



Incorporating Notebook Organization ... a N.O. brainer

Kendia Herrington, Buchanan High School, Clovis, California · 2020-21



Purpose & Background

Over my teaching career, I have implemented hands-on learning, academic discourse, NGSS, and a growth mindset. The current struggle I see in my students is their differing abilities to learn from activities and retain that knowledge.

Need

- Take reflective notes
- Connect to previous knowledge
- Allow for future connections

Students continue to grow their science understanding within the Next Generation Science Standards (NGSS) by making connections from previous concepts to a new storyline, different phenomenon, and building on their practices and concepts.

Progressing student practices > increased confusion in evaluating multiple models in science-learning science environment
(Hardman, 2017)

Adding diagrams with written explanations improved student usage of their notes
(Manalo, 2013)

Created claim from experiences and interactions with phenomenon retained more (28.2%) with addition of visual art integration
(Rosen-O’Leary, 2019)

References

Hardman, MA. (2017). Models, matter and truth in doing and learning science. *School Science Review*, 98 (365) pp. 91-98.
Manalo, Emmanuel. (2013). Science and Engineering Students’ Use of Diagrams during Note Taking versus Explanation. *Educational Studies.*, 39(1), 118-123.
Rosen-O’Leary, R., & Thompson, E. G. (2019). STEM to STEAM: Effect of Visual Art Integration on Long-Term Retention of Science Content. *Journal for Leadership and Instruction*, 18(1), 32–35.

Research Questions

This action research was designed to ascertain the effectiveness of creating a routine of using a graphical organizer to combine a student’s knowledge from different activities.

Focus Question

How does organization in a notebook help students make connections in their chemistry understanding?

How can implementing reflections and summaries from activities impact knowledge connections?

How will scientific discourse support self-regulation on their chemistry understanding?

How will using graphical organizers support self-reflection of students?

What is the impact of these strategies on their teacher?

Data Collection

The collection methods center around the idea of looking at how students can pull ideas together from different activities and write them down to be able to make more connections. The treatment group will be given a different graphical organizer outline than the traditional graphical organizer that is routine in class.

Table 1: Research Matrix

Question	Data Collection					
	Interviews	Student Surveys	Pre & Post GO	Notebook Scores	Observation Time Sheet	Assessment Scores
Notebook Organization synthesize chemistry	A	# Δ	#	# Δ	A #	A #
Reflections & summaries	A	# Δ	#	# Δ	A	# Δ
Discourse support self-regulation	A	# Δ	#	#	A #	A
GO support self-reflection	A	# Δ	#	#	A	#
Teacher Impact					#	

Key: A = qualitative data; # = quantitative data; Δ = change over time

Results

The additional organization to turn the graphical organizer into a class routine showed a student attitude shift and significant increase in improved quality. Figure 1 shows the treatment (red) had a lower disagreement in their ability to reflect on their own (question 11), help in discourse (question 13), and that the graphical organizer will help them (question 16). Over the unit, the treatment group showed a strong disagreement that the journal helped organize their thoughts (question 3), helped to show their confusion (question 9) and, ask for help after reflecting (question 10). After conducting interviews, the guiding questions for their graphical organizer made students feel confident in their work without needing additional help. Figure 2 shows the significant (3.5425 p-value beyond the 2.0010 value with 59 degrees of freedom) improvement of the treatment group’s graphical organizer.

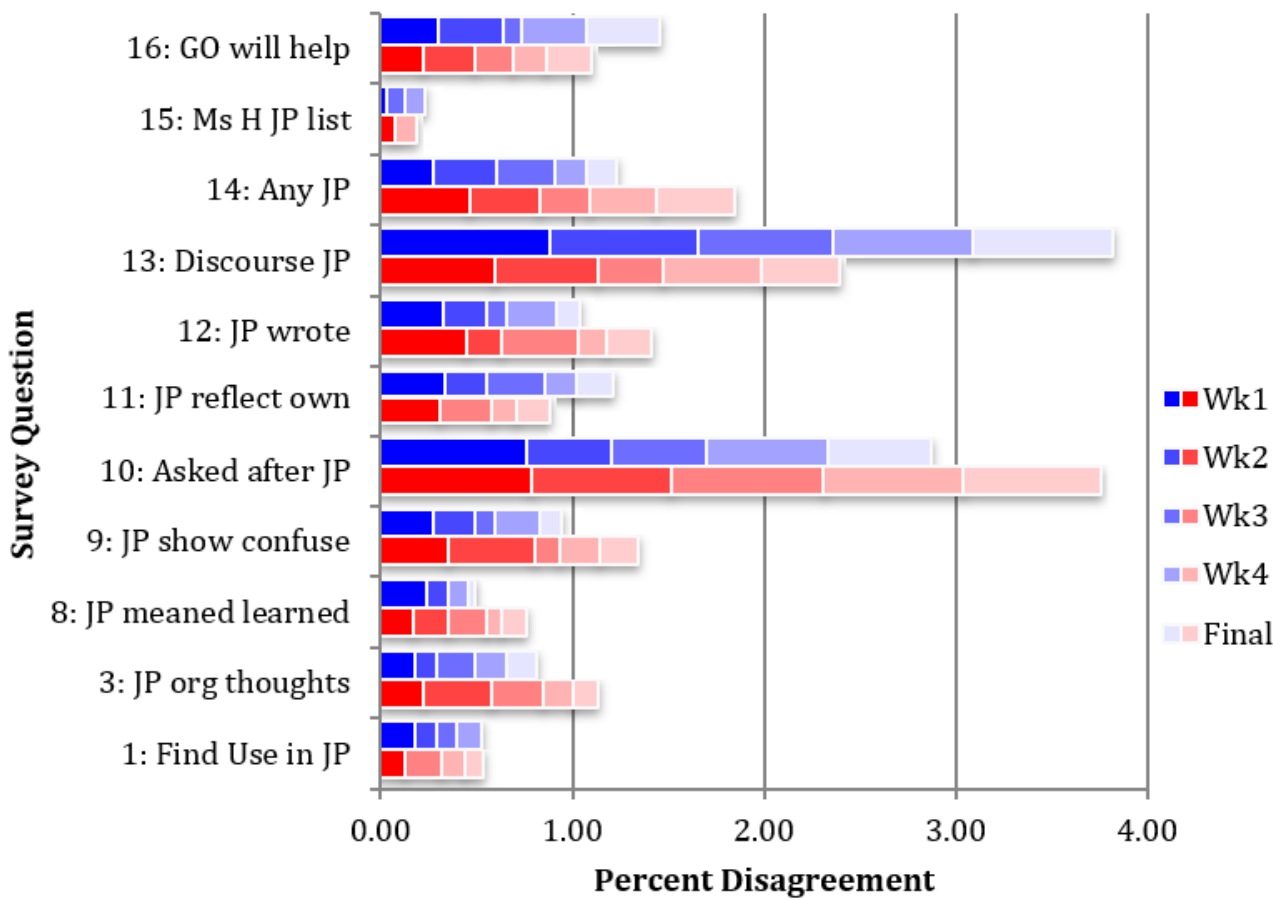


Figure 1: 5-week Survey results (blue-comparison and red-treatment)

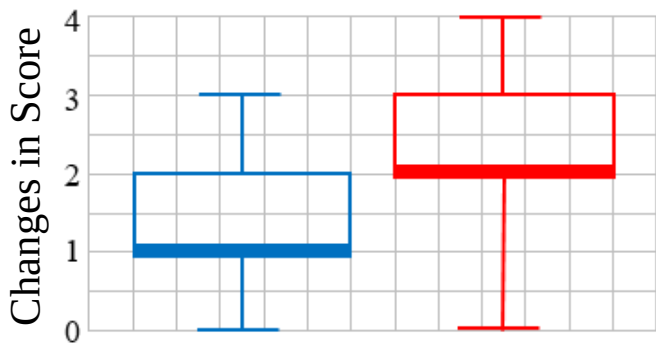


Figure 2: Difference between Pre & GO; (N blue-comparison = 20; N red-treatment = 41)

Student Interviews

Comparison student: “*It helps. I mean showing that I understand it is what I see when I can complete it (reflection).*”

Treatment student: “*The part of the notes that makes me feel more confident is seeing how I understand what I learn and being able to write it down with lots of colors and models. The reflections of activity help me see where I’m still lost.*”

COVID Lessons

The unit within this research was completely taught online during the COVID-19 pandemic. The importance of reflecting in a journal was seen everyday by the teacher, strong students, and ignored by lower students. The daily physical support by a teacher on refocusing, redirecting, and clarifying was shown on the lack of reflection in student’s journals. At the end of the school year, students saw the importance of their journal reflections from need and in person supports.

Future Notebook

Students need a routine to support them in making reflections from an activity so they connect the idea to a phenomenon. At the beginning of the year, there will be a lesson on the importance of keeping up in their journal. This will be continued with routine guiding questions at the beginning of class and time to make a section of their graphical organizer. When a student feels that there is support in their learning, the majority of students do that work. Future unit examples from students will be shown and a current unit teacher support will be shared. This research has shown that without support, lost students will not participate in discourse and fall further behind.