



## Rethinking Mathematics Teaching and Learning in the Early Years

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### Abstract

Research on early mathematics learning has often been restricted to an analysis of children's developmental levels of single concepts such as counting, but has not provided insight into common underlying processes that develop mathematical thinking, reasoning and early generalization. This paper reports on an early years' numeracy program focused on early patterning and mathematical reasoning that challenges traditional expectations of the mathematical difficulty and scope of traditional pre-school programs. The *Patterns and Early Algebra (PEAP) Professional Development (PD) Program* challenges young children to think, reason and solve patterning problems in a range of meaningful contexts through both play and intention teaching opportunities. "Patterning is an essential skill in early mathematics learning, particularly in the development of spatial awareness, sequencing and ordering, comparison and classification. This includes the ability to identify and describe attributes of objects and similarities and differences between them" [1, p.8]. Recent research with young children has shown that the early development of pattern and structure positively influences mathematical achievement overall and provides a stronger foundation for algebraic thinking [2]. A pattern is "a type of generalization, in that it involves a relationship that is 'everywhere the same'" [2, p.240]. Some researchers have claimed that early algebraic thinking develops from the ability to see and represent patterns in early childhood [3]. Others have claimed that the integration of patterning in early mathematics learning is critical to the abstraction of mathematical ideas and relationships, and the development of mathematical reasoning and generalization skills in young children [2] [4] [5]. This paper reports on a suite of studies [6] that provide much needed research on the link between patterning and early algebraic thinking and evidence of the importance of its inclusion in early numeracy programs, thus challenging what mathematics content is taught to children in the pre-school years.

### References

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