NCME 2026, Diagnostic Measurement Special Interest Group on Measurement in Education

Title:

Summary:

Cognitive diagnosis model (CDM) is a psychometric method to classify examinees into different latent classes with combinations of mastery or non-mastery states (Ma and de la Torre, 2016). The mastery probabilities are also generated for each skill or attribute of interest for each examinee. This study discovers about mastery probabilities under different conditions including data are not generated by a CDM. The motivation is that when the true data-generating model is unknown, model misfit will influence the interpretation of mastery probabilities. Specifically, if CDM is the true model, the mastery probability is the probability that an examinee belongs to the mastery group for a given attribute, reflecting certainty of classification. Thus, it reflects how consistent an examinee’s responses are with one of the two groups (Bradshaw & Levy, 2019). However, if CDM is not the true model, arbitrarily classifying examinees into mastery or non-mastery groups may result in incorrect classification or loss of information about the continuous latent ability of each examinee. The preliminary finding from our simulation study is that when data are generated under a multidimensional item response theory (IRT) model but fit with a CDM, the resulting mastery probabilities are highly correlated with examinees’ latent ability (θ).

(Word Count: 200)