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Statistical Methods for Measuring the Impact of Mastery Learning in College Algebra

An intervention involving a unique modification of mastery learning was implemented in Fall 2011 in College Algebra at Montana State University-Bozeman. It was expected that the mastery learning would increase student ability on a variety of topics taught in the course. Item Response Theory Models can be used to estimate ability scores from tests made up of items from final exams from Fall 2011 and Fall 2010 (the comparison semester). Graded Partial Credit Models (GPCM) are an extension of IRT used when partial credit is given when scoring items. The application of GPCM to the College Algebra final is discussed. The ability scores from the GPCM are then analyzed using a Mixed Model to account for differences between sections. Results suggest higher ability in the semester after implementation of mastery learning and minimal differences between sections.