Publications and Presentation


Mathematics Journals (Editor)

- Co-Editor of Vector (British Columbia’s Mathematics Teacher’s Journal) with Peter Liljedahl. 2008 – present.

- *Selected Writings from the journal of the British Columbia Association of Mathematics Teachers: Celebrating 50 years of Vector*. Edited by Egan Chernoff, Peter Liljedahl, and Sean Chorney. Information Age Publishing. In progress.
This dissertation explores ideas from new materialism as a theoretical lens for identifying and understanding the role of tools within mathematical practice. I propose that new materialism, particularly within a post-humanist perspective, offers the opportunity to articulate a non-dualist approach to mathematical thinking and learning—with a particular focus on the entanglement of tools, humans and concepts. Theoretically reshaping the traditional approach of seeing learning as occurring solely within the individual, the focus of mathematical learning in this dissertation is neither on the student nor on the tool, but on the coupled entity “student–tool”.

The theoretical perspective developed in this dissertation draws mainly on scholars from outside the field of mathematics education, including the anthropologist Tim Ingold and the feminist science studies scholar Karen Barad. Both articulate forms of post-humanist materialism that attend specifically to the interplay between tools and cognition. In addition to these scholars, I draw on the inclusive materialism of de Freitas and Sinclair, who in their recent book *Mathematics and the Body* have extended Barad’s ideas to the context of mathematics, and who argue that *material engagement with a tool* in a mathematical activity is *mathematics*. The tool is therefore not subordinate to the human subject or to the practice of mathematics but comprises an integral part of the ‘assemblage’ from which mathematics ‘emerges’.

This dissertation is structured around three papers, in addition to an opening introductory chapter and a closing concluding one. The introductory chapter outlines my intellectual journey which began with a strong interest in the notion of *agency* (especially in the work of Pickering and Latour) and, from there, evolved into an examination of the work of Barad and Ingold. In it, I also make connections to relevant literature in mathematics education, which has also had a long history of interest in tool use.

The first paper presents mathematical practice as a continued *process*, meaning that the ‘partners’ of student–tool and of mathematics are not static but processes of ‘becoming’. The second paper applies the idea of mathematics-as-becoming to the concept of the circle. It contrasts long-standing assumptions about mathematical concepts as ideal, Platonic objects with a new materialist approach in which the circle is seen as deriving from the animation of a life force. Drawing on Ingold’s notion of *meshwork*, I argue that circles emerge from traces of movement. Paper three offers an empirical study and uses a variety of constructs from post-humanist, materialist theories to analyse data taken from a high school geometry classroom. In it, I employ a very recent methodological approach called *diffractive analysis*, novel to mathematics education, which results in new insights and questions into the consequences of studying mathematical learning activities from a non-dualist perspective.

In the concluding chapter, I explore potential and productive overlaps between the different post-humanist, materialist theories as they relate to mathematics education research. I also discuss some of the methodological issues that were raised in my third paper. Finally, I indicate how the new theoretical ideas that this dissertation engages with might contribute to posing and addressing certain questions in mathematics education research.

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**Academic Record**

**Doctor of Philosophy** – Mathematics Education, Simon Fraser University

**Dissertation** – *From Agency to Narrative: Tools in Mathematical Learning*

**Master of Science** – Curriculum and Instruction: Mathematics, Simon Fraser University

**Thesis** – *Higher Level Thought Processes Through Interactive Engagement with Open-ended Mathematics Word Problems*

**Bachelor of Education** – Mathematics, University of British Columbia

**Bachelor of Science** – Mathematics, University of British Columbia

**Awards**

2012 Graduate Fellowship

2011 President’s PhD Research Stipend

2011 Craig Newell Memorial Scholarship

2008 Graduate Fellowship