CAN FOCUSING ON THE CONNECTIONS BETWEEN SCIENCE AND SOCIETY IN AN INTRODUCTORY GEOLOGY COURSE CHANGE THE WAY STUDENTS PERCEIVE THE RELEVANCE OF SCIENCE?

Michael Pelch & David McConnell
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A deeper look into a quasi-experimental methodology.
Quasi-Experimental vs. Experimental Design

Random Sampling

Non-Random Sampling
Non-Equivalent Groups

[Bar charts showing number of students in different groups across different semesters]
Non-Equivalent Groups

<table>
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<th>Semester</th>
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<th>Sophomore</th>
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<table>
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InTeGrate
Interdisciplinary Teaching about Earth for a Sustainable Future

Control

Day 1
Pre-Testing
Mid-Semester Testing
Post-Testing
Last Day

Treatment

Day 1
Pre-Testing
Mid-Semester Testing
Post-Testing
Last Day

Intervention – InTeGrate modules/activities
Interventions

Summary

Despite humans' heavy reliance on Earth's mineral resources, few think about where the products they use come from. This module addresses that disconnect by combining learning about rocks and minerals (and how they are formed) and mineral resource discovery and extraction, and the impact of mineral resource use. This module allows students to see the context of important and immediate societal issues while also asking students to confront human issues in personal choice, and politics that may arise due to obtaining, beneficiating, transporting, trading, using, and disposing of minerals.
Examples

**Unit 6** - Students become “experts” on a topic related to gold mining and then work in groups to weigh the benefits and consequences of exploiting gold as a resource.

**Unit 1** - Students make the connections between commonly mined resources and the products they create.
Instruments

Changes in Attitudes about the Relevance of Science (CARS) Survey

Revised Scientific Attitude Inventory (SAI II)

Likert Surveys

Analyzed using Rasch Modeling

Construct

Design

Attitudes about the **relevance** of science

3 different sets of questions

Attitudes about **scientific field** and **NoS**

1 set of questions given twice

Analyzed using Rasch Modeling

3 different sets of questions given twice
Results – Comparing Control and Treatment Groups

CARS Survey

- CS1
- CS2 * $\eta^2=0.10$
- ES1 ** $\eta^2=0.30$

SAI II Scores

- Scaled Pre-SAI
- Scaled Post-SAI
Controlling for the Unknown

“Are there alternative explanations for the apparent causal association?”

1. Pedagogical style
2. Instructor
   - Socioeconomic status
   - Gender
   - Parental views of science
   - Political views
Summary

• Quasi-experimental designs in education often consist of non-random sampling and non-equivalent groups.

• Interventions are those items or strategies hypothesized to have an impact on your sample.

• Ensure steps are taken to adequately control for other factors that may or may not influence an observed effect.
QUESTIONS?