



CAMBRIDGE ASSESSMENT

Objective questions in science GCSE: Exploring question difficulty, item functioning and the effect of reading difficulties

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Breaking from a strong tradition of constructed response examinations, one revised science qualification in the UK now involves some examinations with only objective questions. It was considered of interest to investigate characteristics of these newer GCSE papers such as difficulty and their contribution to validity. This study also explored the potential to use access arrangements data to investigate how students with certain needs may be affected differently to other students by features of exam questions.

Item level performance data for the entire candidature of two GCSE science examination papers were obtained. Traditional statistical measures of difficulty (facility values) and discrimination (correlations of item score with total mark) were calculated for each item. Rasch analysis was also conducted to provide estimates of difficulty independent from student ability and information on item functioning. For one of the papers, a 'Reader' group of students was identified including all students who had access to a reader in their exam. A 'Norm' group of the same size was selected randomly from students without a reader. Measures of difficulty and functioning were compared between groups. For a number of interesting items a sample of student responses were analysed.

A number of factors potentially making questions easier (e.g. absence of technical terms) or more difficult (e.g. incorrect response option makes an accurate statement) were identified. Factors potentially contributing to problems with item functioning were also identified (e.g. objective questions that facilitate guessing). The analyses also suggested a number of question features that may have particularly influenced those requiring reading support (e.g. better performances on questions with little technical language), some of which are unsurprising. The findings have implications for question writing practice.



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