THE DESIGN OF A COMPUTATIONAL ENVIRONMENT TO EXPLORE CHILDREN'S DEVELOPMENT OF PLACE VALUE

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This paper describes the design process of a computational environment created to explore the development of 5 and 6 year-old children's understanding of place value, particularly their ability to explain the relations between the units of different sizes (i.e. hundreds, tens and ones) used in written multi-digit numbers.

The goal of the game was to integrate the epistemological principles involved in children's understanding of place value in order to (1) discriminate their conceptual development, and (2) promote their reflection about the relations between the different units in the multi-digits, in a meaningful way. Children's conceptual development was explored through the refinement of several number-comparisons categorising the span of relations between different units ("200-300" and "235-245" are examples of different categories), while the use of multimedia promoted their reflection about these categories dynamically.

After a series of game-playing sessions, all participants were able to explain the relations between the different units in multi-digits, and used place value correctly, according to post-task assessments. The analysis of case studies suggests that this computational environment can help to describe individual trajectories of development by opening a window into children's *thinking-in-change*, from idiosyncratic ideas to more sophisticated conceptions about place value.

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