A Self-presentation on Research Design

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Area of Investigation

My project investigates the fairness of Norwegian universities' admission processes. Unlike their counterpart in the USA who assign considerable weights to extra-curriculum activities and reference letters in addition to academic performance, universities in Norway use applicants' grade point averages (GPA) as the sole selection criterion. Studies from the UK (Coe, 2008) and the Netherlands (Korobko et al., 2008), however, have demonstrated that GPA in their unadjusted form can be highly variable in difficulties across subjects, causing considerable fairness concerns. Numerous adjustment procedures have been proposed and adopted in many jurisdictions (Lamprianou, 2009) to varying degrees of success.

Purpose Statement

My study wishes to examine the viability of using one particular statistical technique called partial credit model (Masters, 1982) for the purpose of re-aligning subject difficulties during GPA calculations. Using students' GPA records from the Norwegian registry data between 2006 (the year of education reform) and 2020 (most recent year with available data), I wish to answer these research questions: (1) To what extent can a partial credit model approximate Norway's GPA scores? (2) Does the difficulty parameter differ significantly across subjects? If the answer to (2) is "yes", I then would like to further enquire (3a) Which are the easiest and hardest subjects? (3b) Are there any systematic differences by social-demographic variables such as sex, immigration history or social-economic spectrum? (3c) Do such differences remain stable over time?

Research Design

This study takes a pooled cross sectional quantitative research design by repeating the same measurement over years but on different test candidates. According to the item response theory, students' academic performance may be considered as the outcome of their underlying "latent traits". By examining the covariation among GPA scores, candidates' general academic abilities can therefore be ascertained.

Motivation

This project primarily takes on the postpositivism worldview while lending empirical support to the transformative worldview. It assumes determination between one's ability and their performance and reduces one's complex academic performance process into a few numeric scores. By conducting empirical observation and measurement using archival data, this study attempts to verify the suitability of the item response theory for educational assessment purposes. Three factors influenced my decision of taking this quantitative research approach: (1) my research questions demand a *numerical measure* of goodness-of-fit between a mathematical model and the actual data; (2) I am trained in econometrics, educational measurement and I am familiar with statistical procedures and quantitative paper structure; and (3) the audience of my research, including my thesis advisors, expect an unambiguous answer to the fairness, or the lackthereof, of the university admission criterion currently practised in Norway.

References

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