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An early algebra approach to pattern generalisation: actualising the virtual through words, gestures and toilet paper.

Summary: This paper focuses on pattern generalisation as a way to introduce young students to early algebra. We build on research on patterning activities that feature, in their work with algebraic thinking, both looking for sameness recursively in a pattern (especially figural patterns, but also numerical ones) and conjecturing about function-based relationships that relate variables. We propose a new approach to pattern generalisation that seeks to help children (grades 2 and 3) work both recursively and functionally, and to see how these two modes are connected through the notion of variable. We argue that a crucial change must occur in order for young learners to develop a flexible algebraic discourse. We draw on A. Sfard’s [Thinking as communicating. Human development, the growth of discourses, and mathematizing. Cambridge: Cambridge University Press (2008; ME 2011d.00346)] communication approach and on G. Châtelet’s [Figuring space. Philosophy, mathematics and physics. Dordrecht: Kluwer Academic Publishers (2000)] notion of the virtual in order to pursue this argument. We also root our analyses within a new materialist perspective that seeks to describe phenomena in terms of material entanglement, which include, in our classroom research context, not just the children and the teacher, but also words, gestures, physical objects and arrangements, as well as numbers, operations and variables.

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