

A Cognitive Component Analysis for PISA Science Literacy

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The item difficulty cognitive component analysis is useful for the development of curriculum and assessment. This study integrates the framework and the literature perspectives to propose and interpret the item cognitive component model for an assessment of science literacy. The 103 items of The Programme for International Student Assessment (PISA)--Science Literacy were used for this analysis. Four cognitive components were proposed to predict the item difficulty parameters: the number of knowledge category, knowledge level, science competencies, and number of words. The results suggest that cognitive components can predict about 52% of item difficulty variance. The implications of these results for items that students did not perform well and for teaching strategies were also discussed.

Keywords: science literacy, cognitive component, international assessment

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