

REVISITING PROPORTIONAL REASONING TRAJECTORY USING A BLEND OF TECHNOLOGY AND DISCURSIVE PRACTICE

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Module Objective

- To *leverage technology* and *discursive classroom practice* in strengthening students' understanding of *quantitative reasoning*
- To enable students to identify and *understand multiplicative relationships in contexts* involving comparisons, sharing and scaling, and *conceptual applications*

Thematic flow

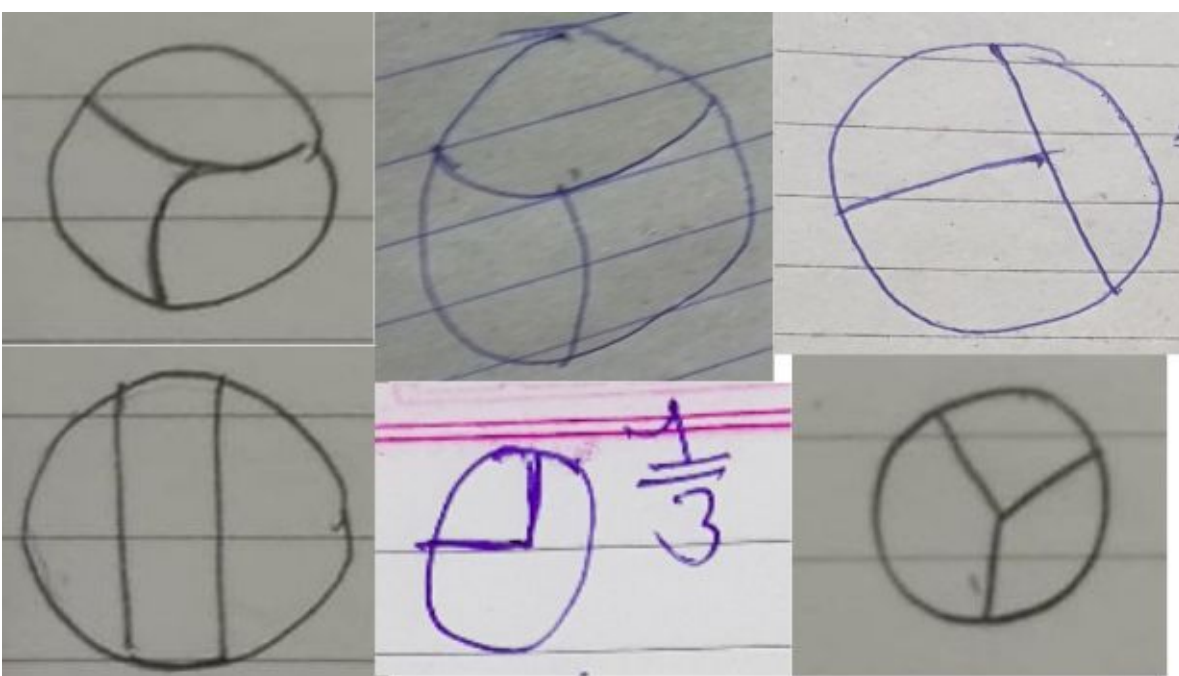
- Pre and Post Assessments
- Understanding equal sharing and notion of fairness
- Additive and Multiplicative thinking
- Ratios and proportions
- Applications to other domains

Cross-multiplication is the hallmark of school taught method for proportion related problems

$$\frac{10}{15} = \frac{32}{x}$$

$$10x = 32 \times 15$$

Typical school approach for proportional reasoning



Students representation of fraction, e.g., 1/3

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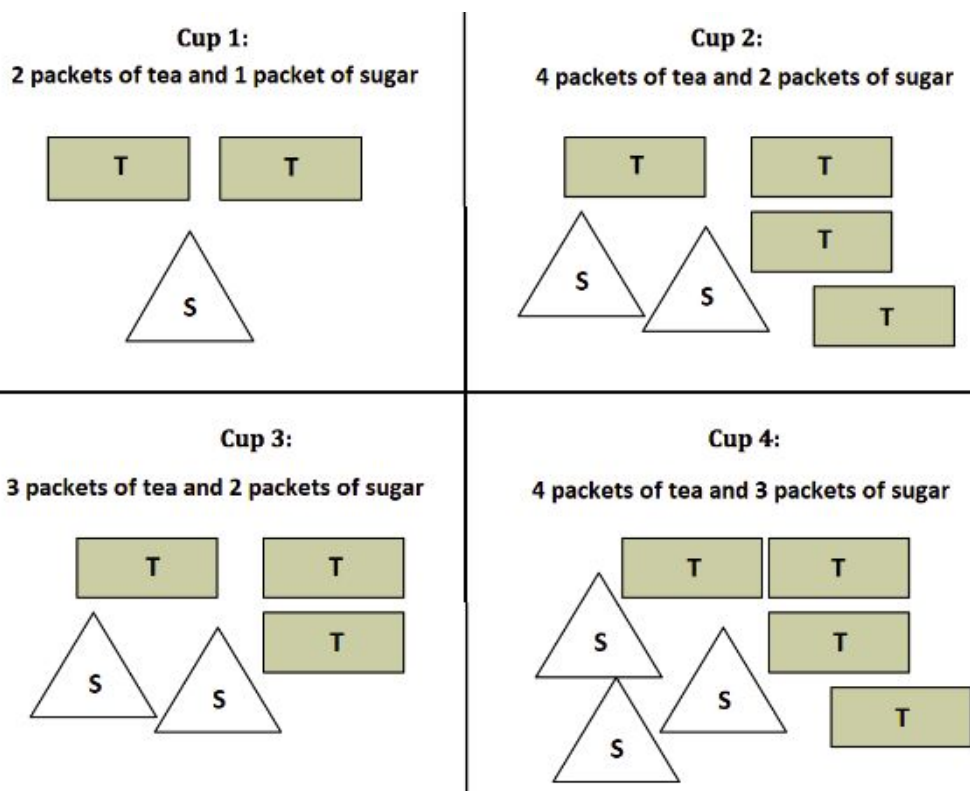
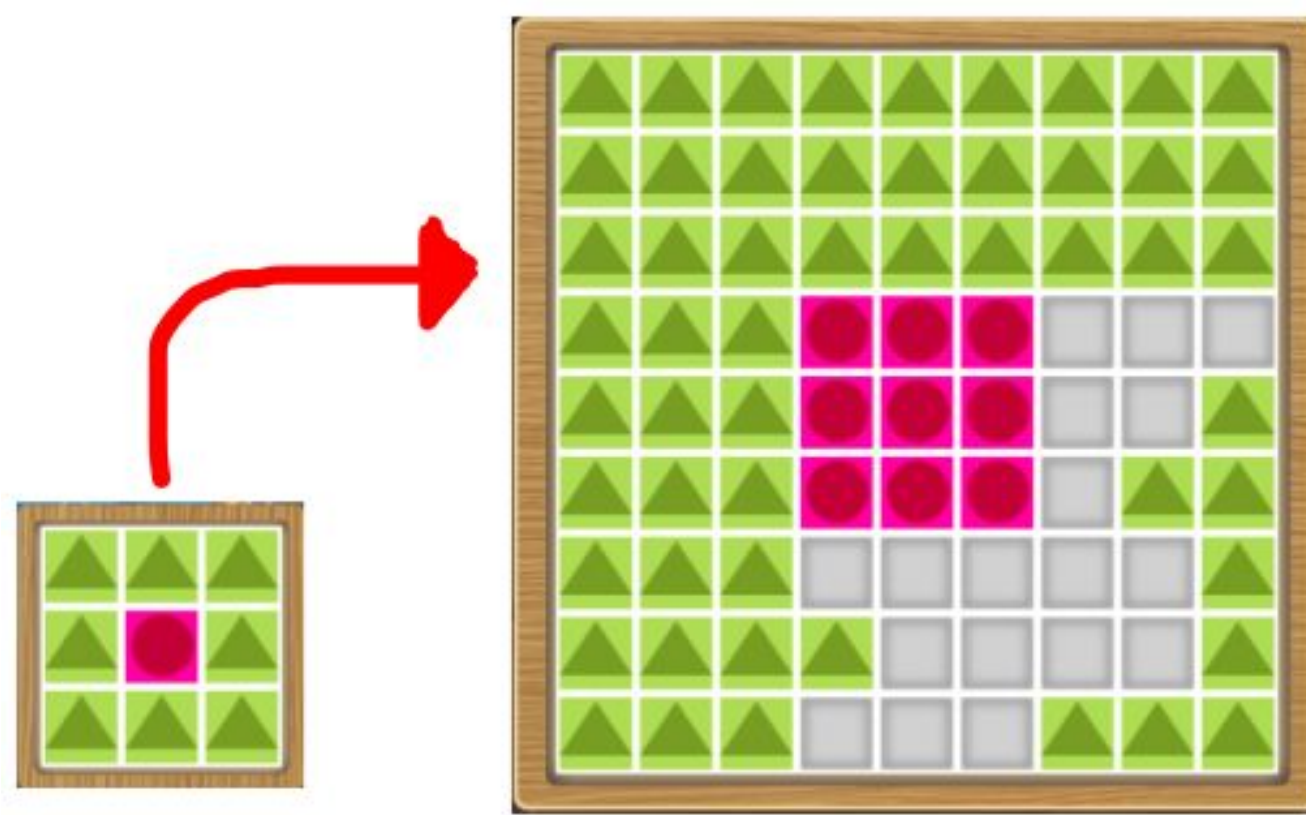
Within and Across relationships: crucial constructs for understanding quantitative reasoning

Module highlights



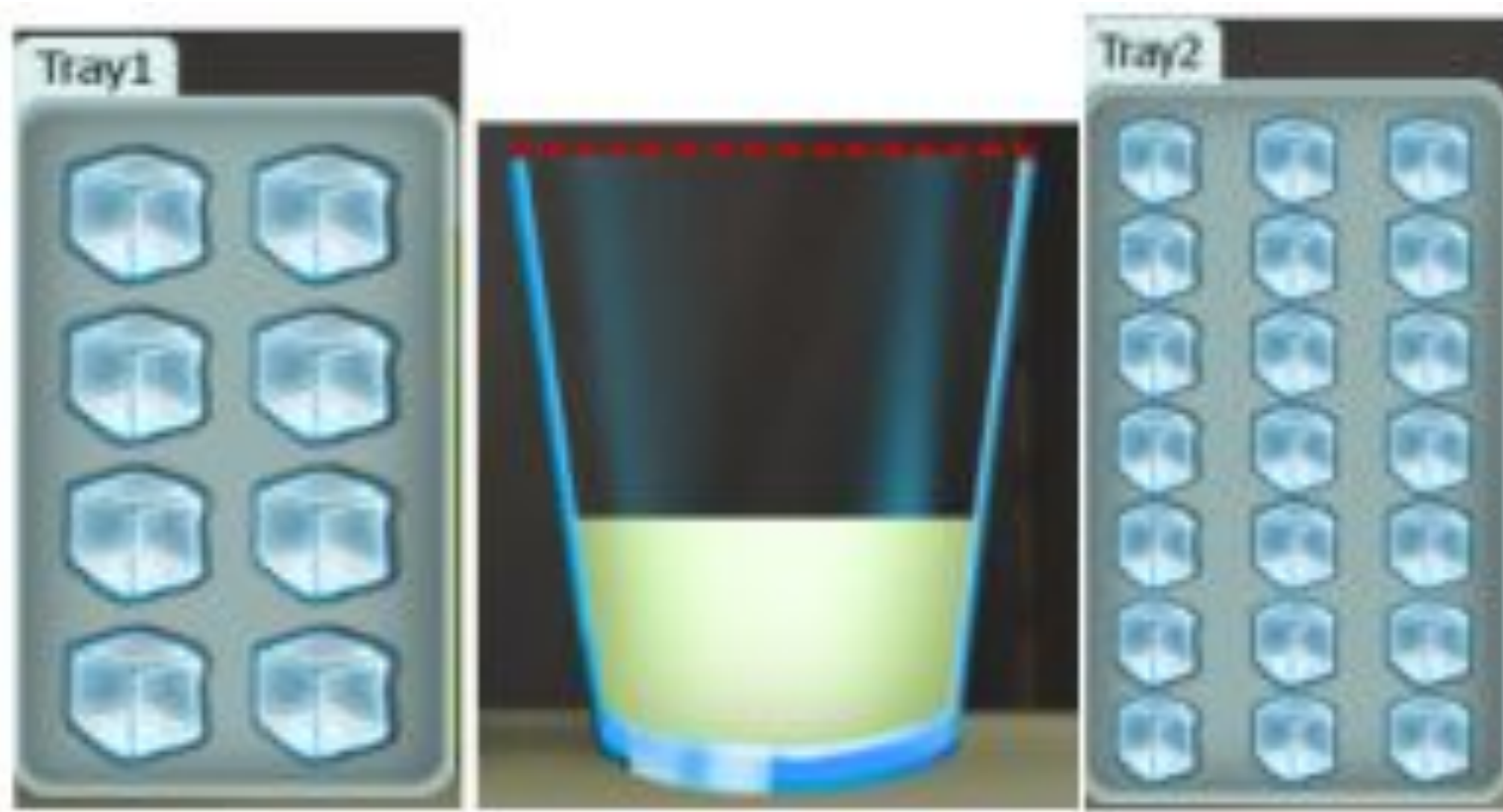
- Using Cutting tool for distributing food packets
- Grouping tool for making groups of people
- Drag and drop to find each person's/group's food share
- *Is fair distribution always equal?*

- To scale up or scale down given patterns.
- New and original patterns should look alike.
- Use given coloured tiles to fill up newly formed grid. Make your own grid and play around!



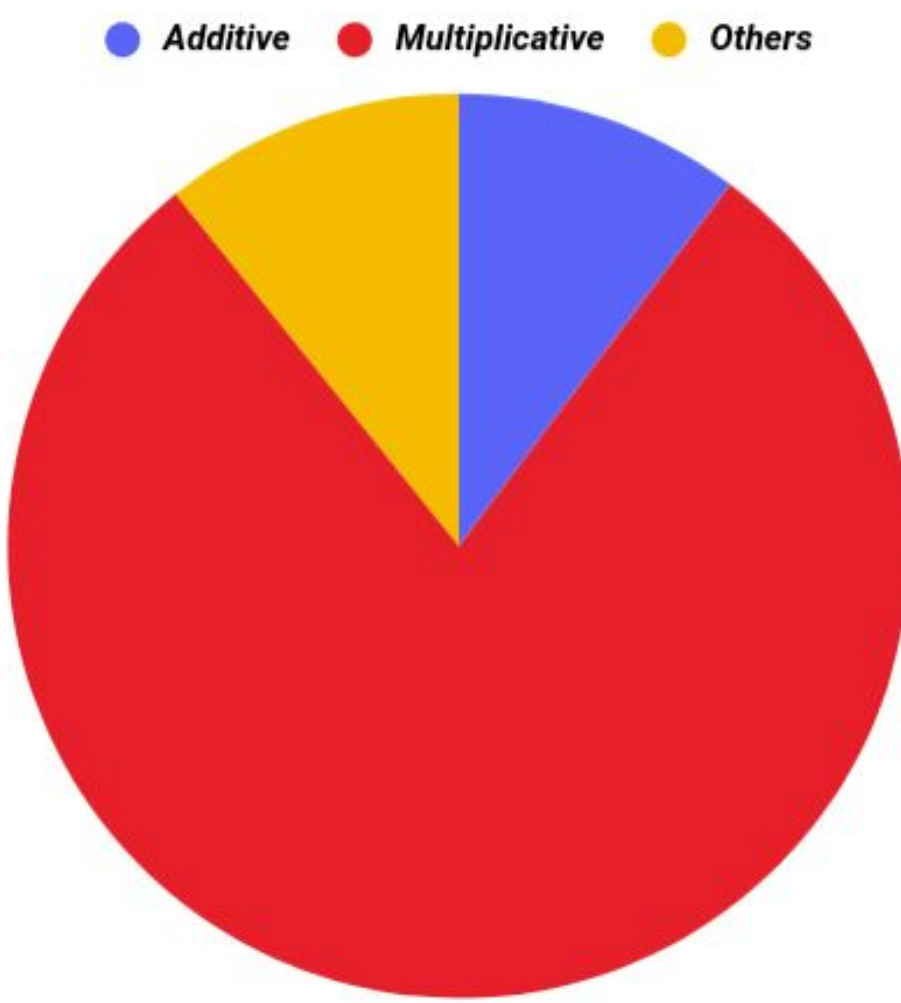
Which tea is sweeter?

Drag and drop ice cubes in a glass so that water reaches the brim. Guess the number of cubes required!



Understanding variations

Our research suggests ...



This is an interesting deviation from Lamon's (2007) famous study which stresses that students more often use additive reasoning.

Pre-test indicates students' strong propensity towards using multiplicative reasoning in finding relations between quantities - similar to what curriculum prescribes  
Many students couldn't distinguish between additive and multiplicative thinking.

Students engaged with CLIX modules:  
A view from a Rajasthan School



References:  
Lamon, S.J. (2007). Rational Numbers and Proportional Reasoning: Toward a Theoretical Framework. In F. K. Lester Jr. (Ed.), *Second Handbook of Research on Mathematics Teaching and Learning* (pp. 629-668). NCTM-Information Age Publishing, Charlotte.