

Gender Differences in Performance and Differential Item Functioning on the Basic Mathematics Competence Test for Junior High School Students in Taiwan

Abstract

The study attempted to investigate the gender differences in performances and detect the DIF items on the basic mathematics competence test for junior high school students. Specifically, the study aimed to (1) investigate the performance difference of gender between three categories in the mathematic test, (2) investigate the fairness in test items from the basic mathematics achievement test based on gender groups, (3) compare the consistency of results for the different ways of detecting DIF, (4) investigate item bias in test items from the basic mathematics achievement test, and (5) investigate the properties of DIF and item biases in the test.

The data included 2,599 males and 2,401 females randomly selected from 299,368 students who attended the basic mathematics competence test for junior high school students. The study applied statistics, two DIF methods, and four types of software to analyze data. They comprised of MANOVA, area measure, model comparison measure, and SAS, SPSS, Matlab as well as BILOG software.

The study results as follows:

1. The female did slightly better mathematically performed in the three

categories. It is significant in the algorithmic category and overall but the effect size is small.

2. The signed area and model comparison measures are likely to yield similar results in identifying items with significant DIF when statistical significance tests are applied to the area measure.
3. In general, the quality of the mathematic subject of the students' basic competence test for junior high school students is good. Only Item 13 and 26 are identified to be DIF, and Item 24 is close the criteria of DIF. Only item 13 has to be revised after we checked the item.
4. It appears that the item b-value (after transformed) difference plays a significant role in determining whether an item is DIF or not.

Recommendations for application of the study findings to testing theory and practice and future research are presented in the final section of the report.