

Identifying patterns of skills acquisition in elementary mathematics among a cohort group of pupils: Implications to teaching and learning

Jesus E Sevilla, Jr. and Kathryn M Tan

Center for Educational Measurement, Inc, Philippines

This study explores the use of test performance to identify patterns of skills acquisition that differentiate good and poor performers in elementary mathematics. Good and poor performers in mathematics were identified through their cumulative raw score on six achievement tests in grade 1 to grade 6 mathematics. These tests were administered consecutively for six school years to an intact cohort group of 1,347 pupils towards the end of each school year. Discrimination and difficulty indices of all test items were computed to identify "critical" skills that highly discriminate the good performers from the low performers. The connection between the critical as well as non-critical skills in doing fractions and the patterns of acquiring these skills from one grade level to the next were then described and illustrated.

The results showed that majority of the critical items are more difficult than the non-critical items. The pattern of difficulty and discrimination indices of items on fractions indicated that both good and poor performers acquire the ability to identify fraction concepts from illustrations and perform addition and subtraction on similar fractions. Both groups, however, need to extend their conceptual understanding of fractions. The competencies of good and poor performers diverge at the point when they are required to compare fractions and execute basic operations on dissimilar and/or mixed form fractions. The results also showed how proficiency may be demonstrated with procedural knowledge without necessarily implying a good grasp of underlying concepts.