Gender Differences in Chemistry Performance: What is the Relationship between Gender, Question Type and Question Content

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Abstract

The role of gender in chemistry performance, and other subject areas in general, has precipitated a variety of studies that have generally shown that male students performed at higher levels compared female students, particularly in a the pure sciences of physics and chemistry (Beller & Gafni, 1991; Buccheri, Gurber & Bruhwiler, 2011; Hamilton, 1998; Hedges & Howell, 1995)

Differences between the observed students' performances on the Victorian Certificate of Education (Australia) examinations (VCE) supported the findings of previous research into gender performance. Students were performing differently on the two semester examinations (VCAA, 2005, 2006, 2007, 2008). Male students were performing at a significantly higher level than were female students. Whilst there were small differences in grade distribution across all students, the differences at the higher grades were of concern as these grades that could be crucial in determining a student's entry into university courses.

This difference raised questions. Why should this be occurring? Were any observed differences actually significant? A number of factors were relevant in considering this issue. Apart from the gender of the students, two other important factors were considered likely to influence the performance of the students. These were: type of question (short-answer or multiple-choice) and the content type of the question (recall or application). Rasch analysis of the class trial data, including gender difference analysis, was performed and the analyses related to performance characteristics of the VCE examination. It was found that male students achieved higher scores than female students with respect to mean scores on both the tests and related sub-tests. However, when student abilities, as measured by Rasch analysis were considered, male and female students of equal abilities performed equally well in each test comparison suggesting that chemistry was equally accessible to both male and female students.