

Climate Change Education for Secondary Students

Problem

A 2011 study found that only 25% of U.S. teens would receive a passing grade on a test of climate change knowledge¹. Furthermore, only 54% believe that climate change is happening¹. Climate change education in the classroom is needed in order to overcome this knowledge gap and develop climate literate citizens¹.

However, climate change is not an easy topic for teachers due to its controversial status. Four states have already passed legislation requiring teachers to incorporate climate change denial perspectives when teaching about climate change². People may hold strong beliefs about climate change. Teachers should be sensitive to those beliefs so that students do not feel alienated and stop listening.

This research aims to identify strategies to teach about climate change in such a way that students do not shut down or feel that their views are being attacked while at the same time teaching sound climate science.



Research Questions

1. Which demographic factors affect students' opinions on climate change?
2. Does the timing of the introduction of the topic of climate change in the lesson affect student learning?
3. To what extent does a social learning activity help students accept others' climate change opinions?



Literature Review

The framework for addressing scientific misconceptions³ states educators should overcome misconceptions at the beginning of the lesson; if the misconceptions are not identified and addressed, the student will not retain any of the new information. However, the anchoring heuristic⁴ states that information in the working memory may act as an anchor and prevent the learner from drifting too far from what they already believe. Research question 2 will be examining each of these theories in the context of climate change.

Social learning research suggests that by working together and focusing on a problem, adults can be more successful at understanding the others' reasoning and applying new knowledge. Research question 3 will test this with students and climate change.



Methods

The participants in this study will be high school students in a summer science program. All students participating in this study will be asked demographic questions and questions about their opinions on the causes, effects, and solutions of climate change. Responses will be analyzed to examine if there is a correlation. Factors that will be considered include:

- Students' political orientation
- Students' level of trust in scientists
- Students' perceptions of their parents beliefs about climate change

For research question 2 students will be split into two treatment groups. Both groups will receive the same content in a different order. The content will be on the carbon cycle, carbon sequestration in trees, and their relation to climate change.

- Treatment A will relate the concepts to climate change from the beginning of the lesson.
 - Treatment B will tie the concepts to climate change later in the lesson.
- Students will be given a posttest and interviewed about their knowledge of climate change and their opinions about the activity.

For research question 3 students will be split into three treatment groups. Both groups will receive a lecture on the science of climate change and differing perspectives on climate change.

- Students in treatment A will work by independently to evaluate the evidence and beliefs that might underlie differing statements about climate change. This will be followed by a posttest and then a group discussion
- Students in treatment B will work independently to evaluate the evidence and beliefs that might underlie differing statements about climate change. This will be followed by a group discussion and then a posttest.
- Students in treatment C will work in groups to identify possible ways their community could mitigate or adapt to climate change. Each student in the group will be assigned a different perspective on climate change to represent. Students will be given a pretest and a posttest to evaluate changes in their climate change knowledge, their awareness of other opinions on climate change, and degree to which they understand other opinions.

Applications

This research will help develop instructional resources on climate change and forests.

It will also be useful to educators who teach about controversial issues.



References

1. Leiserowitz, A., Smith, N. & Marlon, J.R. (2011) American Teens' Knowledge of Climate Change. Yale University, New Haven, CT: Yale Project on Climate Change Communication.
2. Horn, S. (2012, March 22). How ALEC is Destroying the Teaching of Climate Change Science, One State at a Time. *AlterNet*.
3. Monroe, M.C. (2004). Addressing Misconceptions about Wildland-Urban Interface Issues. *EDIS Document FOR108*.
4. Tversky, A. & Kahneman D. (1974). Judgment Under Uncertainty: Heuristics and Biases. *Science* 185 (4157), 1124-1131.