

## The Characteristics of Quantity Operation for 2nd and 3rd Grade Mathematics Slow Learners

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**Abstract :** The development of mathematical competency has individual benefits as well as benefits to the wider society. Children who begin school behind their peers in their understanding of number, counting, and simple arithmetic are at high risk of staying behind throughout their schooling. The development of effective strategies for improving the educational trajectory of these individuals will be contingent on identifying areas of early quantitative knowledge that influence later mathematics achievement. A computer-based quantity assessment was developed in this study to investigate the characteristics of 2nd and 3rd grade slow learners in quantity. The concept of quantification involves understanding measurements, counts, magnitudes, units, indicators, relative size, and numerical trends and patterns. Fifty-five tasks of quantitative reasoning—such as number sense, mental calculation, estimation and assessment of reasonableness of results—are included as quantity problem solving. Thus, quantity is defined in this study as applying knowledge of number and number operations in a wide variety of authentic settings. Around 1000 students were tested and categorized into 4 different performance levels. Students' quantity ability correlated higher with their school math grade than other subjects. Around 20% students are below basic level. The intervention design implications of the preliminary item map constructed are discussed.

**Keywords :** mathematics assessment, mathematical cognition, quantity, number sense, validity

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