

From pedagogical content knowledge to instructional practice: investigating the role of teacher-child interactions in early mathematics education

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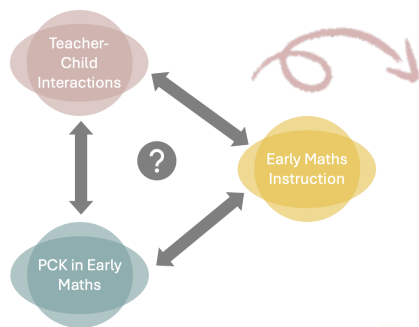
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Key Concepts

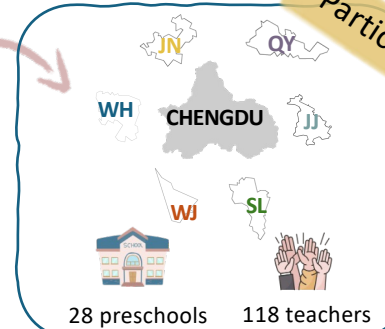
- The quality of **teacher-child interactions** has been found to significantly predict children's gains in mathematics learning
- Children who experience more cognitively stimulating and conceptually rich **instruction** in early years demonstrate significantly higher math achievement later
- Teachers' **pedagogical content knowledge** is central to how they interpret, represent, and respond to children's mathematical ideas



RQs

- What predict teachers' instructional quality in early maths teaching?
- How do proximal factors of teaching (i.e., PCK, teacher-child interactions and instructions) work together?

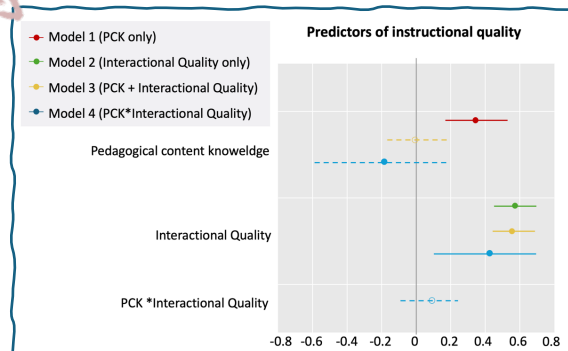
Participants



Instruments

- Sustained Shared Thinking and Emotional Well-being scale* (SSTEW) (Siraj et al., 2024)
- Early Childhood Quality Rating Scale – Emergent Curriculum maths subscale* (ECQRS-EC) (Sylva et al., 2025)
- Pedagogical Content Knowledge in Early Maths* (PCK-EM) survey (Chen & Zhang, 2014)

Interactional Quality	1		
Instructional Quality	.720**	1	
PCK-EM	.627**	.481**	1
	Interactional Quality	Instructional Quality	PCK-EM



Implications

- Teachers' PCK matters, but only becomes meaningful when **enacted through high-quality – relational and intentional interactions**
- Using **micro-analysis** of classroom interactions to investigate how knowledge is mobilised through high quality interactions
- Teacher training** should help teachers to translate content knowledge into responsive dialogues or interactions.

Pedagogical Content Knowledge

a
 $\beta=0.75^{***}$

ACMC (c') $\beta=0.44^{***}$

b
 $\beta=0.62^{***}$

ADE (c) $\beta=0.05$

89.4% of PCK's total impact on instructional quality works through those high-quality interactions

Instructional Quality