

Abstract Submitted  
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**Analyzing polytomous test items using Gaussian smoothing**

CALVIN STUBBINS, Franklin Marshall College — We present an assessment method for analyzing results of various types of testing, including dichotomous and polytomous multiple choice tests. The basic assumption behind this approach is that we expect questions and students that are similar to each other, as measured by mean item and mean student scores, to have similar student and item scores. This concept is implemented through Gaussian smoothing by using a weighted average of item scores. We demonstrate the effectiveness of this method by applying it to results from the Mechanics Baseline test for both dichotomous and polytomous testing. We find that this method is effective even for a small sample size ( $N = 20$ ) and gives results, such as difficulty and discrimination, that are similar to results from classical test theory. It also produces graphs that relate the probability of getting an item correct with student ability and item difficulty. These graphs are consistent with results from item response theory.

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