Routines of Interactions Around Carbon TIME Tools That Enhance Student Learning

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Research Questions

What does student engagement in the Practices look like?

How deeply or productively are students engaged?

What benefits from Carbon Time and why?

Conceptual Framework

Curiosity, Agency, Motivation

Social Role in the Group

Principled Reasoning

Data Sources

- Student-facing videos
- Post-unit student interviews
- Student work on process tools (i.e., Explanations Tools, Evidence-Based Arguments Tools, etc.)
- Pre & Post tests

Key for Pre/Post Test "bubbles"

This research is supported in part by a grant from the National Science Foundation: Sustaining Responsive and Rigorous Teaching Based on Carbon TIME (NSF 1404388). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

Carbon TIME

Summary of Findings

- The 16 focus students are at best rough representatives of the four classes as a whole, and these teachers do not represent the full range of teachers and classrooms in focus.
- Categorizing students as typically successful or struggling and providing pretest and posttest scores can give us brief profiles—vastly oversimplifies the variety of student resources, approaches, and experiences.

Limitations

- We traced focus students’ engagement using three attributes: a) curiosity, agency, motivation; b) principled reasoning; c) social role in the group. We generated claims based on students’ own resources and the scaffolding provided by teachers and classroom discourse observed in the nature of students’ engagement and in their learning.
- Most students needed significant scaffolding for 3-D learning and strong adherence to the Carbon TIME storyline and intentional use of process tools.
- In most classes, there were some students who were successful in Carbon TIME even with limited scaffolding in 3-D learning and reasoning (e.g. students in Ms. Callahan’s class; Eshal in Mr. Ross’s class).
- Some typically struggling students (e.g. Annaemarie in Ms. Nolan’s class) actively engaged in classroom discourse when 3-D learning was scaffolded. Other typically struggling students (e.g. Leah in Ms. Apol’s class) had few opportunities to engage in sense-making in the absence of this scaffolding.

Conclusions

- The 16 focus students were typically struggling students; Ms. Apol’s Class

Typically Struggling Student; Ms. Apol’s Class

Typically Struggling Student; Ms. Nolan’s Class

Typically Successful Student; Ms. Ross’s Class

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