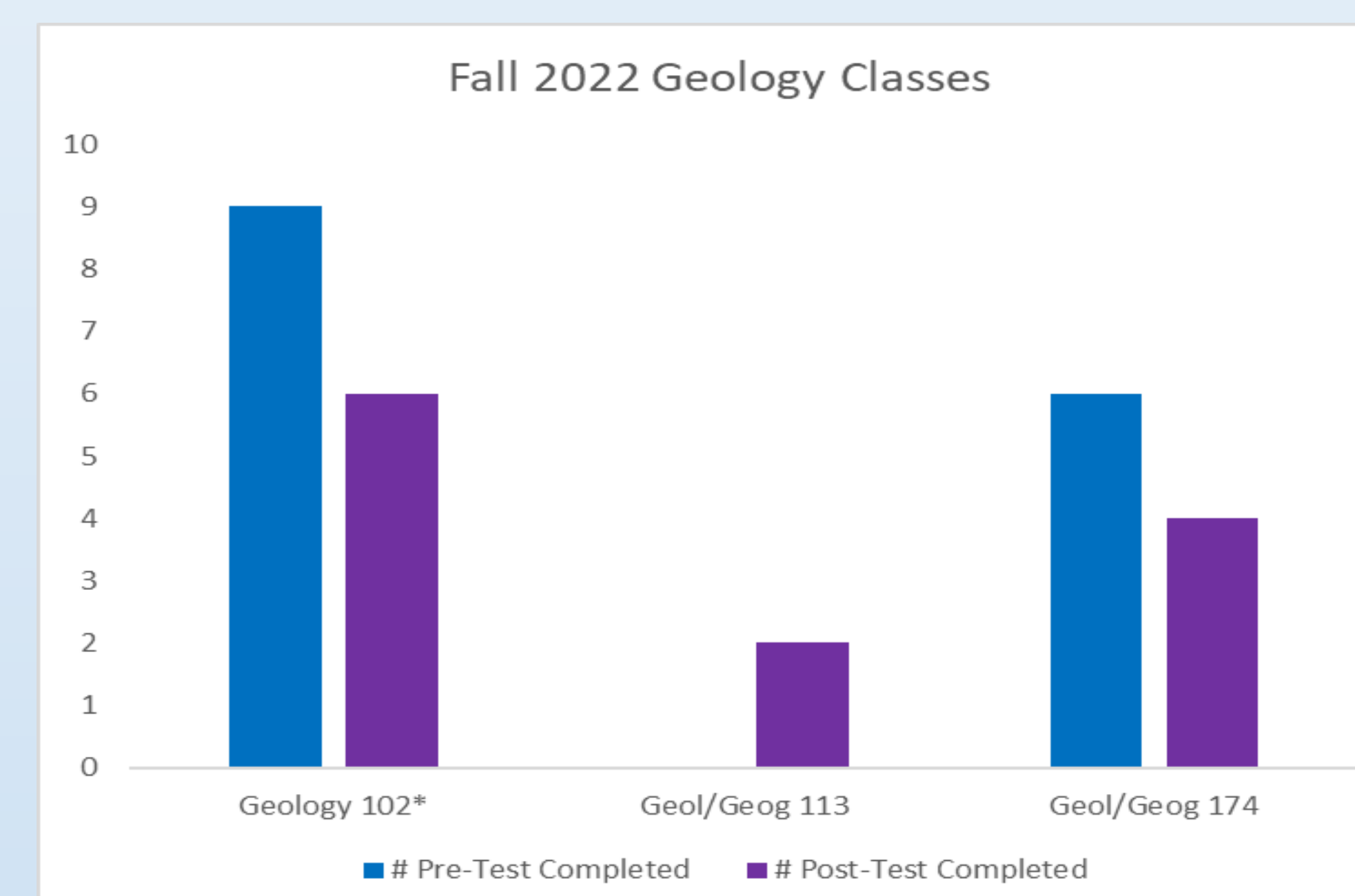
- Students chose their activities based on their interests
- Traditional recruitment activities side-by-side with opportunities for volunteering
- Options allowed students to incorporate the social justice aspects important to them
- Options include activities that do not involve cost or transportation

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| Visit the Weis Earth Science Museum at UWO-Fox Cities Campus | Volunteer to work with a scouting group working on projects related to geology, environmentalism, etc. | Follow a social media page dedicated to geology, paleontology, or disasters for two weeks | Research the local geology and how it was used in the local economy | Attend a monthly meeting of a local geology club and write about what you learned |
| Research the education, salary, job prospects, etc. for a career in geology | Participate with a student club for geology or environmentalism for at least two meetings | Create two one-page infographics on different geology topics suitable for the general public | Listen to a podcast or watch a video about geology, paleontology, or disasters (min. total of 30 minutes) | Read a blog about geological, environmental, or disaster hazards and write about three events |
| Research three examples where a real-life knowledge of geology helped or protected people | Research the careers of five different geoscientists that resonate with you and explain why | Visit Dr. Johnson in her office to talk about majoring in geology | Create two geology posters or advertisements to hang around campus or display on TVs | Volunteer for a litter clean-up event in the community or campus |
| Volunteer at a museum, nature center, or planetarium | Research five geological disciplines and explain what they are | Research five natural hazard or disaster monitoring programs | Complete an EarthCache (a type of Geocache) | Design a geology or paleontology display or exhibit |
| Speak with an instructor in the UW Oshkosh Geology Department about careers in geology (NOT Dr. Johnson!) | Participate in a citizen science project | Research five professional societies in geology and explain how they help support and educate students | Tutor another student in geology or form a geology study group | Visit a county or state park or a nature center and research its geology. (NO sites covered by our class field trip.) |



Figure 1 (Top): The Geology Bingo card used for both semesters of the project. Red circles mark traditional recruitment activities often used to attract students. Yellow stars mark altruistic activities where students can use what they know about geoscience to help others.

Figure 2 (Bottom): Environmental Geology 150 students on their class field trip to High Cliff State Park, Sherwood, WI on April 15, 2023. Such an image of students working on geology in the field is commonly used by geoscience departments to recruit students to the major.



Selected Agree/Disagree Questions from the Pre-Test/Post-Test Survey

- 1) I understand what the science of geology/geoscience is about.
- 2) Geology/geoscience is important to my everyday life.
- 3) I can use what I know about geology to help others.
- 4) I can have a successful career in geology.
- 5) I can help the environment using geology/geoscience.
- 6) I can use my knowledge and/or skills in geology to help my community.

Student Comments

- “I wish I had more opportunities to take geology-type classes throughout middle/high school.”
- Wished known prior to taking geology: “Maybe like some baseline facts about the Earth and study of geology.”
- “I have found geology to be a fascinating subject, and I have learned a lot more than I thought there was to know about the subject.”
- “Geology has helped me understand the importance of the environment and how identifying minerals can help you understand the significance of environmental sights [sic].”

Conclusions

- 1) Low participation rate in fall impacted results. Experiment repeated in spring and is ongoing.
- 2) Effect of SoTL intervention unclear between Geology 102 and Geology/Geography 174 because of topics covered in 174.
- 3) Students are reporting satisfaction with geology, but not enough to change their planned majors.

Works Cited

- Brookfield, S. (2017). Chapter 2: Uncovering Assumptions of Power, *in Becoming a Critically Reflective Teacher*. San Francisco: Jossey-Bass, p. 21-37.
- Carter, S.C., Griffith, E.M., Jorgensen, T.A. *et al.* Highlighting altruism in geoscience careers aligns with diverse US student ideals better than emphasizing working outdoors. *Commun. Earth Environ* 2, 213 (2021). <https://doi.org/10.1038/s43247-021-00287-4>
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