

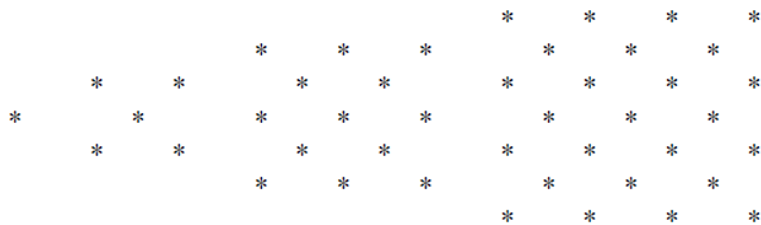
# DIDACTICAL HANDLING OF A GAP BETWEEN A TEACHER'S INTENTION AND STUDENTS' MATHEMATICAL ACTIVITY

Heidi Strømskag

Sør-Trøndelag University College, Norway

The concept of *milieu* (Brousseau, 1997) models the elements of the material and intellectual reality on which the students act when engaging with a mathematical task. The research question addressed in the reported project is: *What features of the milieu constrain students' establishment of algebraic generality in a given shape pattern?*

Research participants were a group of three student teachers and a teacher educator of mathematics. The data are transcripts of student teachers' (video-recorded) engagement with a task on algebraic generalisation of a shape pattern, with teacher intervention. This is the pattern they were supposed to generalise:



The task was to find first a recursive *formula*, then an *explicit formula* for the general element of the sequence mapped from the shape pattern. From the numerical values of the elements of the pattern, the following recursive formula was established by the student teachers:  $(n - 4) + s_{n-1} = s_n$ . In their attempt to find an explicit formula (expressed in the task as ‘a connection between position and numerical value of the elements’), the student teachers calculated the difference between the numerical value and position of elements,  $f(n) - n$ . This inadequate approach was however not noticed by the teacher. In an attempt to help them to progress, the teacher changed the milieu by directing attention towards type of growth of the sequence at stake. This I interpret as a *metamathematical shift* (Brousseau, 1997), where the original task is substituted by a discussion of the logic of its solution.

In the reported episode there was no focus on connections between recursive and explicit formulae (neither on arithmetical nor iconical properties). This condition is a weakness in the milieu for pattern generalisation (Lannin, Barker, & Townsend, 2006).

## Reference

- Brousseau, G. (1997). *The theory of didactical situations in mathematics*. Dordrecht, The Netherlands: Kluwer.
- Lannin, J. K., Barker, D. D., & Townsend, B. E. (2006). Recursive and explicit reasoning: How can we build student algebraic understanding? *Journal of Mathematical Behavior*, 25, 299-317.