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Enhancing the Interpretation of Group-Level Diagnostic Results from Cognitive Diagnostic Assessment: Application of Quantile Regression and Cluster Analysis

Authors : Wenbo Du, Xiaomei Ma

Abstract : With the empowerment of Cognitive Diagnostic Assessment (CDA), various domains of language testing and assessment have been investigated to dig out more diagnostic information. What is noticeable is that most of the extant empirical CDA-based research puts much emphasis on individual-level diagnostic purpose with very few concerned about learners' group-level performance. Even though the personalized diagnostic feedback is the unique feature that differentiates CDA from other assessment tools, group-level diagnostic information cannot be overlooked in that it might be more practical in classroom setting. Additionally, the group-level diagnostic information obtained via current CDA always results in a "flat pattern", that is, the mastery/non-mastery of all tested skills accounts for the two highest proportion. In that case, the outcome does not bring too much benefits than the original total score. To address these issues, the present study attempts to apply cluster analysis for group classification and quantile regression analysis to pinpoint learners' performance at different proficiency levels (beginner, intermediate and advanced) thus to enhance the interpretation of the CDA results extracted from a group of EFL learners' reading performance on a diagnostic reading test designed by PELDiaG research team from a key university in China. The results show that EM method in cluster analysis yield more appropriate classification results than that of CDA, and quantile regression analysis does picture more insightful characteristics of learners with different reading proficiencies. The findings are helpful and practical for instructors to refine EFL reading curriculum and instructional plan tailored based on the group classification results and quantile regression analysis. Meanwhile, these innovative statistical methods could also make up the deficiencies of CDA and push forward the development of language testing and assessment in the future.

Keywords : cognitive diagnostic assessment, diagnostic feedback, EFL reading, quantile regression
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