



## Mathematical Competence Exhibited by Year 2 Students When Learning Through Sequences of Challenging Tasks

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Developing reliable and effective processes to monitor student progress during problem-solving tasks is an ongoing challenge in mathematics education. Interpretations of student progress across mathematics is context-dependent and influenced by preconceived notions that are founded on educators' beliefs about the most effective ways to teach mathematics.

The research presented in this paper positions mathematics learning through a challenging tasks approach (Sullivan et al., 2015) placing value on the simultaneous development of conceptual understanding and productive disposition as students solve non-routine problems. Throughout the literature there is little evidence of reliable and transferable approaches to assessment that accurately reflect students' learning experiences when problem-solving.

The study reported in this paper was conducted as part of a larger project entitled *Exploring Mathematical Sequences of Connected, Cumulative and Challenging Tasks* (EMC<sup>3</sup>) (Sullivan et al., 2020) and investigated the ways Year 2 students demonstrate and develop mathematical competence when learning through sequences of challenging tasks. Qualitative data sources inclusive of observations, work samples and interview transcripts from six Year 2 (n=6) students were analysed to determine the specific competence elements students exhibited throughout their mathematics lessons.

The first stage of analysis consisted of triangulating the data to create learning artefacts representative of students' dispositional behaviours as they recorded each stage of their thinking throughout the lesson. The second part of the analysis compared each students' learning artefacts across the length of the study and showed that students demonstrated growth in both cognitive and dispositional elements of competence when learning through sequences of challenging tasks. These elements, consistently identified across different class settings and lesson topics, have the potential to broaden interpretations of mathematical competence within both practice and research domains.

### References

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