AMPLIFYING STUDENT PERFORMANCE AND CONFIDENCE IN SCIENCE USING LITERACY

Background:

I am in instructional coach in Helena, MT. My district recently adopted a new science curriculum program, which presented the opportunity for me to look at the impact of an inquiry program, with built-in disciplinary literacy, on student performance and confidence, and their abilities to read and write in science.

Methodology:

I collaborated with one 6th grade science teacher, who teaches five sections of science with a total of 124 students. Pre- and post- program assessments, non-program articles with questions, surveys, student and collaborating teacher interviews, and an argumentation rubric were used to determine growth in science achievement, confidence in science, and reading and writing skills.

Research Questions	Data Source 1	Data Source 2	Data Source 3
Focus Question: To what extent does the use of Amplify Science, which teaches science concepts through inquiry, with an emphasis on disciplinary literacy strategies, affect student performance and confidence in science?	Amplify Pre- and Post- Unit Assessments	Collaborating Teacher Interview	Student Pre- and Post- Confidence Survey and Interviews
Sub-Questions: 1. To what degree will the embedded disciplinary literacy strategies impact students' abilities to actively read and comprehend science texts?	Non-Amplify Article Student Annotations	Non-Amplify Article Reading Questions	Collaborating Teacher Interview
2. To what degree will the embedded disciplinary literacy strategies impact students' abilities to write scientific arguments?	Student Scores on Amplify Argument	Student Scores on non-Amplify Argument	Collaborating Teacher Interview
3. To what extent does the use of disciplinary literacy strategies affect students' confidence in reading and writing in science?	Pre- and Post- Student Self-Assessment Reading Survey	Student interviews	Collaborating Teacher Interview

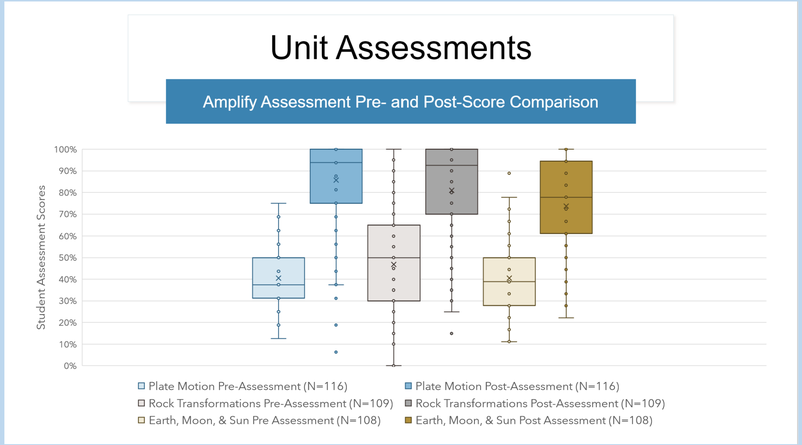


Figure 1. Pre- and Post- Unit Assessment Score Comparison for Amplify Units.

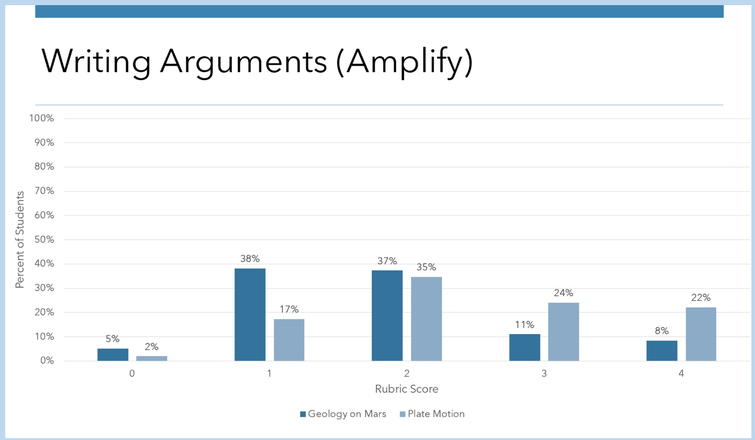


Figure 2. Rubric scores by percentage of students for Amplify arguments, Geology on Mars (*N*=118), Plate Motion (*N*=104). *Note:* Scores 3 and 4 are proficient and above.

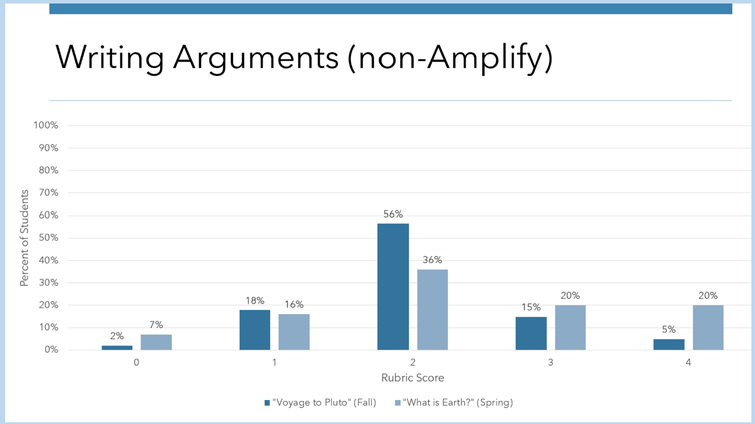


Figure 3. Rubric scores by percentage of students for non-Amplify arguments, "Voyage to Pluto" (*N*=97), "What is Earth?" (*N*=98). *Note*: Scores of 3 and 4 are proficient and above.

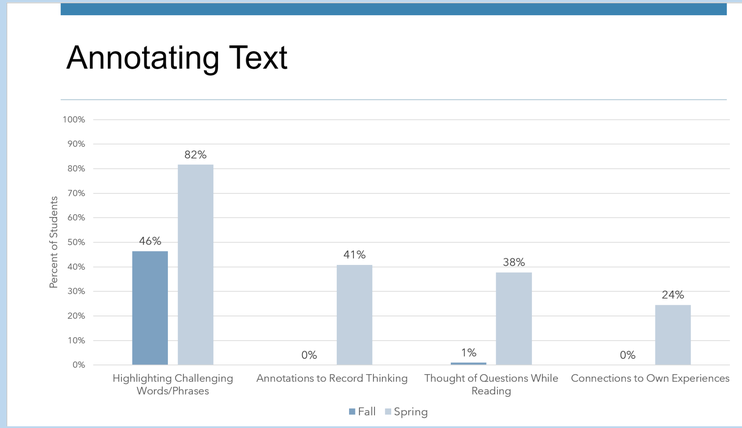
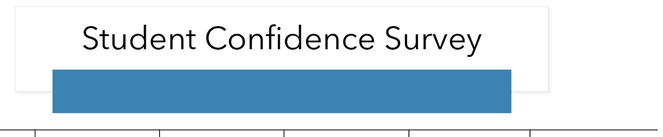


Figure 4. Percentage of Students Usage of the Active Reading Strategies in Non-Amplify articles, Fall (*N*=97), Spring (*N*=98).



	1 Strongly Disagree		2 Disagree		3 Neutral		4 Agree		5 Strongly Agree	
	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
I like science.	0	0	0	0	4	0	8	9	7	10
I find science difficult.	0	7	7	8	5	2	3	2	4	0
I am confident in my ability to learn science.	1	0	0	0	1	2	12	5	5	12

Figure 5 Results of the Fall (Sept. 2019) and Spring (Feb. 2020) Student Confidence Survey, (*N*=19)

Conclusions:

- Students exhibited significant, positive growth in their performance in science, largely due to the concepts being taught through inquiry and the amount of embedded disciplinary literacy.
- The largest impact was on students' abilities to read and write in science.
- Students also indicated a significant increase in confidence in reading, writing, and in science in general.

Values:

- Quality science instruction needs to include inquiry and disciplinary literacy woven together.
- Authentic learning of science content and skills must include purposeful reading, writing, and communicating.
- For students to become strong readers and writers of science these skills must be explicitly taught in conjunction with content.

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