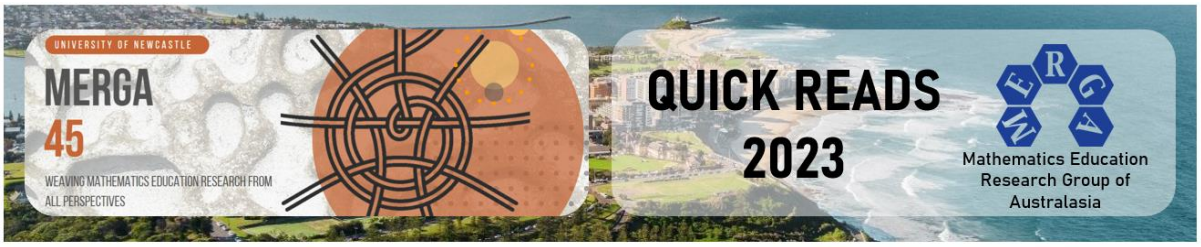

Throw Away the Script: Examining the Introduction of a Guided Mathematical Inquiry Unit

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Explicit instruction entails a teacher-controlled, highly scaffolded and sequenced breakdown of tasks for learners with repetition and practice. However, explicit instruction has been associated with non-participation and disengagement; passive approaches to learning; and, reduced opportunities for students to express their mathematical ideas. By contrast, during Inquiry Based Learning (IBL), students are encouraged to engage with mathematical concepts in depth, thereby promoting: a deep understanding of the subject matter; increased transferability of learning; improved motivation; perceived relevance of mathematics; and, a critical stance. However, IBL is not without difficulties, including: extended time demands limiting curriculum content coverage; inadvertent privileging of students who have prior knowledge; student struggle and frustration; and, the need for teacher preparation and skill at implementation. To counter this, we examined the introduction of an experienced Guided Mathematical Inquiry (GMI) teacher's unit of work through the following lens: *What insight into GMI can be gleaned from analysing the introduction phase of a GMI unit*? In order to provide guidance on factors to consider in introducing a mathematical inquiry.

Year 3 students from a suburban government school in Australia addressed the problem *What is the best card for a game Addition Bingo?* Data included student work samples, transcribed lesson videotapes, and field notes.. Thematic analysis was carried out with initial codes derived from the Domains of Knowledge Framework (Fielding-Wells, 2016). The findings suggested a number of important considerations: 1) an early focus on context development occurred before a shift to mathematical knowledge; 2) teacher established prior understandings about context and content and sought to ensure broad familiarity; and, 3) extensive development of context and mathematical content vocabulary and terminology. The teacher took time to establish prior mathematical knowledge, using the context to achieve two purposes: 1) supporting the students to discover and explore important concepts for themselves, including the importance of considering the boundaries of a set and the frequency of the numbers in that set; and, 2) exploring students' mathematical knowledge and advancing potential understanding. The proposal is not that all learning must take place through GMI and we recognise that there are limitations to both IBL/GMI and explicit instruction. However, in a time when explicit instruction is supported as a sole approach, the potential for GMI to counter limitations associated with this explicit instruction must be considered.

References

Fielding-Wells, J. (2016). "Mathematics is just 1+1=2, what is there to argue about?": Developing a framework for argument-based mathematical inquiry. In B. White, M. Chinnappan, & S. Trenholm (Eds.), *Proceedings of the 39th annual conference of the Mathematics Education Research Group of Australasia*: *Opening up mathematics education research* (pp. 214–221). Adelaide: MERGA.