Application of Rasch Analysis in the Development and Psychometric Evaluation of Dental Undergraduates Preparedness Assessment Scale

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DEVELOPMENT AND PSYCHOMETRIC EVALUATION OF DENTAL UNDERGRADUATES PREPAREDNESS ASSESSMENT SCALE (DU PAS) USING RASCH ANALYSIS


Aim: Development of a valid and reliable scale to measure preparedness of dental undergraduates

Methods:

Mixed Methods Study

1. Exploration of the concept of preparedness of new graduates
   - Qualitative Methods (Interpretivism Paradigm)
     - Interviews; Focus Groups

2. Scale Development
   - Rasch Analysis (Item Response Theory Model)
     - Generation of Scale Items and Response Categories
     - Pilot study
     - National study
     - Scale Evaluation and Refinement

Results:

Data analyses undertaken using Rasch Unidimensional Measurement Models - RUMM2030 (Perth, Western Australia: RUMM Laboratory Pty Ltd, 2010).

- 457 participants accessed the web-link and of these 392 participants provided complete responses (85.77%).
- 236 females (60.20%) and 156 males (39.80%).
- Majority of participants (88.30%) were in the 20-29 years age group.

- Adequate Construct validity indicated by fit to the Rasch model ($\chi^2$=272.55; d.f.=250; $p=0.156$)
- Adequate Internal consistency (Person Separation Index= 0.877; ability to discriminate 3 levels of ability)
- Person ability and item difficulty measured independently
- Ordered thresholds (Guttman scaling)
- Unidimensionality (Independent t tests of Residual Principal Component Analysis)
- Local independence of items (Residual correlations)
- Lack of Differential item functioning (Free from bias)
- Adequate Test-retest reliability (Pearson’s $r = 0.847$)

Conclusions:

- DUPAS scale is valid and reliable
- May be used to map the progress of students longitudinally
- Suitable for self-assessment as well as assessments by dental educators