

# Do active learning activities increase a sense of engagement and students' perceptions of success in general education geology coursework?



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## ABSTRACT

Non-science students in general education geology courses at the University of Wisconsin Superior frequently complain of a lack of relevance to their lives. Faculty members tell them learning about environmental problems will make them better citizens (in addition to learning for the sake of learning). Traditional lab activities try to teach problem solving skills and content at the same time. Students perform on the labs, do well on the tests, and yet will report feeling disconnected from the material. This study examines the influence of alternative learning strategies on students' perception of success. I examine the impact of POGIL (Process Oriented Guided Inquiry Learning) activities and/or Academic Service-Learning have on students' self-concept of success.

## Course Background

- Pilot study implemented in Geology 112: Historical Geology
- Low enrollment, sample size n= 12
- Class meets for lecture (3 x 50 minutes) + lab (1 x 120 minutes)

## Sample activities

Sample Activities:

1. You will be experimenting with sediment and water. When your whole group is ready to watch, you will slowly pour 200 mL of sand into the aquarium filled with water. What do you anticipate will happen to the sediment? Write it out in sentence form and draw a little sketch in the "aquarium".

1. Circle the words that do not apply to the study of geology.
2. Underline any that are unknown to your group.

|                        |                   |                       |
|------------------------|-------------------|-----------------------|
| Lithosphere            | Moon              | Scientific method     |
| DNA                    | Mars              | Clay                  |
| <u>Micro-organisms</u> | Sandstone arches  | Weathering            |
| Asthenosphere          | Water quality     | Banded Iron Formation |
| Atmosphere             | Pangaea           | Population            |
| Oceans                 | Pollution         | Global Warming        |
| Fossils                | Radioactive decay | Carbonates            |
| Lakes                  | Oil exploration   | Metamorphic Rocks     |
| Plate tectonics        | Geologic Faults   | Rock cycle            |
| Precambrian            | Trees             | Darwin                |
| Evolution              | Biosphere         | James Hutton          |

## Academic Service-Learning

In groups of 2-4, students work through multiple assignments in and outside of class to ultimately create an educational poster and a hands-on activity to be presented at our campus's community event, Science Night. Science Night draws 800-1000 community members annually for hands-on fun activities across all disciplines of science. Environmental Geology students are challenged to take a complex topic they learned in class, break it down into its basic components, and present to an audience of children and parents in approximately 2-5 minutes.

## Survey Data

Please rank the following activities according to how helpful each is in helping you learn new material:

|   | very helpful | not very helpful | not at all helpful |
|---|--------------|------------------|--------------------|
| Lecture   | 9            | 0                | 0                  |
| Studying with friends   | 2            | 5                | 2                  |
| In class activities – lab problems, problem solving, discussing topics, working with classmates | 9            | 0                | 0                  |
| Exams   | 0            | 0                | 0                  |
| Academic Service-Learning Project   | 7            | 2                | 0                  |

## Conclusions

- Students identified equal importance on direct instruction and active learning.
- No direct correlation between grade and preferred methodology.
- Need larger sample size.