Visualizing Measurement: Preschool Children's Representations and Emerging Understandings

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Abstract:

Children encounter measurement concepts long before they enter formal schooling. This study investigates how preschool children conceptualize and represent measurement through drawings. Drawings, as a non-verbal and developmentally appropriate tool, offer valuable insight into children's emerging mathematical thinking. The study involved 27 preschool children, aged 5 to 6, who had limited formal exposure to measurement activities in their kindergarten environment.

Participants were asked to complete five drawing tasks designed to elicit their understanding of measurement attributes such as length, mass, and time. Each task was introduced through a short contextual story or question that encouraged the child to draw freely. The children's drawings were analyzed using qualitative content analysis, with a coding framework developed to identify measurement-related elements, representational strategies, and the use of conventional or symbolic tools. Verbal explanations provided by the children during or after the drawing process were transcribed and used to supplement the visual data and clarify children's intentions.

The findings revealed that most children were familiar with length measurement, frequently illustrating themselves comparing objects or measuring with informal tools. Additionally, many children demonstrated an intuitive understanding of comparison, effectively representing contrasts in size and weight. However, drawings involving rulers and clocks were often symbolic or non-standard, indicating limited conceptual familiarity with these tools and their functions.

This study underscores the importance of including open-ended, creative tasks in early mathematics education and suggests that drawings—when accompanied by children's verbal reflections—can serve as a meaningful medium for assessing young children's informal knowledge of measurement.

Keywords:

Measurement, preschool education, early mathematics, drawings, visual representation.