

Detection of collusion and cheating in multiple choice examinations

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Plagerism and cheating is known to occur in both school and university situations. In this paper we study multiple choice examinations that continue to be used in a variety of situations including, medicine, professional accreditation and other areas such as amateur radio where licenses are issued by government communication agencies such as OFCOM in the UK, We here present details of an approach that assesses both unconditional and conditional correlations in scores between student pairs taking the examination. Specifically we compute individual scores, A_i , A_j and overlap of scores A_{ij} between results for the students taking the examination. One can then assess the nature of correlations associated with A_{ij} as a function of $\sqrt{A_i A_j}$. One might expect the probability distribution to have a Gaussian character. However in some cases the distribution function exhibits clear outliers the most extreme of which may be associated with collusion of cheating. The method will be demonstrated using a number of real-life data sets where for each data set, students sit the examination simultaneously in a number of registered centres across the UK. Typically the number taking the examination at any one centre can vary from 1 through to 20.