



Implementing Accountability in the Flipped Classroom

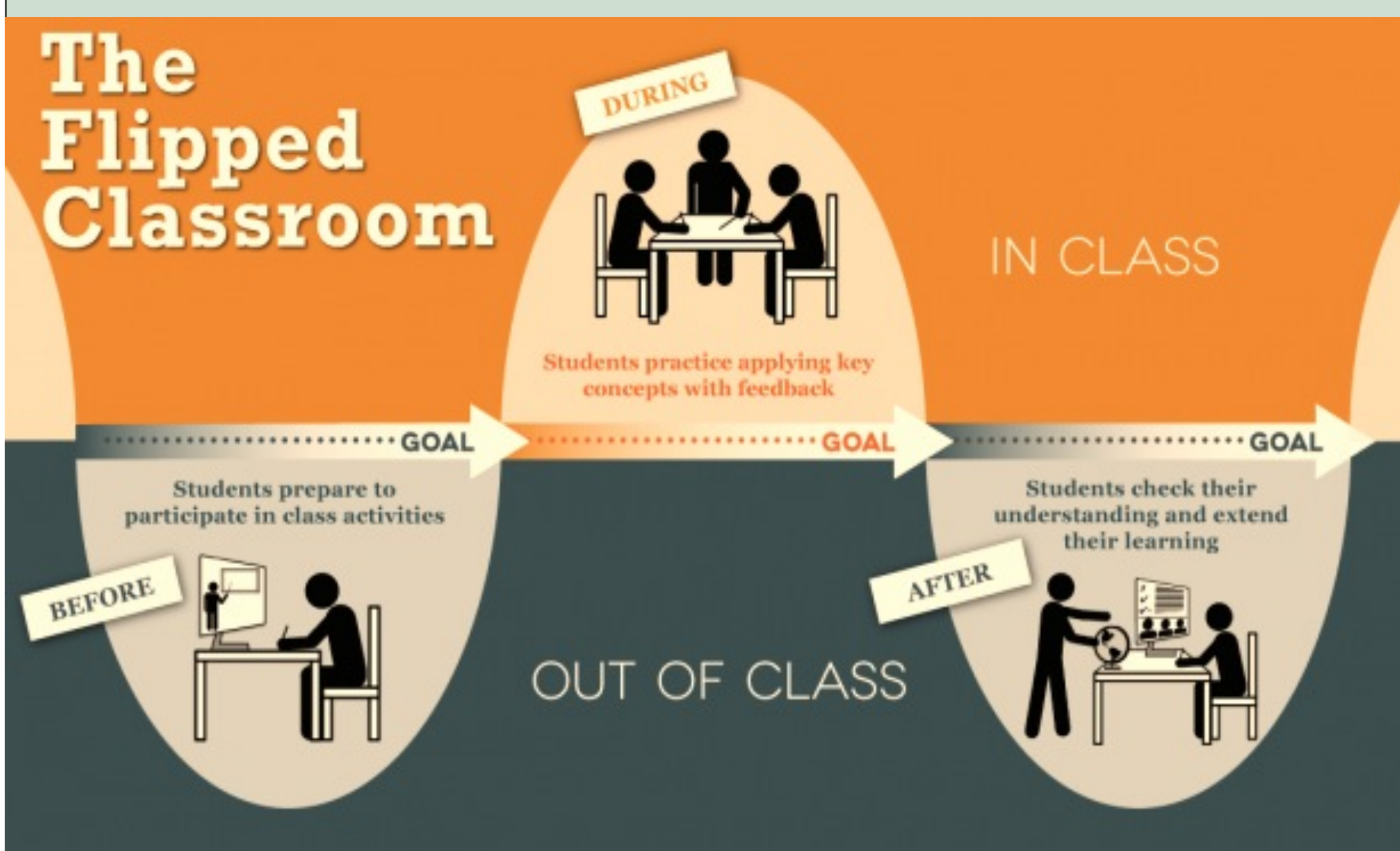
Ava Javid

Menlo-Atherton High School, Atherton, CA. MFA Master Teacher Fellow.



Introduction

This study investigates 11th and 12th grade students in Advanced Placement Environmental Science (APES) classes, a combination of high achievers taking multiple AP courses and students from a population who traditionally have not taken an AP course. The school population is 48.4% White, while 49.7% are minorities, mostly Hispanic. The APES curriculum integrates concepts and skills across science and math. With such a wide range of content, the course is designed using a Flipped Classroom approach to teaching content: time in class is spent applying content in order to conduct experiments, design projects, and further consolidate content understanding. Thus, much of the content acquisition work occurs outside of class where students are assigned one chapter to read from the textbook each week and are assigned lectures to watch online in preparation for class.



Research Question

- First-time students taking AP courses face difficulties with the challenging content and the expanded workload of the class.
- Students lacked skills to acquire difficult content in a self-paced manner.
- How can students who are at a disadvantage compared to peers who have taken AP courses be supported?

How does implementing increased accountability measures in flipped lessons improve content mastery for first time AP students and minority students?

Intervention

- **Goal:** students will be more prepared to understand lessons in class and increase participation and self-directedness during lessons since they have notes to reference during the lesson.
- **Action:** Students submitted Cornell Notes, after watching lectures or reading the book, to be graded using a rubric with 4 categories:

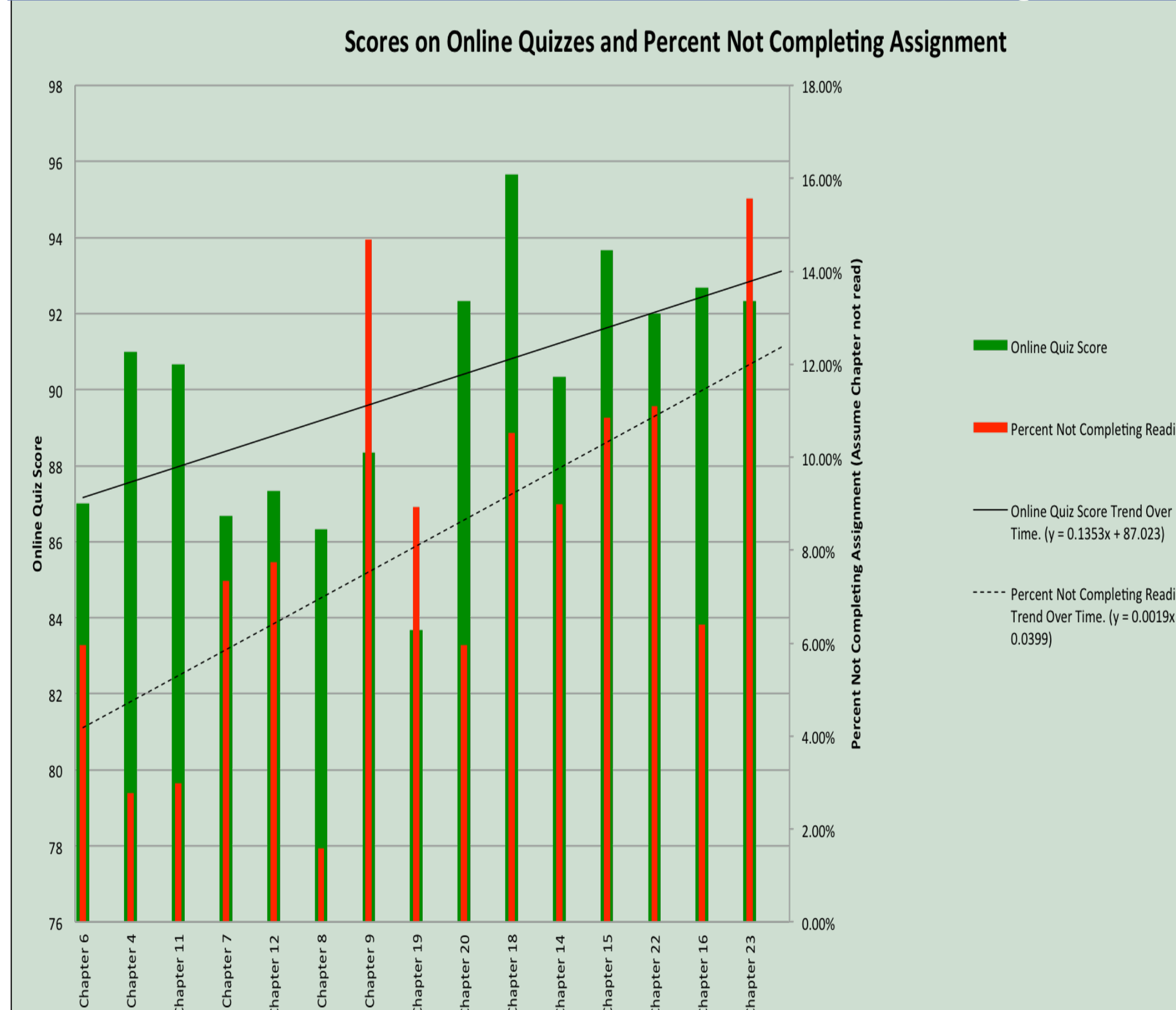
Quality of Notes

Completion of Notes

Cornell Summaries

Questions in Margin

Quantitative Data Analysis



Observed:

- Increased mastery of content from reading, as evidenced by higher quiz scores overall.
- Decreased completion of homework (due to increased workload and extra time needed to take Cornell Notes?)

Qualitative Data Analysis

	Students who have never taken any AP or Honors classes before. (LEAST EXPERIENCED)	Students who took Honors and AP classes before in Science. (MOST EXPERIENCED)
Minority Students	75%	11%
Students who improved study habits after Intervention	38%	56%
Students who report the Intervention helped them understand APES better	63%	56%
Students who report they can understand and follow along with what is being discussed in class after Intervention	38% MORE	0% MORE
Students who report the Intervention helped them participate and collaborate better in class	50% NO DIFFERENCE	100% NO DIFFERENCE
	63%	44%

Least Experienced Students Say

"I actually read and take notes"

"It helps me understand more of the information that is important and easier to review."

"[Cornell Notes are] a little more challenging but it helps me understand the lecture or quiz."

Most Experienced Students Say

"I feel the concepts are easier and I am more prepared for class."

"My way of taking notes helps me better, and it helps much less to turn it in for a grade, where my focus is mostly on getting credit than learning."

"Being confined to one style of writing notes can restrict students learning."

Conclusions and Implications

Big Picture

There are fewer minority students taking advanced Science classes altogether.

Was the Intervention Right for the Target Group?

Most minority students were comfortable with the Cornell Notes, implying that they are a good target group for implementing this Intervention.

Who Benefitted Most?

Students who were less experienced in advanced coursework had increased understanding of lessons in class and improved participation and confidence compared to other students.

Future studies: How can students improve study habits?

Students who have never taken advanced coursework did not improve study habits as much as those who had taken at least one Honors course.

References and Acknowledgements

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