A quantitative enquiry into the fairness and equity in Norwegian secondary school assessment practices: Project proposal

Tony C. A. Tan

Centre for Educational Measurement

University of Oslo

Attachment 3 to UV PhD application form

Prof Rolf V. Olsen & Dr Astrid M. J. Sandsør

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Introduction

Purpose Statement

Research Questions

Methods

Sample

For this study, students' GPA records will be captured from the Norwegian registry covering the decade between 2010 and 2020. GDPR registration is lodged through the NSD Portal and the UiO ethics approval is also obtained. All data import, storage, and analyses are to be conducted within the secured infrastructure TSD provided by the UiO Central IT Division. TSD logs all activities and no data or results can be copied out of the restricted system without prior approval from project leaders.

Under the advisory of He and Stockford (2015), subjects with fewer than 1,000 candidates and students taking fewer than two GPA subjects will be excluded from subsequent analyses. Each year's record (score matrix) should contain N rows representing the number of valid candidates and L columns reflecting the usable number of GPA subjects in that year. Since no student takes *all* the GPA subjects, a large proportion of the score matrices will remain missing by design. The existence of missing data does not pose any problems for using the Rasch model as the model functions at the individual item and items as long as there is sufficient overlap across subjects in the score matrix. The ability to deal with incomplete data is one major advantage of using the Rasch model for studying inter-subject comparability.

Rasch Model

The Rasch model was developed in the 1960s for establishing measurement scales and for improving test development (Rasch, 1980). In Rasch modelling, the underlying ability or latent trait of the person to be measured by the test (θ) and the characteristics of the items in the test (δ_j) are specified, and a logistic function (Λ) is used to describe the probability that

the person will successfully score a particular item ($x_j = 1$) given their ability θ and the characteristics of the item δ_j (de Ayala, 2009):

$$\mathbb{P}\left(x_j = 1|\theta, \delta_j\right) = \Lambda(\theta - \delta_j) = \frac{1}{1 + e^{-(\theta - \delta_j)}}. \tag{1}$$

Data Analysis

Hypothesised Results

References

de Ayala, R. J. (2009). *The theory and practice of item response theory.* Guilford.

He, Q., & Stockford, I. (2015). *Inter-subject comparability of exam standards in GCSE and A Level* (ISC Working Paper 3). Office of Qualifications and Examinations Regulation.

Rasch, G. (1980). *Probabilistic models for some intelligence and attainment tests.* University of Chicago Press.