DREME Math Observer: A Practical Tool for Early Math Observations and Coaching

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Overview

- Linking early math learning and algebra readiness
- Supporting later learning and instructional coherence
- Importance of focusing on instructional practices
- Supporting math learning and teaching with the DREME Math Observer tool
- Q&A Discussion

What is the DREME Network?

HEISING-SIMONS FOUNDATION

- Development and Research in Early Math Education
  - The DREME Network seeks to advance the field of early mathematics research and improve young children's opportunities to develop math skills
  - Scholars from 12+ universities all over the country
  - Created in 2014
  - Birth to 8 years, emphasis on preschool/PreK years
  - dreme.stanford.edu

Early Math is Important

- In pre-k and early elementary classrooms, math often gets much less attention than literacy. But…
- Early math knowledge predicts later math AND literacy achievement (Fyfe et al., 2019; Jordan et al., 2009; Nelson et al., 2021)
- Early math learning provides the foundations for future math learning, including preparing students for algebra (Booth et al., 2014; Hornberg et al., 2022)
- Connections with executive function (memory, flexible thinking, attention, impulse control) (Ribner et al., 2017; ten Braak et al., 2022)

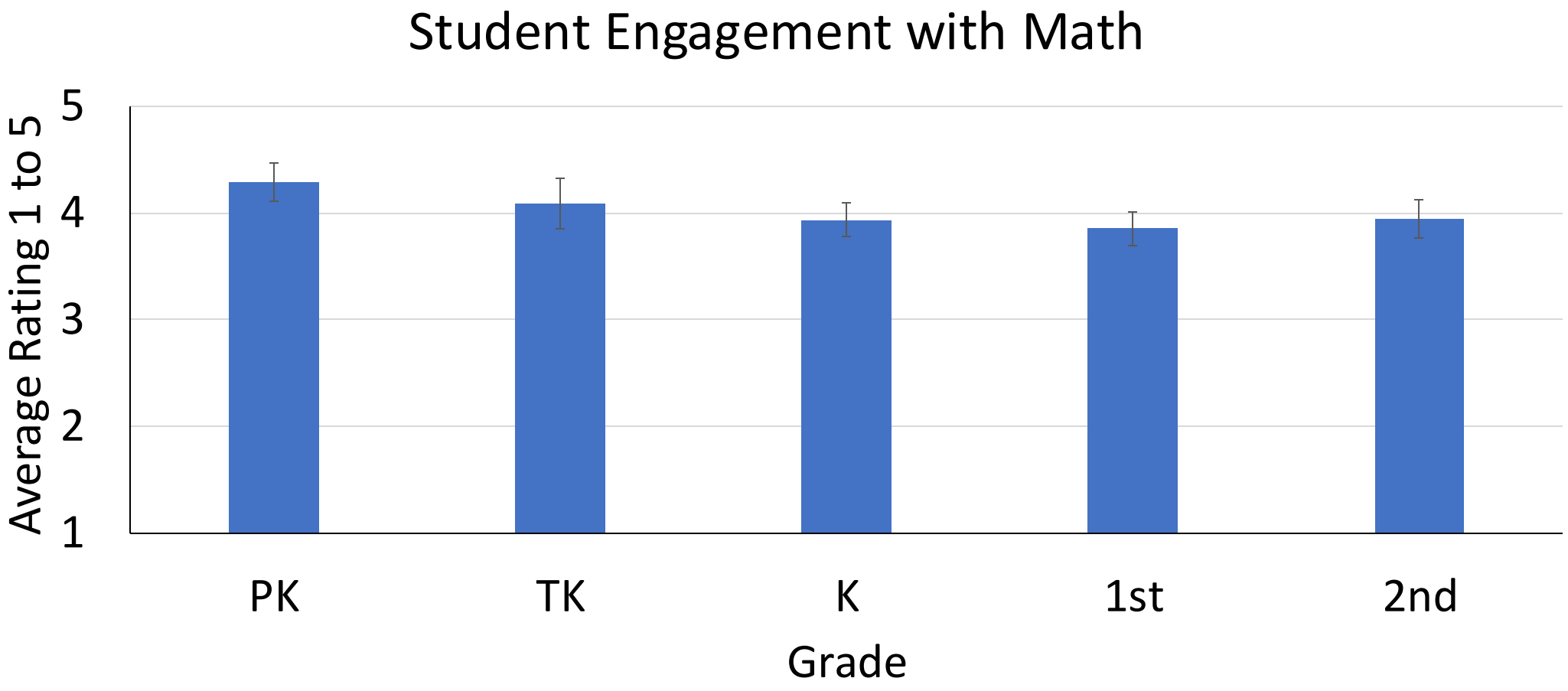
Instructional Coherence

- Central to P-3 alignment is continuity in the **type** as well as the **quality** of math instruction.
- Coherence = degree to which classrooms comprise mathematical situations and interactions that are connected in terms of the mathematics and in terms of the development of children's mathematical understanding (desirable!)
- Can also have consistency that is undesirable
- Study with 2 CA Districts, we asked:
  - How does math instruction change across grades?
  - Do we find evidence of coherence?

Focus on Practices

- How math is taught is as important as the scope and sequence of the content
- Few studies exist that describe what regular instructional practice looks like in the early grades during math in nuanced ways
- Observation system designed to focus on dimensions important for learning AND to reveal patterns and variability across grades

Results Across Grades



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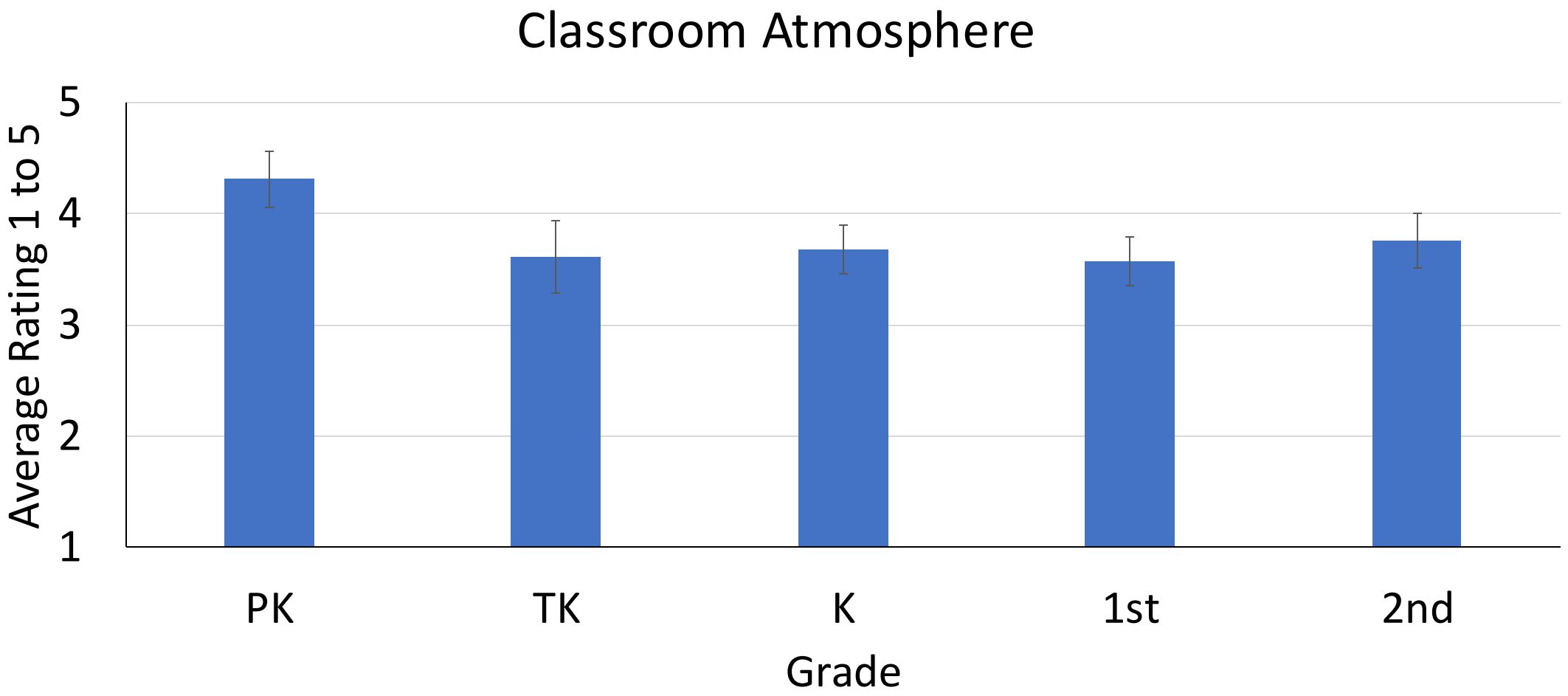

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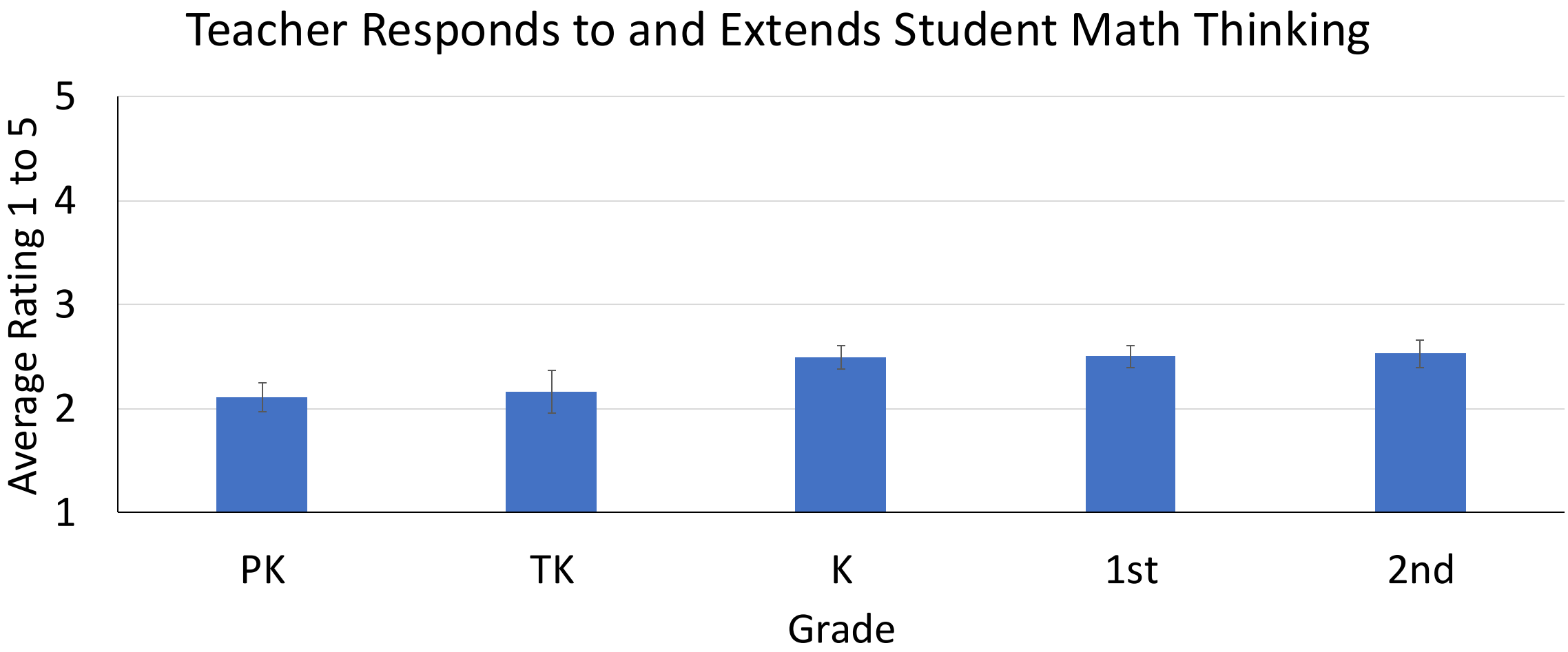

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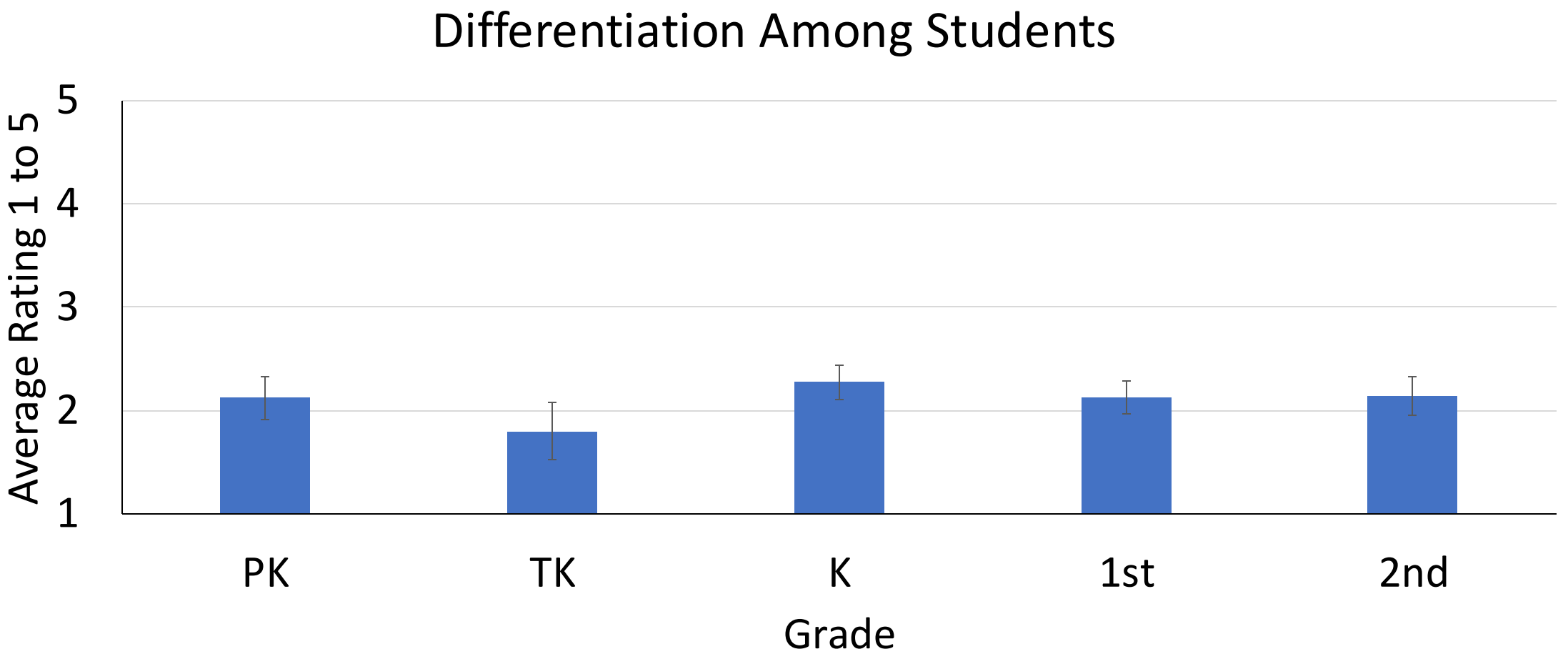

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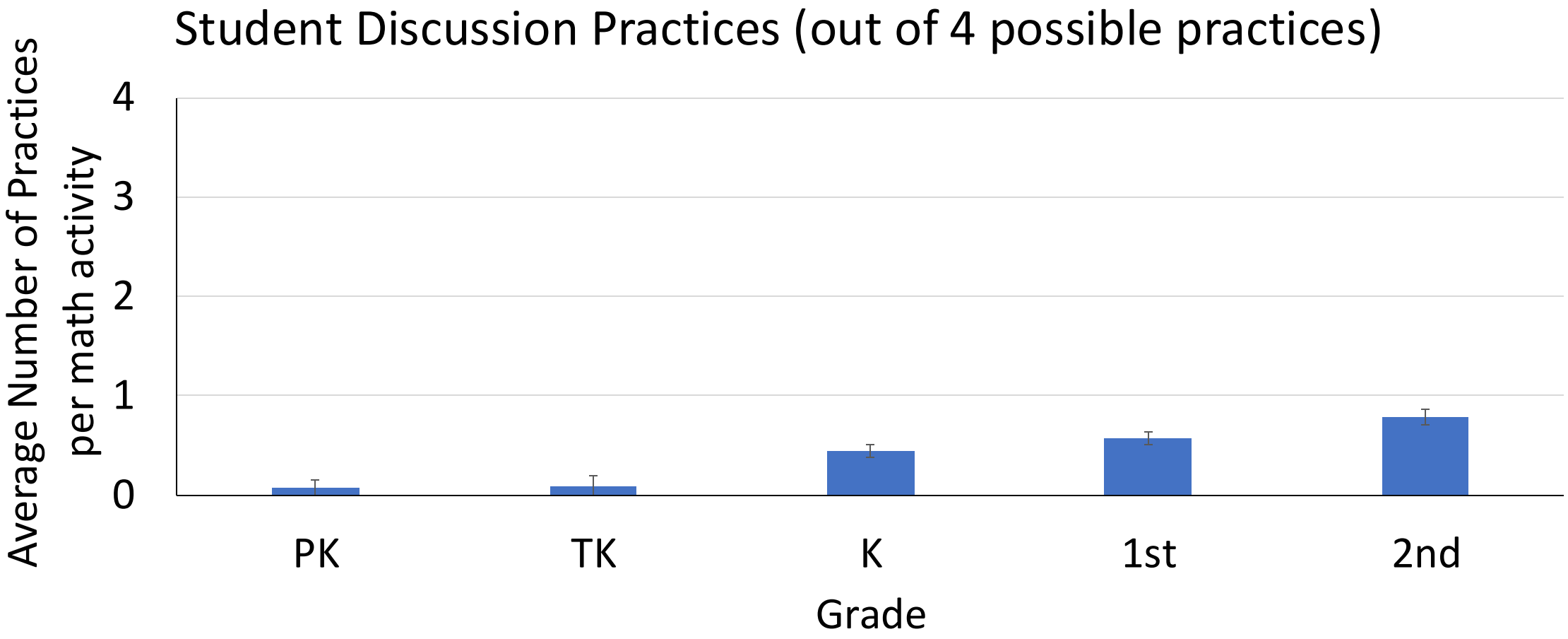

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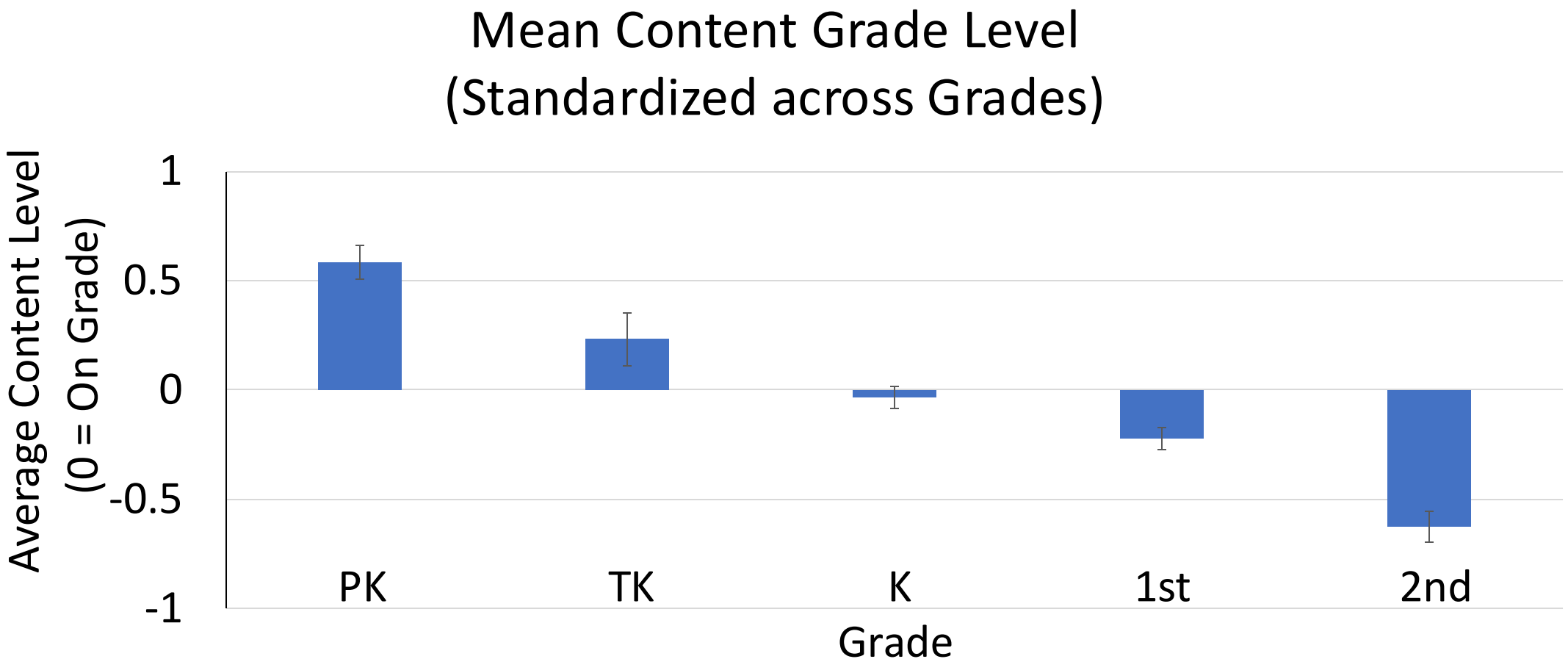


Implications

- Positive atmosphere may be easier for teachers to implement than differentiating learning and fostering student discussion practices.
- Teachers may underestimate what younger students are capable of (e.g., answering more open-ended questions).
- Of concern is the increasing amount of time spent on content below grade level as students get older and the little individual differentiation.
- Supporting early grades math can lead to better learning in later grades.
- This same focus on a constellation of high-quality practices can apply to all grades.
- Need new tools for measuring these practices in nuanced ways with actionable and specific feedback.

Introduction

DREME Math Observer App (free)

Apple

Android

DREME Math Observer App

- Adapted research tool into a practitioner-friendly tool
- Free app available on the Google Play and Apple Stores for mobile devices and tablets
- For coaches, administrators, instructional leaders, and teachers
- Developed in partnership with practitioners
- Used to conduct *formative* assessments, for peer learning, and to support teachers to improve their math instruction
- A practical measure (vs. accountability measure)
- Includes specific practices and specific examples

Practical Measures vs Accountability Measures

Accountability Measures

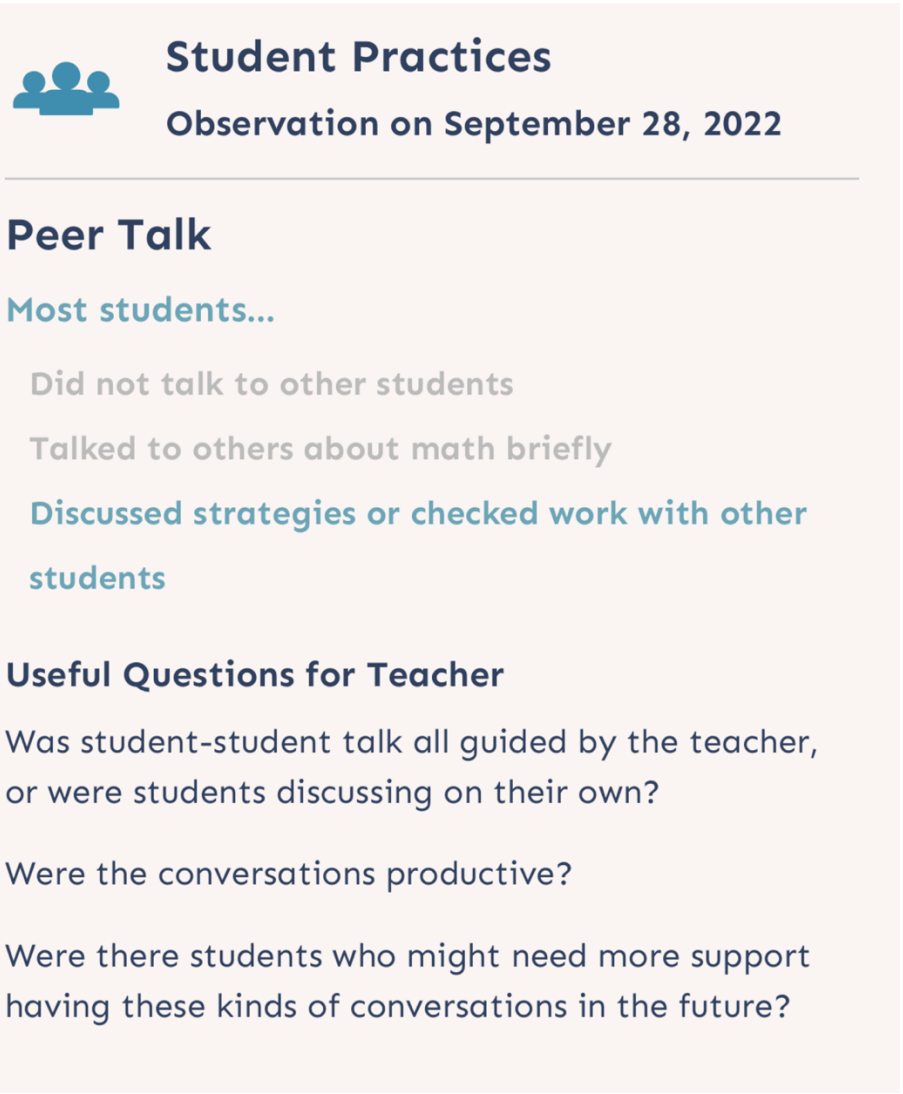
- Goal to evaluate
- Often too broad for actionable steps
- Often not helpful for what comes next

Practical Measures

- Goal to support professional development
- Focused on specific practices
- Actionable

Short, mutually exclusive, behaviorally anchored

Generative – questions to build on observed practice



Our app: A Practical Measure

The DREME Math Observer

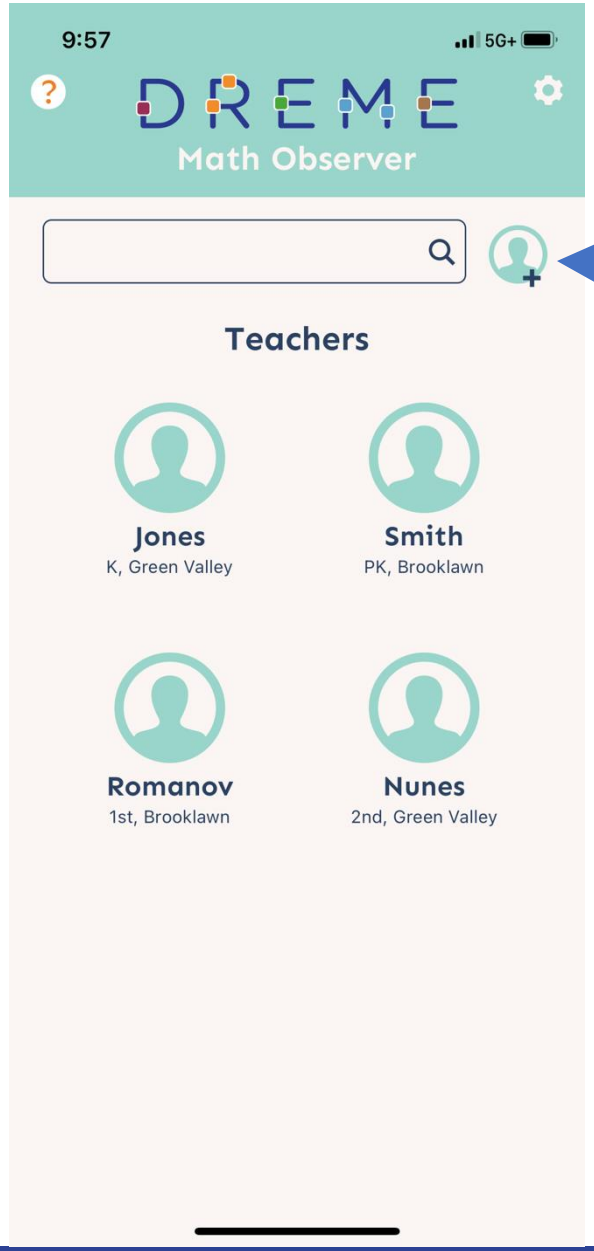
Modeled on research-based early and elementary classroom math practices

Observe full or partial lessons, focus on what's relevant

Generate guiding questions to debrief

Track trends over time

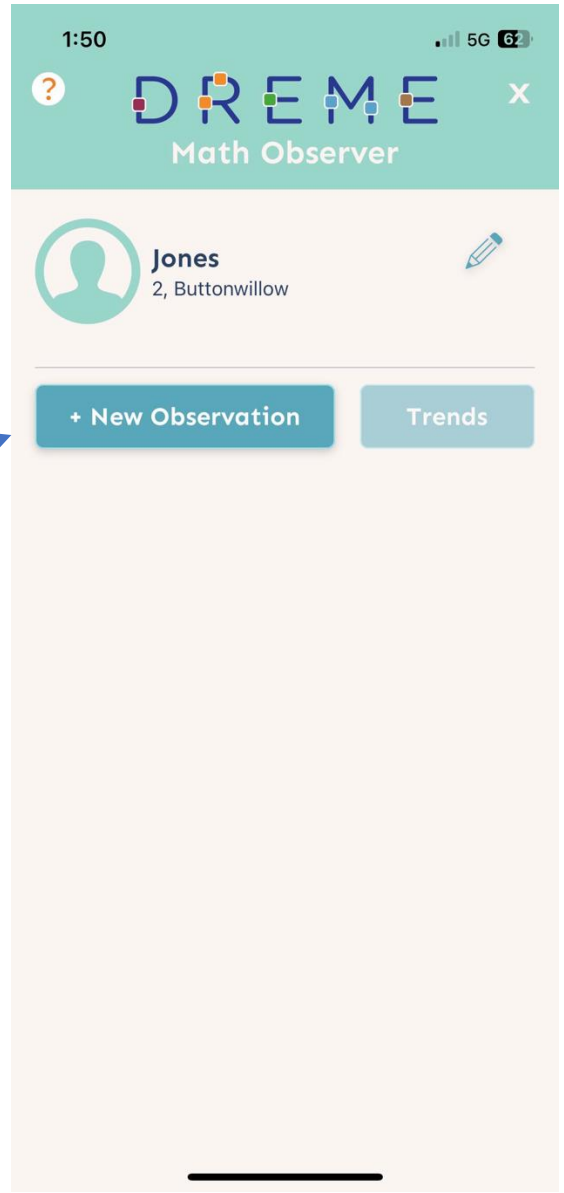
1. Create a Teacher Profile



Create a profile for the teacher you're observing

You can setup a bunch of profiles if you observe a lot of teachers, or you may just setup one.

2. Start an Observation

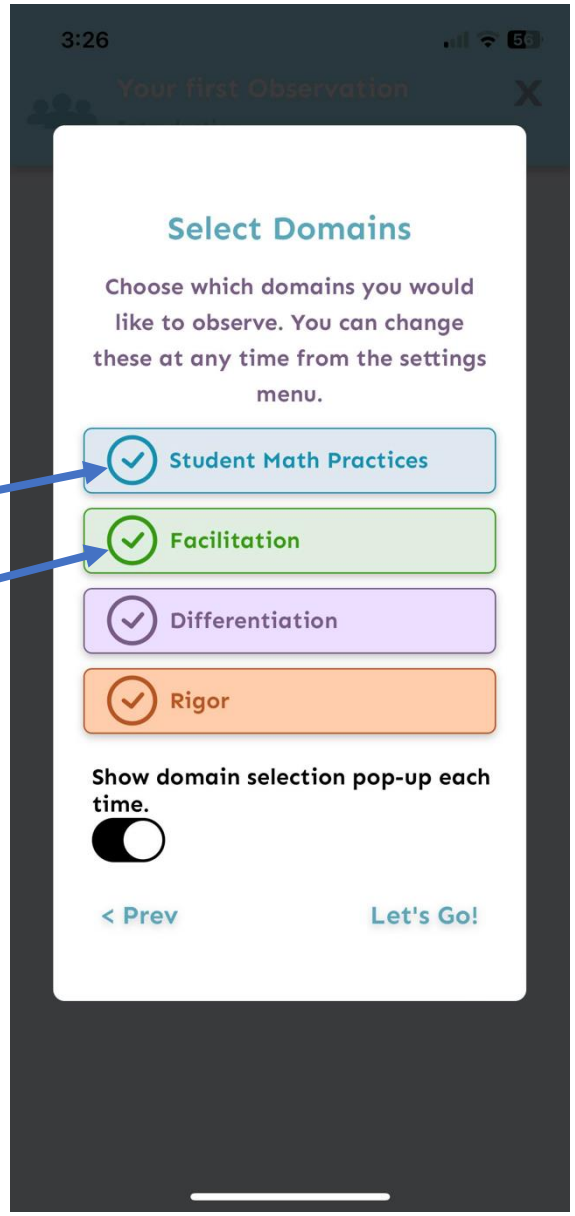


Just tap here

Observations can be as long as you want. If you're only interested in a particular activity, you might only stay for that part.

Or you can stay for a whole math lesson to get a more holistic view.

3. Select Domain(s)

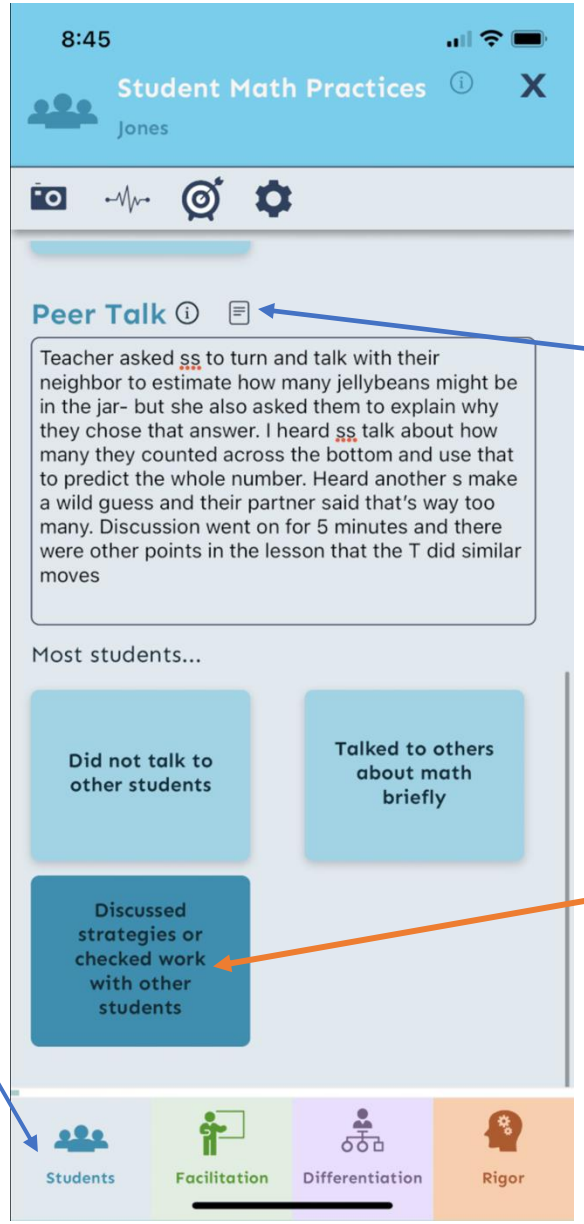


Check which types of practices you want to focus on this observation

You can choose to hide the ones that you are not interested in right now… but you can always turn them back on in Settings

4. Take notes and select the option that best fits.

Each domain you turned on is at the bottom of the screen. You can toggle between them.



Toggle the notes field on and off here

Choose your rating here

Student Engagement

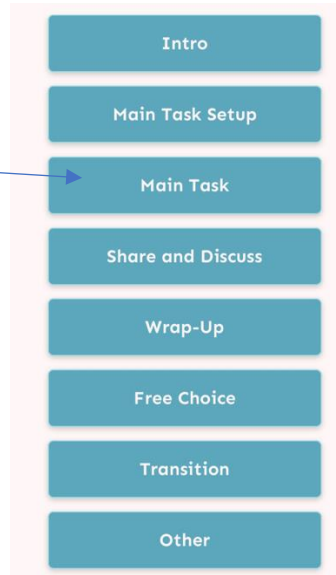
Will be automatically set to prompt for a rating every 3 minutes (see progress bar)

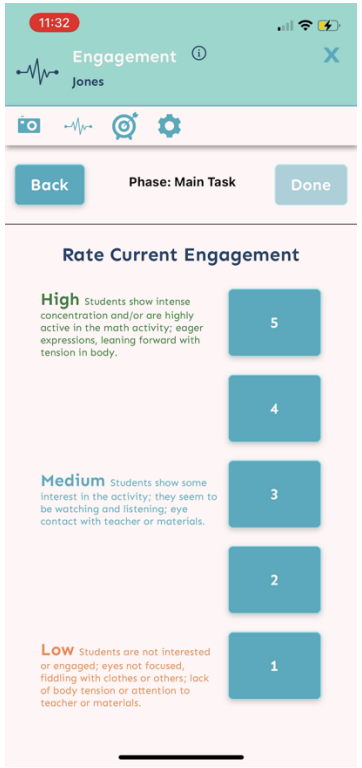
Choose the “Lesson Phase” for example “Main Task”

Rating 1-5

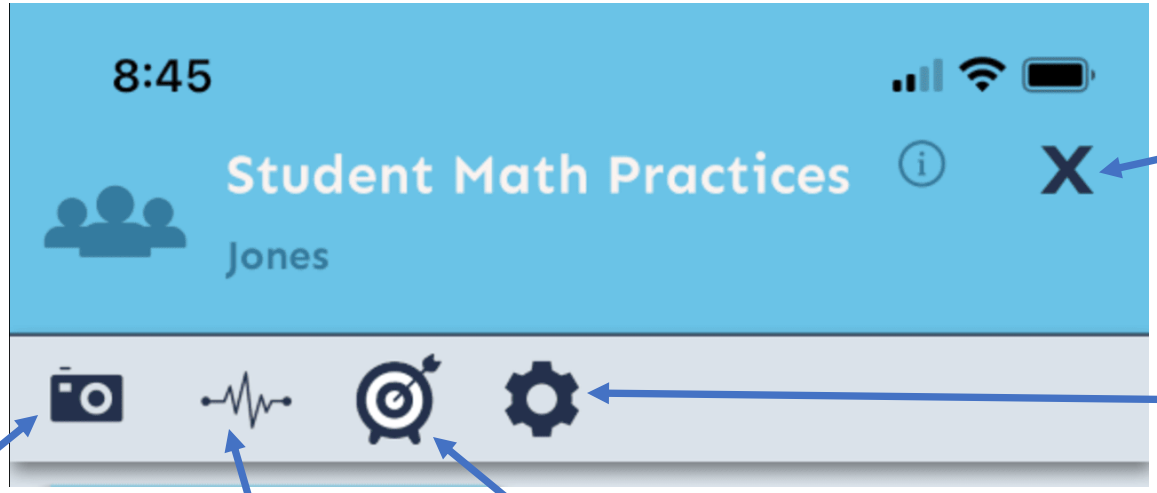
Provides affective dimension – which parts of the lesson were kids excited about?

Can turn off if not interested





There’s a toolbar with other things you might want to do at the top of each screen



Click the X to save and close

More settings

Take photos of things you want to remember

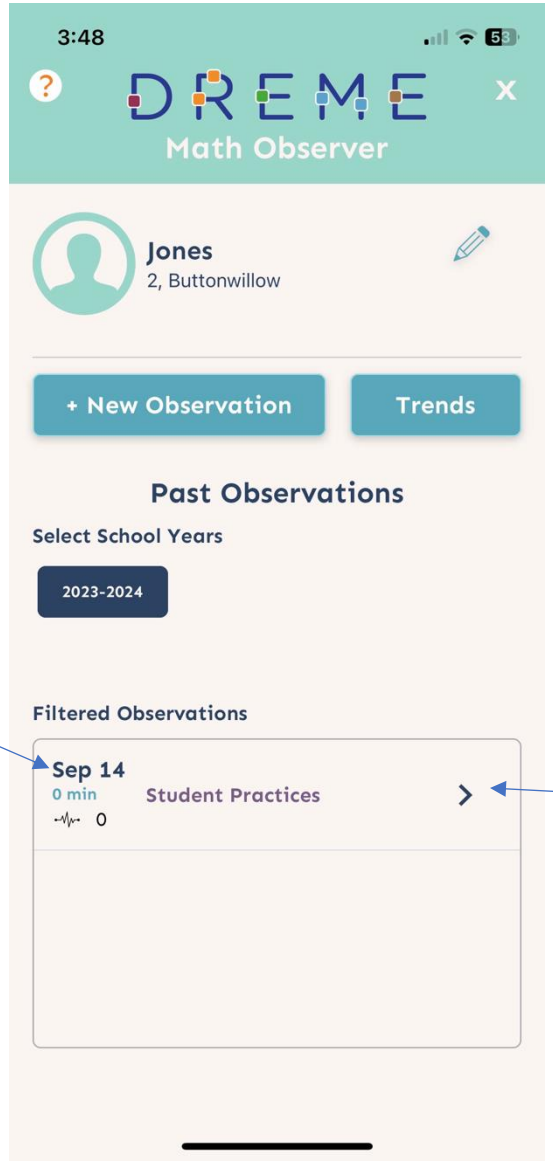
Rate the class engagement

Write notes about the math objective

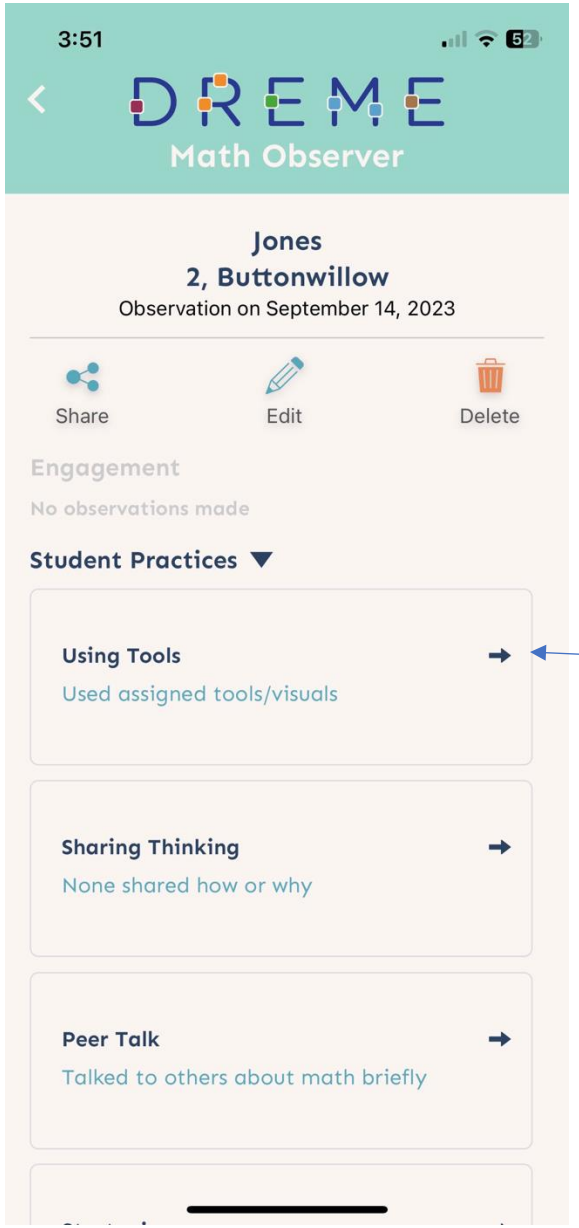
Wherever you see this icon, there's a menu with more information. In many places there are tutorial videos!

5. Review your observation

All your past observations will show up here



Click here to open

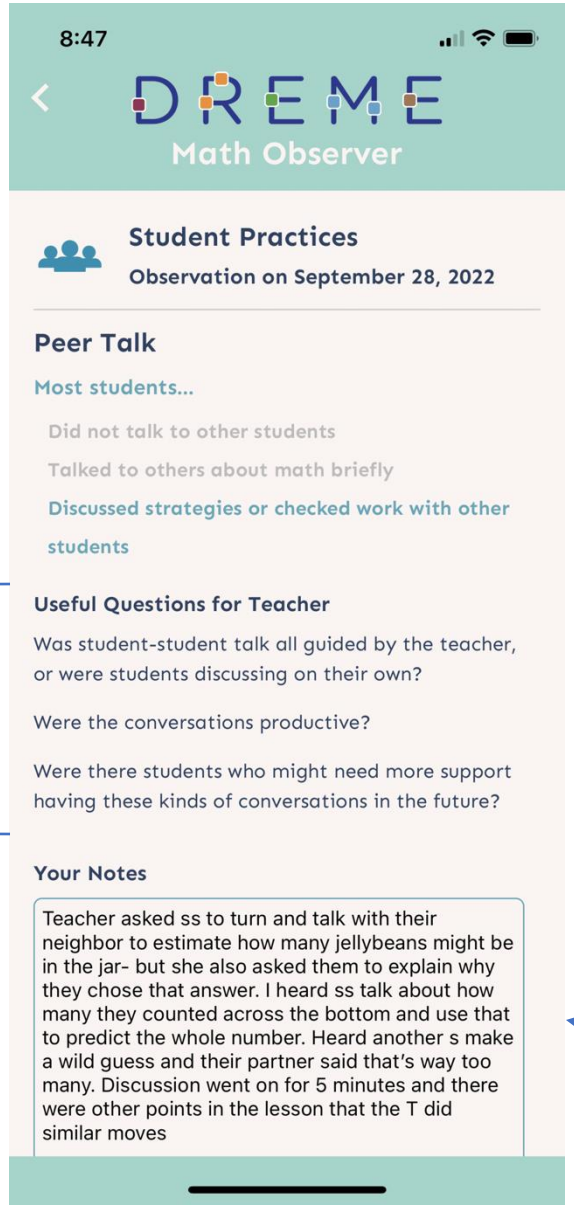


Under each domain you can see each subdomain and practice that you chose

Tap the arrow to get some guiding questions related to your selection

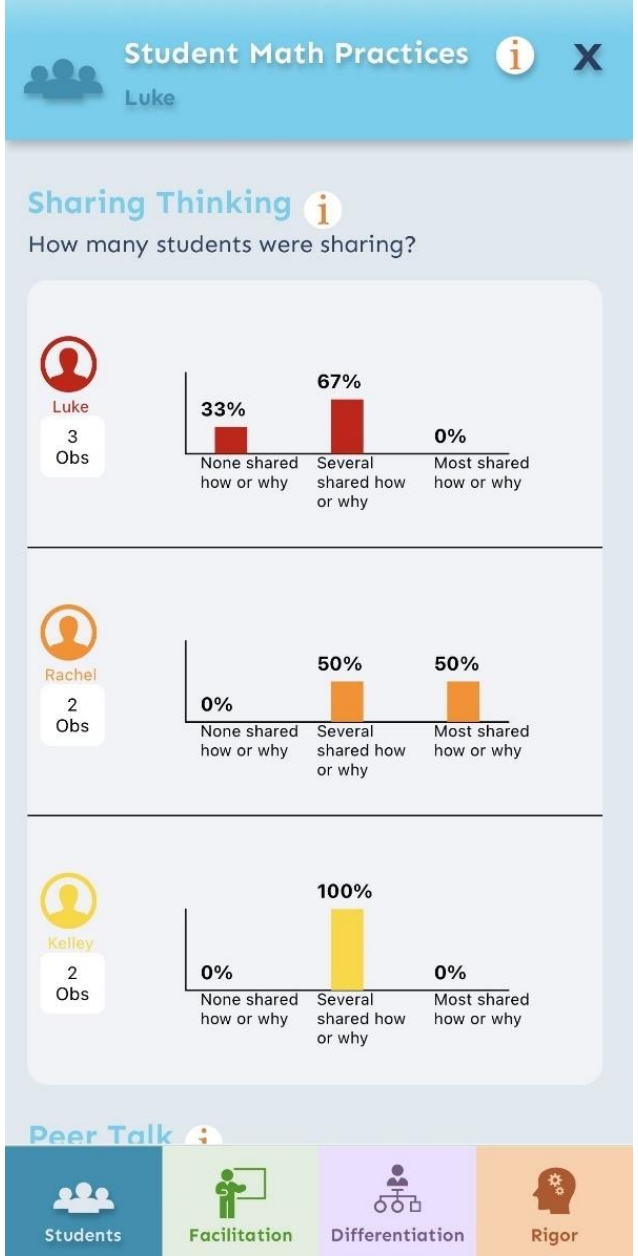
6. Use guiding questions to structure debrief after observing

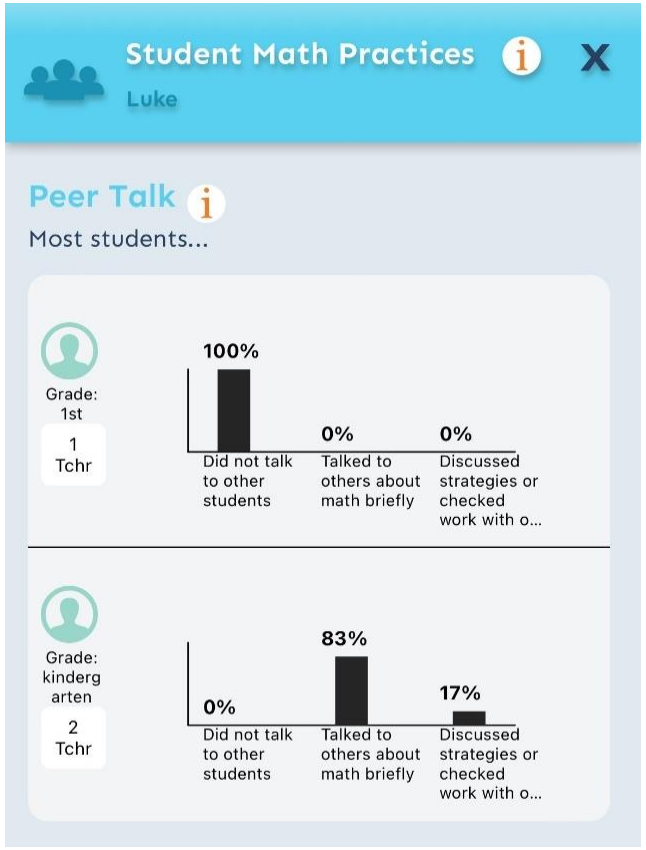
These generate different questions based on your selections



You can keep notes about your debrief here

7. See overall Trends





Overview of Domains

Student Practices

- -Using Tools
- -Sharing Thinking
- -Peer Talk
- -Strategies

Teacher Facilitation

-Responsiveness

-Student Errors

-Questioning

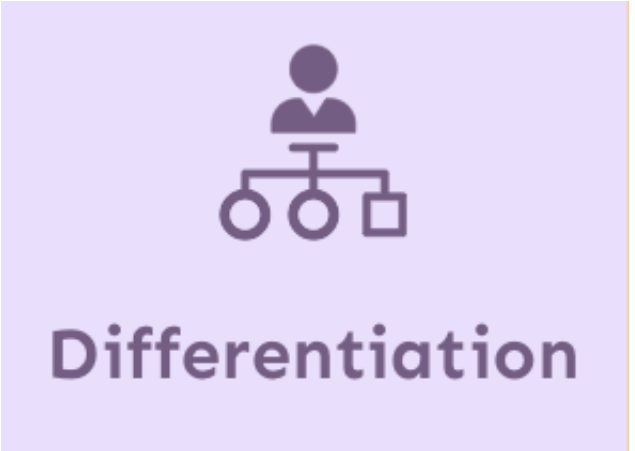
-Connections

Differentiation

-Individualized Interactions

-Adaptation

-Planning For Differences



Rigor

-Math Fluency

-Math Procedures

-Math Concepts

-Problem Solving

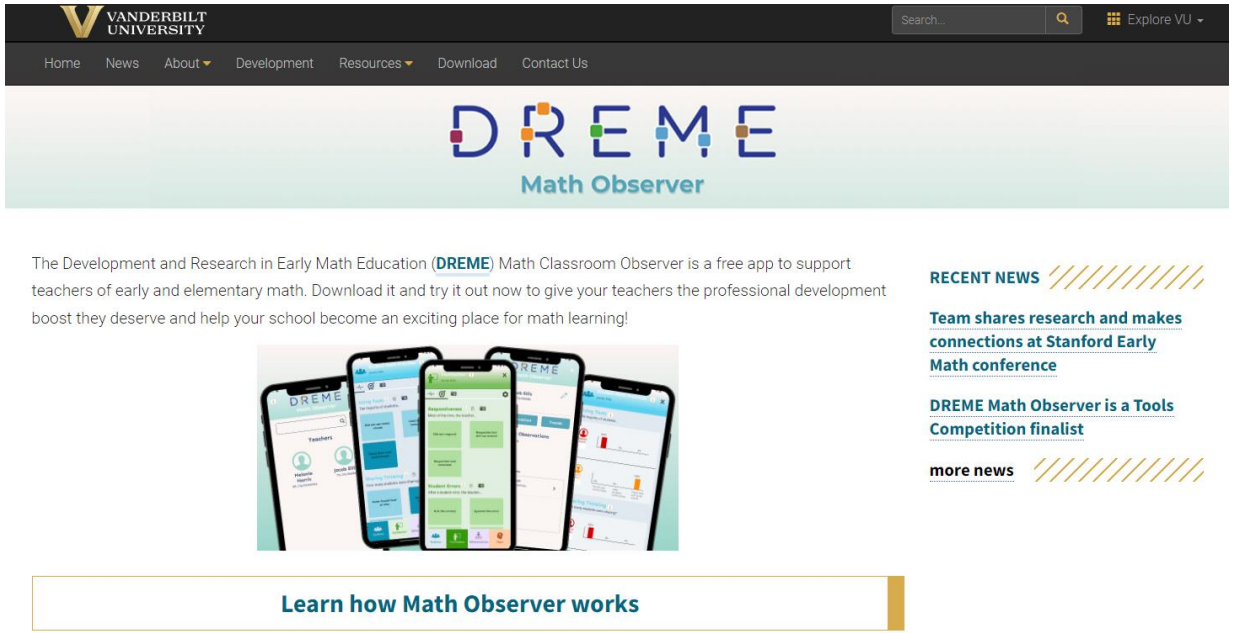
Our Current Project

- Please reach out to kelley.durkin@vanderbilt.edu or luke.rainey@vanderbilt.edu if you're interested in joining our pilot study
- Regular feedback about using the app across the school year and beyond
- Incentives offered

Visit our lab website to learn more:

https://lab.vanderbilt.edu/dremeobserver/

- Tutorial videos
- Ideas for how to use
- Detailed user guide



Acknowledgements

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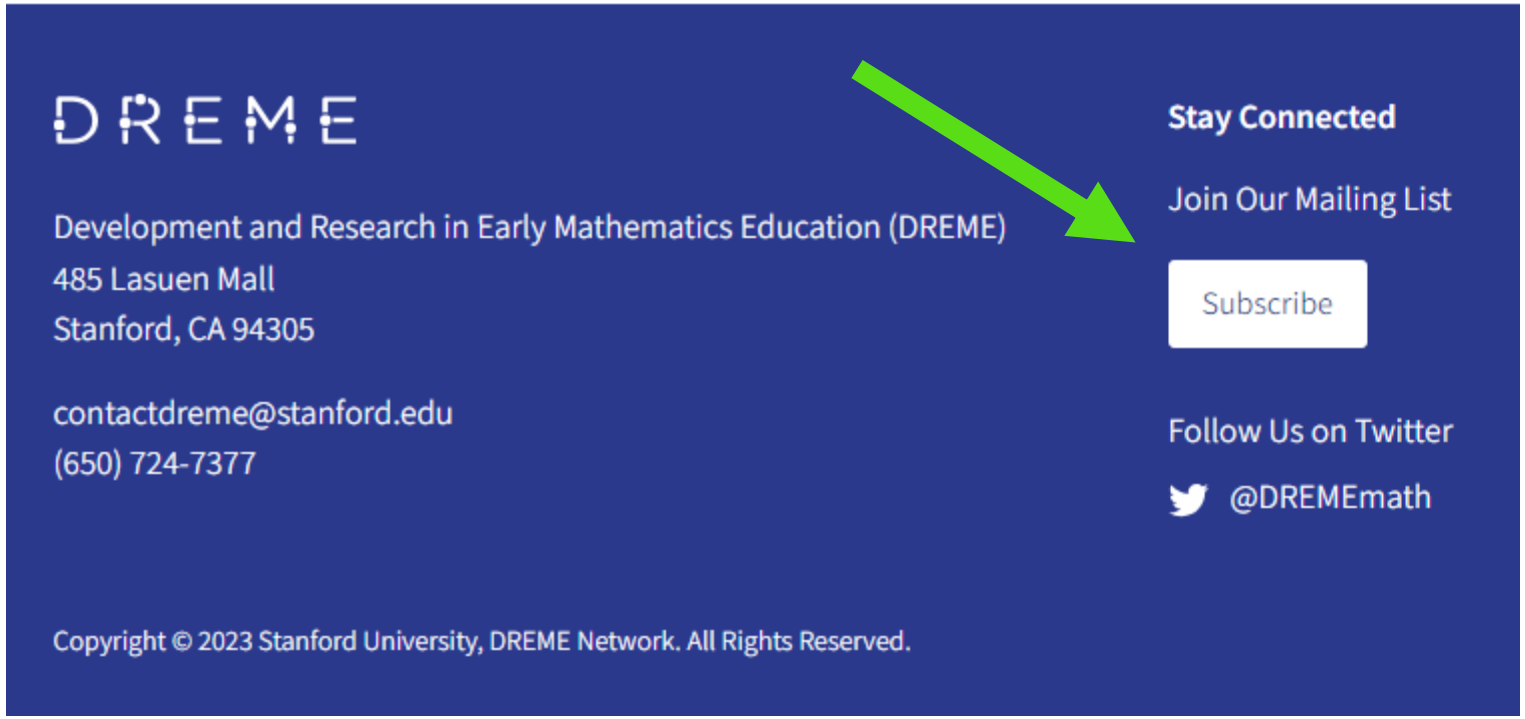
  - The Heising-Simons Foundation for funding this work
  - Dr. Dale Farran at Vanderbilt University
  - Practitioners across the country who have participated in the research and provided feedback
  - Other researchers at UCLA, the University of Denver, Northwestern University, and Stanford University who have contributed to the project work

Want more DREME? Want to learn more about our app?

Scroll down and click “Subscribe”



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