

UNIVERSITY OF MARYLAND
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Graduate Studies

ORAL DEFENSE ANNOUNCEMENT

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TITLE OF DISSERTATION: AN INFORMATION CORRECTION
METHOD FOR TESTLET-BASED TEST ANALYSIS: FROM THE
PERSPECTIVES OF ITEM RESPONSE THEORY AND
GENERALIZABILITY THEORY

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ABSTRACT

An information correction method for testlet-based tests is introduced in this dissertation. This method takes advantage of both generalizability theory (GT) and item response theory (IRT). The measurement error for the examinee proficiency parameter is often underestimated when a unidimensional conditional-independence IRT model is specified for a testlet dataset. By using a design effect ratio composed of random variances which can be easily derived from GT analysis, it becomes possible to adjust the underestimated measurement error from the unidimensional IRT models to a more appropriate level. It is demonstrated how the information correction method can be implemented in the context of a testlet design.

Through the simulation study, it is shown that the underestimated measurement errors of proficiency parameters from IRT calibration could be adjusted to the appropriate level despite the varying magnitude of local item dependence (LID), testlet length, balance of testlet length and number of the item parameters in the model. Each of the three factors (i.e., LID, testlet length and balance of testlet length) and their interactions have statistically significant effects on error adjustment. The real data example provides more details about when and how the information correction should be used in a test analysis. Results are evaluated by comparing the measurement errors from the IRT model with those from the testlet response theory (TRT) model. Given the robustness of the variance ratio, estimation of the information correction should be adequate for practical work.