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A Preliminary Framework for the Effective Use of Generative Artificial Intelligence (GenAI) by Mathematics Teachers

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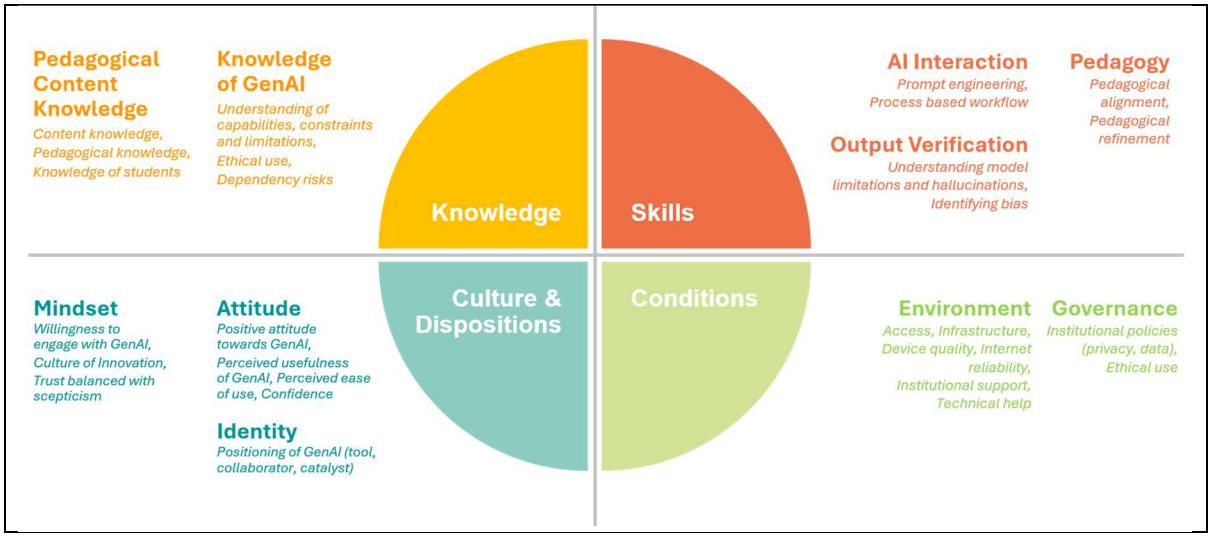
This paper reports a preliminary framework for the effective of use generative artificial intelligence (GenAI) by mathematics teachers. Informed by a rapid review of mathematics education literature published after 2020, the framework consists of four domains (*Knowledge*; *Skills*; *Culture and Dispositions*; *Conditions*) that support mathematics teachers to make effective use of GenAI (see Figure 1). Each domain (e.g., *Knowledge*) consists of several elements (e.g., *Pedagogical Content Knowledge* and *Knowledge of GenAI*) and sub-elements (e.g., *Understanding of capabilities, constraints and limitations; Ethical use; Dependency risks*) that describe specific aspects of the domain that support effective use of GenAI.

Figure 1

The Preliminary Effective Use of GenAI for Mathematics Teaching Framework



The framework provides an initial evidence base for the development of pre-service and in-service professional learning about GenAI and provides several implications for the design and delivery of such programs. The complexity of the framework highlights that professional learning, that only focusses on isolated sub-elements, is unlikely to be effective in supporting teachers to make effective use of GenAI. In many cases, GenAI professional learning will need to be grounded in discussions of pedagogy. The framework also highlights the continuing importance of the human element in mathematics teaching in the age of AI, with teachers acting as mediators between GenAI-generated outputs and the realities of daily classroom interactions.

For more information, please refer to the following paper presented at the 48th Annual Conference of MERGA in July 2026.
Cameron, S. & Mesiti, C. (2026). A preliminary framework for the effective use of generative artificial intelligence (GenAI) by mathematics teachers. In N. Berger, M. Thompson, J. Ley & C. Wilsmore (Eds.), Beyond boundaries: Strengthening futures in mathematics education. Proceedings of the 48th annual conference of the Mathematics Education Research Group of Australasia, Sydney (pp. 66–73). MERGA.