

MATHEMATICS TEACHERS' BELIEF CENTRALITY, CONTEXT, AND PRACTICE

Kim Beswick
University of New South Wales, Sydney

Teachers' beliefs and their influence on practice continue to be of interest to those concerned with achieving lasting reforms of mathematics teaching. The field has moved from attempts to identify simple belief-practice links and claims of conflicts between beliefs and practice, to understanding beliefs as existing in systems and varying in their centrality (Green, 1971). The influence of context on their enactment, and the entailment of emotions has also been acknowledged. The problem of how the relative impacts on practice of beliefs or categories of beliefs can be predicted remains. A model derived from existing studies (Beswick, 2005, 2018) is described, along with examples and theoretical implications, as a contribution to a solution.

The model described emerged from two studies involving interviews with a total of 16 mathematics teachers and classroom observations of 6 of these (Beswick, 2005, 2018). The relative centrality and distance from a specific classroom context can be imagined as perpendicular axes in relation which a teacher's beliefs can be located. Beliefs that are highly connected to others (i.e. central) and related most closely to the specific classroom being considered are positioned nearest the origin and exert the greatest influence on practice in that context. These beliefs tend also to be associated with strong emotional responses. Impact on practice can be considered a third axis defining a 3-dimensional cartesian space in which beliefs are positioned.

Beliefs about the nature of mathematics, student capabilities, the teachers' role in relation to classroom/behaviour management, the teachers' responsibilities in relation students' learning, and engagement in ongoing professional learning have all been found to be relevant to their practice. The findings suggest that teachers' context specific, identity-related and hence central beliefs concerning their role as teacher are, at least in part, derived from primary beliefs (Green, 1971) about student capabilities. This is consistent with evidence that beliefs concerning the capabilities of students significantly impact practice and would also be positioned near to the origin of the model described. Beliefs concerning classroom/behaviour management are less context specific. That is, teachers who are significantly concerned with such issues appear to carry that concern across all of the classes that they teach. These beliefs are inherently close to the context of any given class and hence the extent of their influence on teachers' practice is primarily a function of their centrality in relation to the teacher's other beliefs in that context. Beliefs concerning how mathematics is best learned and taught are more distant from the specific classroom contexts but not as distant as beliefs concerning the nature of mathematics, or the importance of professional learning. Similarly, for those teachers who hold beliefs about school mathematics in isolation from their beliefs about mathematics as a discipline, beliefs about school mathematics are inherently closer to classroom contexts than those about the discipline. The impact of these beliefs is thus a function of their relative centrality.

The presentation will provide further illustrations along with diagrammatic representations of the model.

References

- Beswick, K. (2005). The beliefs/practice connection in broadly defined contexts. *Mathematics education research journal*, 17(2), 39-68.
- Beswick, K. (2018). Systems perspectives on mathematics teachers' beliefs: Illustrations from beliefs about students. In E. Bergqvist, M. Österholm, C. Granberg, & L. Sumpter (Eds.), *Proceedings of the 42nd conference of the International Group for the Psychology of Mathematics Education* (Vol. 1, pp. 3-18). Umeå, Sweden: PME.
- Green, T. F. (1971). *The activities of teaching*. New York: McGraw-Hill.