

Measuring Student Improvement in Climate Literacy in a First-Year Interdisciplinary Climate Change Course



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INTRO

- In order to improve climate literacy, the social sciences must be more fully integrated with the biophysical basis of climate change.
- We tested climate literacy before and after a first year interdisciplinary elective climate change course.

METHODS / ANALYSIS

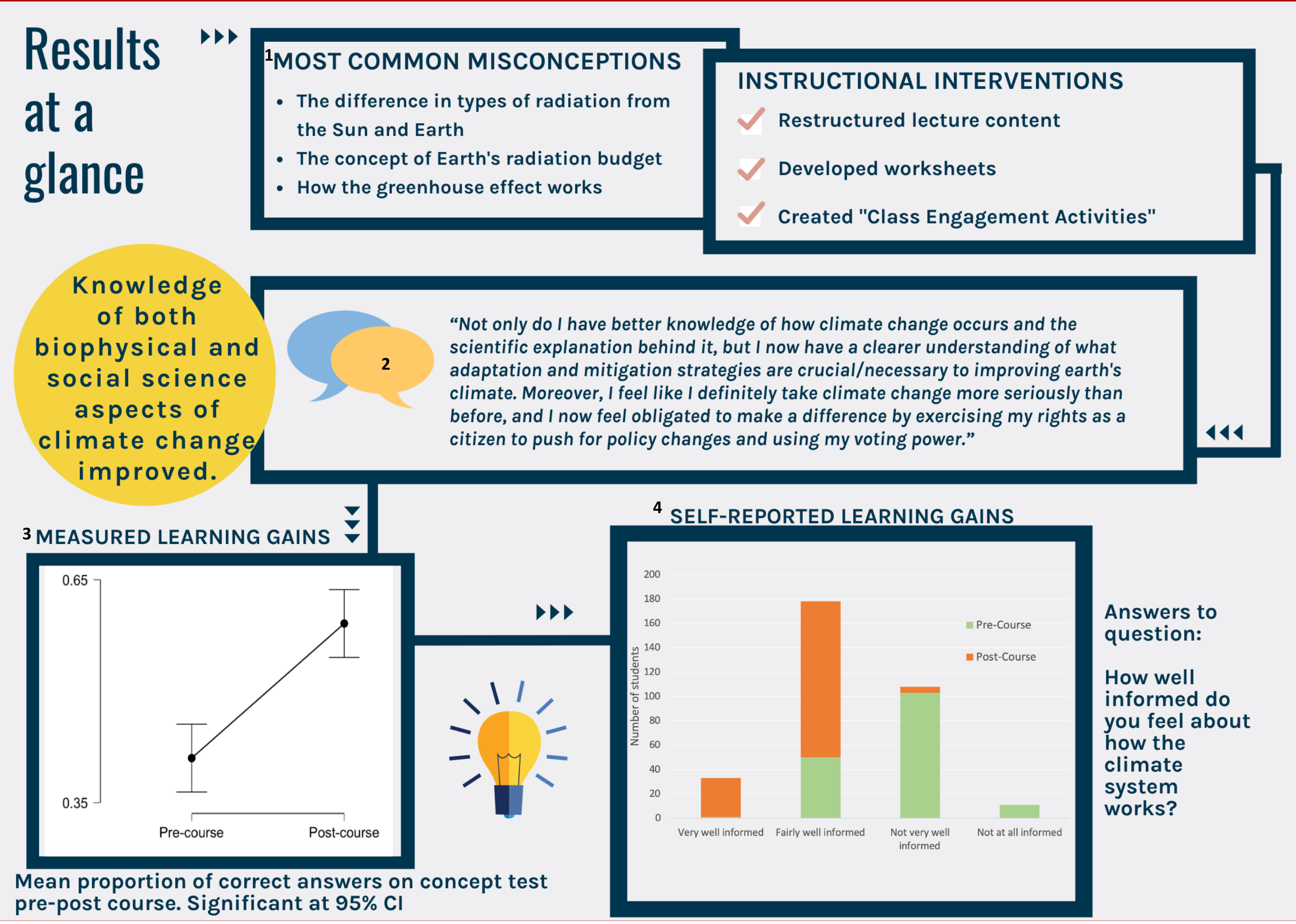
We administered a validated climate change concept inventory (Libarkin et al., 2018) pre and post the course over 3 terms in 2020 (n = 161 students). An open-ended question asked students to explain how their knowledge improved.

1. Identified most common misconceptions and measured improvement pre-post;
2. Thematic analysis of open-ended question;
3. Paired t-tests to test for learning gains pre-post;
4. Compared pre- and post-course answers to climate system knowledge question;
5. ANOVA test for learning gains compared to degree program and year of study.

DISCUSSION

- The most common student misconceptions all relate to Earth’s energy balance and the greenhouse effect, which is fundamental for understanding the cause of climate change.
- Incorporating more active learning helped improve student understanding, but there is still room for instructional improvement.
- Including social science aspects of climate change in the course gives students a broader understanding of the severity of climate change, and also gives them tools and knowledge for solutions.

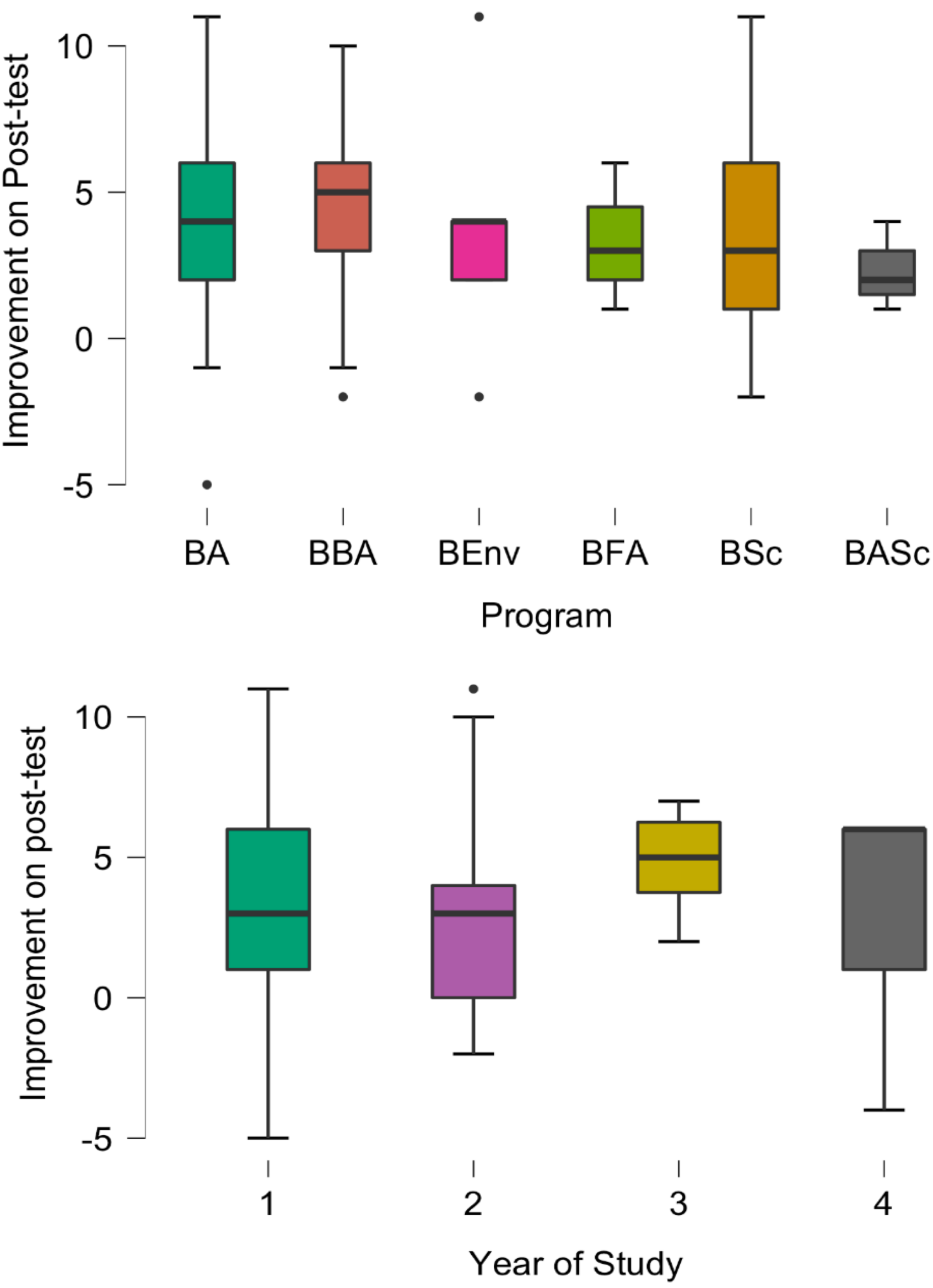
Students showed significantly improved climate literacy after taking the course.



ADDITIONAL RESULTS

¹ Pre-course misconceptions and corrections post-course

Question concept	Proportion incorrect on pre-test	Proportion corrected on post-test
Most common form of radiation given off by the Sun	0.950	0.017
Greenhouse effect influence on Earth's atmospheric temperature	0.915	0.165
Behaviour of photons emitted by greenhouse gas molecules	0.883	0.167
Earth's energy budget	0.881	0.215
Interaction of greenhouse gases with sunlight	0.833	0.300



⁵ Learning Gains by Degree Program (top) and Year of Study (bottom)