CHILDREN'S THINKING ABOUT AREA AND PERIMETER IN THE CONTEXT OF A GARDEN THEME[1]

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As part of a research project aimed at establishing and analyzing links between "home mathematics" and "school mathematics," we developed a teaching innovation centered on a garden theme in a fourth-fifth grade classroom (9-10 year-olds). This theme was chosen based on the students' and their families' knowledge and experiences with gardening. Our goal is to engage children in sociocultural activities that are personally meaningful to them and "recognized as 'real' by the mathematical community" (van Oers, 1996, p. 106). The gardening context allowed us to explore students' informal understandings of area and perimeter as they faced authentic problems. For example, the need to cover their enclosed gardens with plastic led to finding the areas of these irregularly shaped gardens. The need to make their enclosed gardens bigger, yet using the same amount of chicken wire, led to an optimization problem. The discussion of these real life situations was followed by in-class tasks to further probe the children's understanding of area and perimeter. As Hoyles (1991) writes, "it is pedagogic intervention which imposes the mathematical structuring and provokes the pupils' awareness of the underlying mathematical ideas" (p. 149).

This presentation will focus on four children's thinking about area and perimeter as they worked on a series of tasks which included finding the area of a miniature garden (tools available were transparent grid paper, rulers, tiles and cubes) and exploring what shape would give the maximum area (for a fixed perimeter). Each child was individually interviewed and each interview was videotaped and audiotaped. Analyses of the interviews shed light on at least four areas: 1) the interplay between everyday knowledge and school mathematics; 2) the influence of tools (e.g., rulers vs. tiles) on the children's approaches (Nunes, 1996); 3) the effect of prior kinesthetic experiences on shaping a child's thinking about perimeter (the children had explored perimeter by making shapes with their bodies as units of length); 4) the use of "academic" approaches to the tasks (in terms of methods and language).

References

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