

# TEACHING GLOBAL CLIMATE CHANGE AS A SOCIOSCIENTIFIC ISSUE TO ADDRESS THE NGSS

## Problem Statement

The newly adopted Next Generation Science Standards (NGSS) requires that California secondary science teachers integrate global climate change (GCC) content into their curriculum, but research reveals major inconsistencies in teaching GCC content across the nation (Bunten & Dawson, 2014; Hestness et al., 2014; Plutzer et al., 2016). The teaching inconsistencies are due to factors such as the lack of scientific literacy, deep GCC content knowledge, and need for effective teaching methods to address politically controversial issues. Other barriers to teaching GCC include weak curriculum and confusion among teachers regarding scientific consensus on the topic (Dawson, 2012; Hansen, 2010). There is a high demand for GCC education among teachers, but there is a higher demand for effective GCC programs (Shea, Mouza, & Drewes, 2016). This study seeks to identify teachers' personal perception of GCC, how that might impact their curriculum design, and evaluate a GCC education program to uncover what is needed to support science educators teaching GCC.

## Methods

This is an explanatory mixed-methods study using survey instruments, interview protocols, and document analysis to gain a deeper understanding of teacher perception of GCC and how the workshops may inform their teaching. The first program will take place June 2018 as a pilot study allowing for modifications before data collection in the Fall 2018. The first phase of the study includes creating a three-day workshop with scientists, national educational directors (from NOAA, NCSE, and NASA), and advocates focusing on GCC. Phase two will involve quantitative data collection in the form of pre- and post-surveys at the workshops. Lastly, phase three involves using the quantitative data to select participants for personal interviews to uncover themes and patterns. Lesson plans and daily reflections will also be collected for analysis.

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Kelley Le is an educator and doctoral student at UCLA in the Educational Leadership Program. She has taught chemistry, nanoscience, and earth science in Los Angeles and Orange County. She has presented at various STEM conferences on NGSS related topics and nanoscience. She also works with UCLA Science Project as an NGSS workshop facilitator and instructional coach.

Special thanks to the following companies for their generous support

UCLA Educational Leadership Program (ELP) - Cohort 24

## Research Questions

This study's units of analyses are teacher perceptions of GCC and perceptions of how GCC educational programs will inform their teaching. The study will address the following research questions:

1. According to teachers, why do they enroll in GCC education?
2. In what ways, if any, do teachers' perceptions about GCC influence their decision to incorporate GCC content into their curriculum?
3. According to teachers who complete a GCC workshop,
  - a. What components do they identify are the most helpful?
  - b. What components do they identify are the least helpful?
  - c. What changes, if any, do they propose to improve the content of the GCC workshop?
  - d. In what ways do they anticipate using what they learned?
4. What do teachers say are challenges to using what they learned about GCC in their classrooms?

## Workshop Approach

This educational program was created using the SSI Framework and current research revealing effective ways to teach GCC (Monroe et al., 2017). Given the politically controversial nature of GCC, unveiling teachers' perceptions of GCC and offering effective GCC education are essential. Teachers' deeply held perceptions of GCC may have an impact on their curriculum development and their willingness to learn about GCC. One way to support science teachers as learners is to approach GCC as a socioscientific issue (SSI). Socioscientific issues are issues that are controversial, tentative in nature, and open-ended without straightforward solutions. Research reveals that teaching GCC as a SSI can increase students understanding of nature of science and science content (Carter & Wiles, 2014; Sadler, Barab, & Scott, 2007).

## Acknowledgements & Contact Info

This project is for John, Westin, and Russell for pushing me to be my best self. This is also for all of my amazing students that continue to inspire me everyday. A special thank you to all of the individuals that continue to support this project in hopes of creating a better world for everyone.

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