From research to practice: The case of multiplicative thinking

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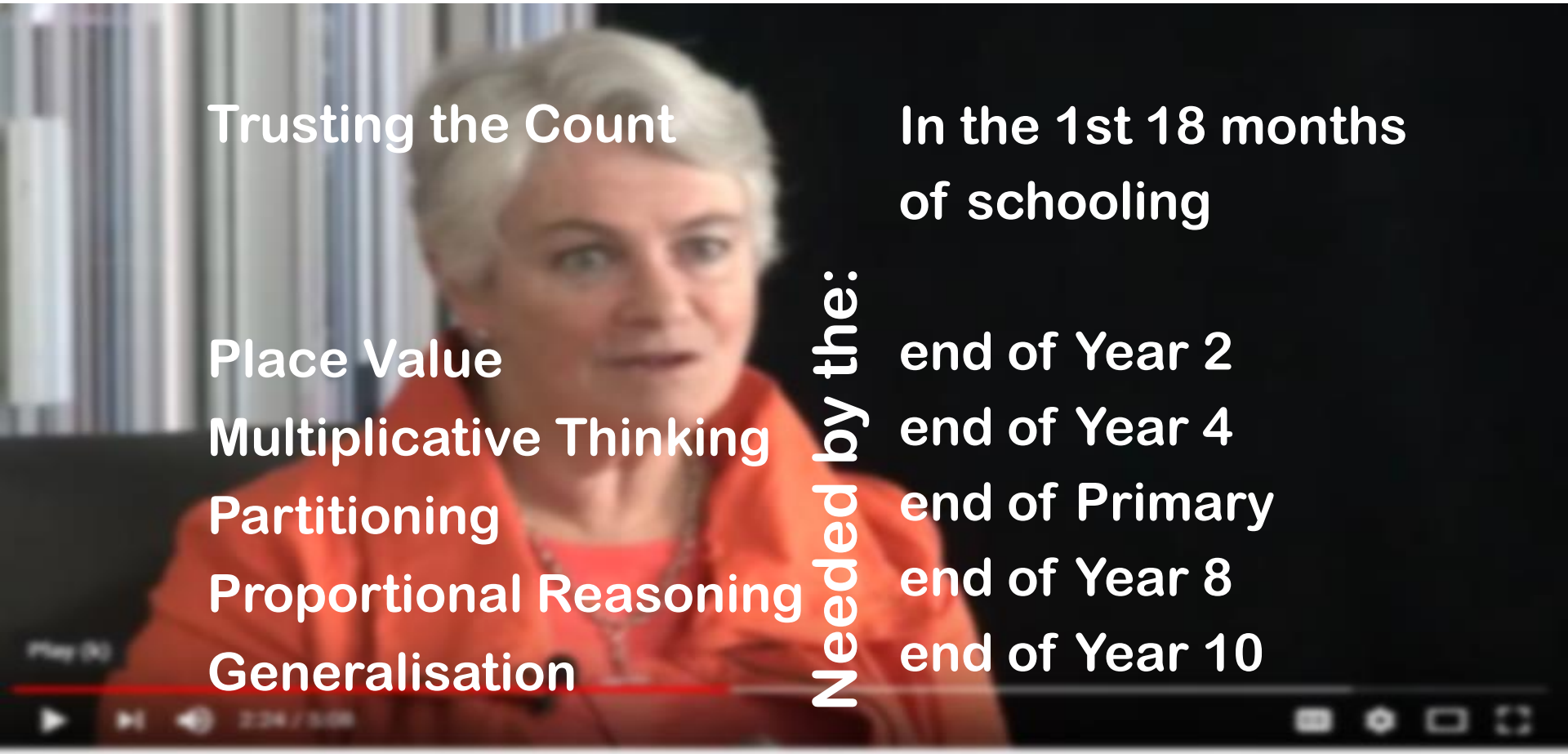
Di Siemon's non-negotiable big ideas



The Big Ideas in Number by Professor Dianne Siemon (full version)

How important?

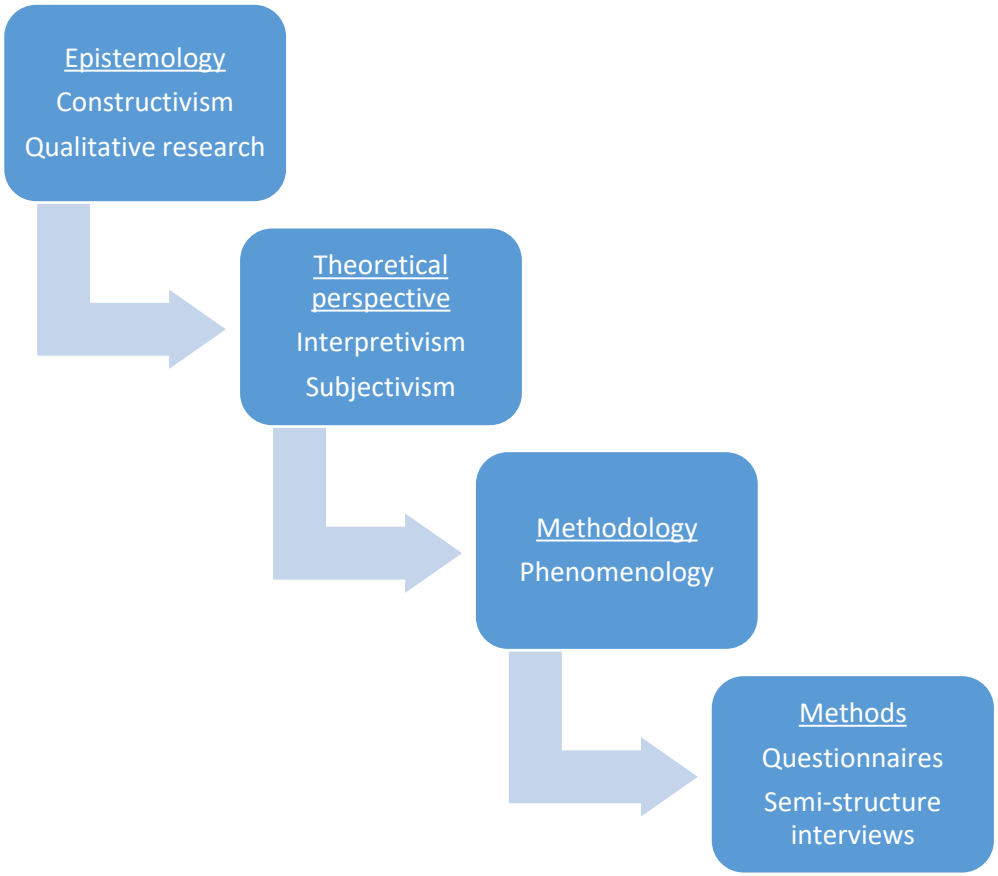
"The capacity to think multiplicatively is crucial to success in further school mathematics. … [it] is the single most important reason for the eight-year range in mathematics achievement in Years 5 to 9."

(Siemon, 2013, p. 41)

Multiplicative Thinking

- 2 000 primary aged students (Years 4, 5 & 6)
- 80 teachers
- 21 schools in WA, England, New Zealand and Victoria.

Theoretical framework



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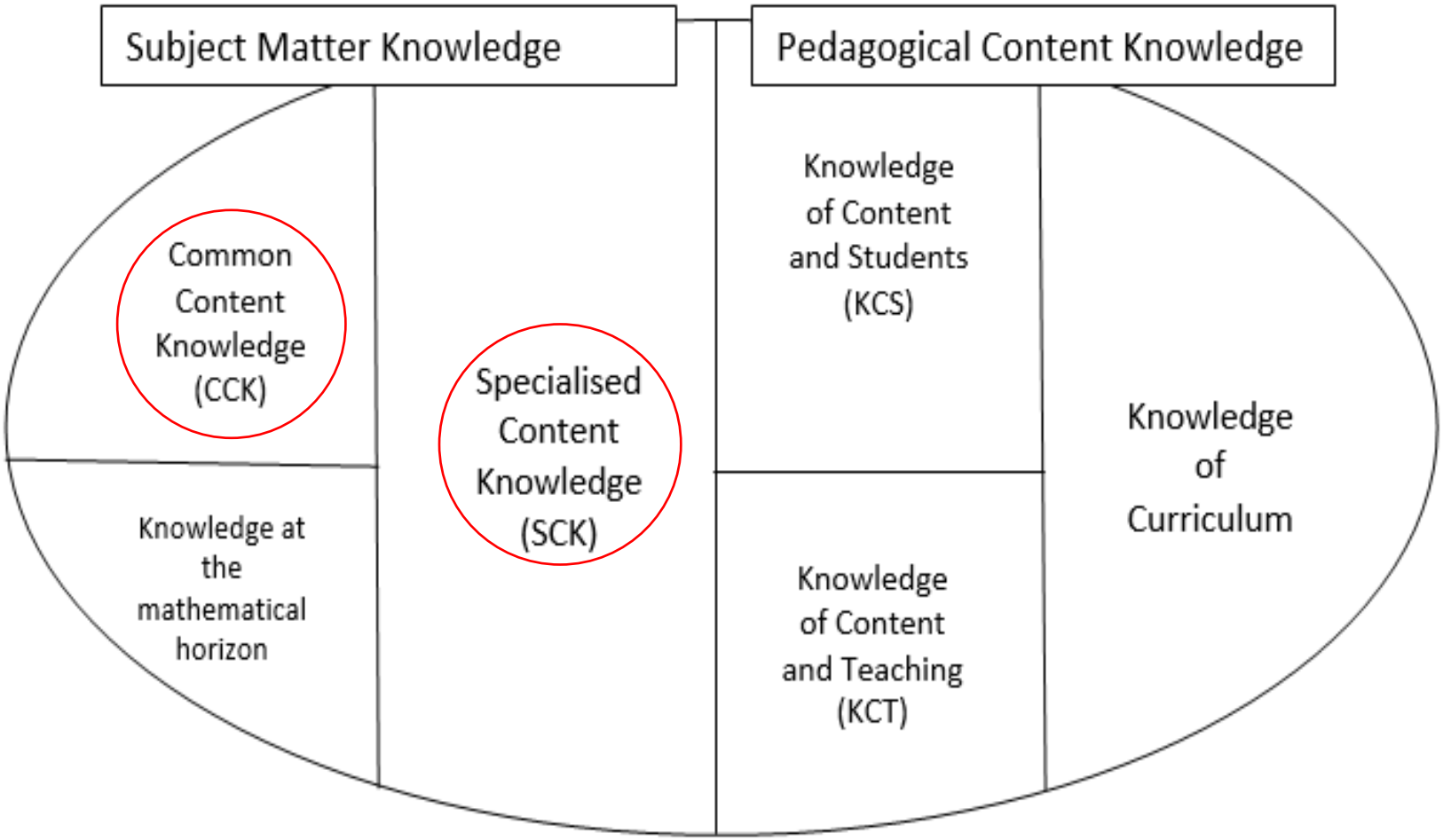
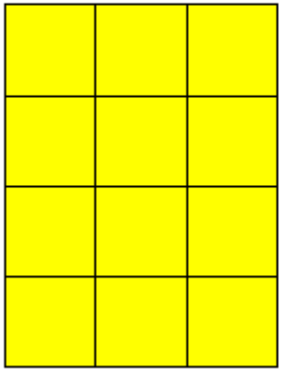


Mathematical Knowledge for Teaching (Hill et al. 2007)

Tommy and Jamie were asked to represent 3 x 4 with tiles. They responded in the following ways.



Tommy

Jamie

Questions asked of teachers:

- What does each work sample tell you about the student's understanding of the mathematics involved?
- What teaching strategies would you employ to help each student?

	Appropriate response	Appropriate intervention
No PL (n=14)	26.9%	7.1%
PL (n=10)	72.7%	60%

Reframing Mathematical Futures Projects

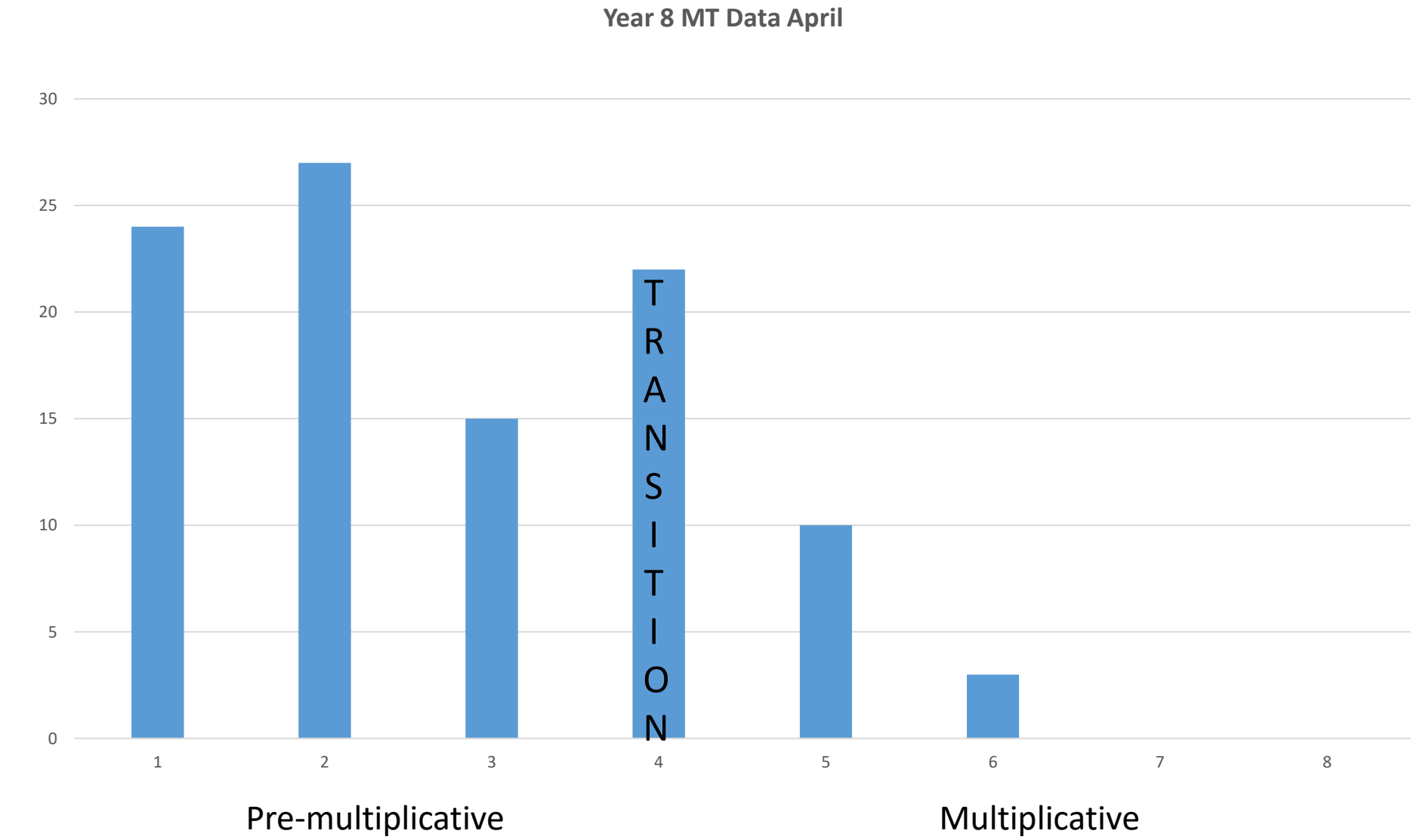
- AMSPP Priority Project (RMF) – 20 schools Australia-wide

  Multiplicative Thinking

- AMSPP Competitive Grant (RMFII) – 32 schools Australia-wide (3 500 students), four in WA

  Mathematical Reasoning (algebraic, geometric and statistical)

- The new schools (including WA) who joined RMFII spent the first 6 months of the Project completing the Multiplicative Thinking component before moving to the Mathematical reasoning project.


Year 8 MT Data April
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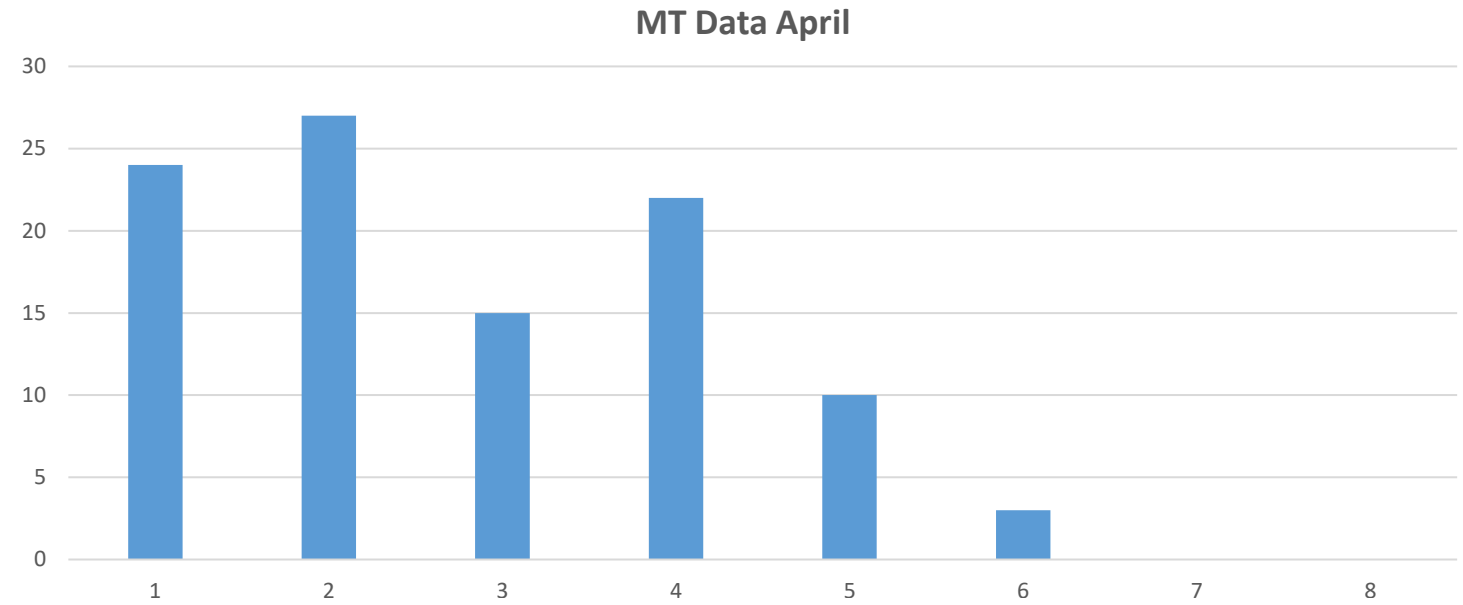
TRANSITION
Pre-multiplicative
Multiplicative

WA Curriculum: Mathematics Multiplicative Thinking content descriptors

P – 10:	160/301	53%
7 – 10:	91/126	72%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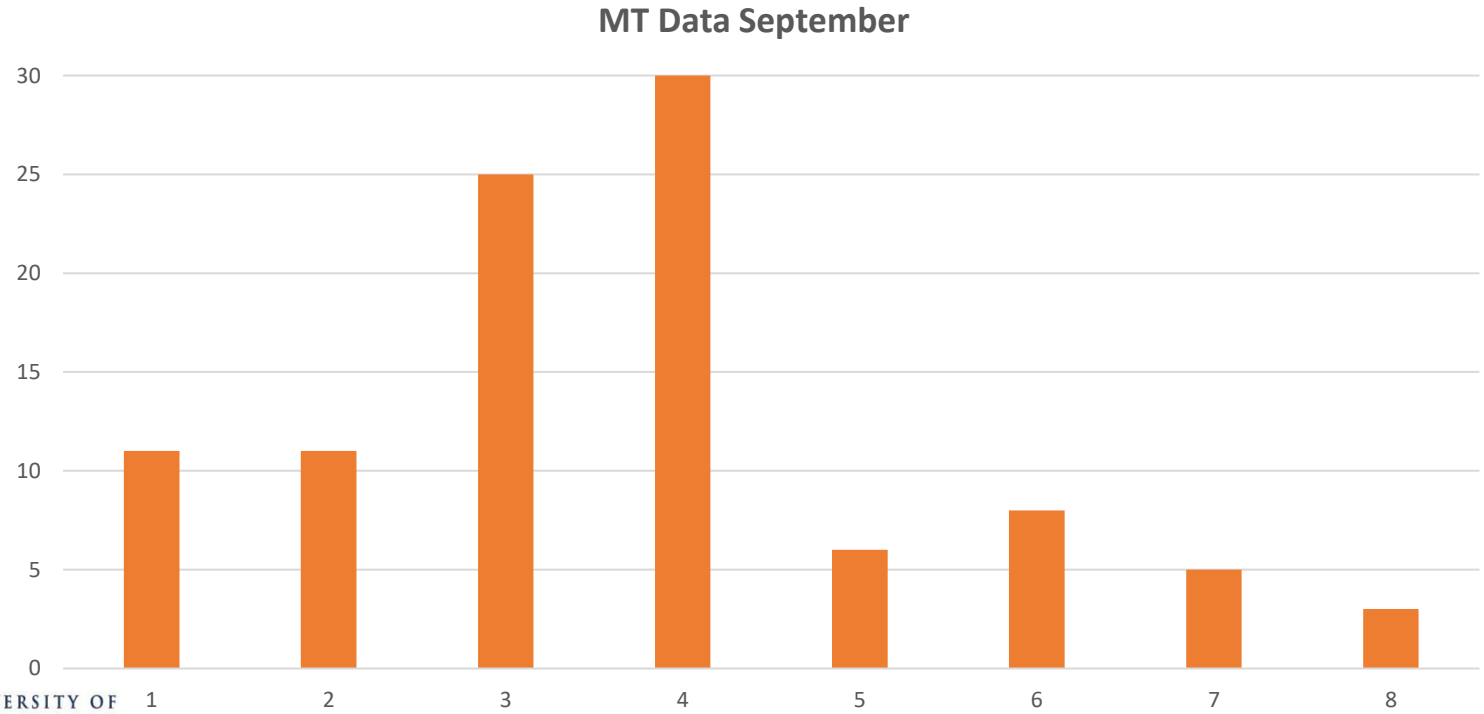
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Other opportunities

From this research, it appears that there are grounds to consider that there is a relationship between the ability to reason mathematically and multiplicative thinking.

An updated learning progression of multiplicative thinking has been commissioned by the Federal Government (Growing Mathematically: Multiplicative Thinking) which includes mathematical reasoning items.

This work is ongoing.