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# 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

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**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

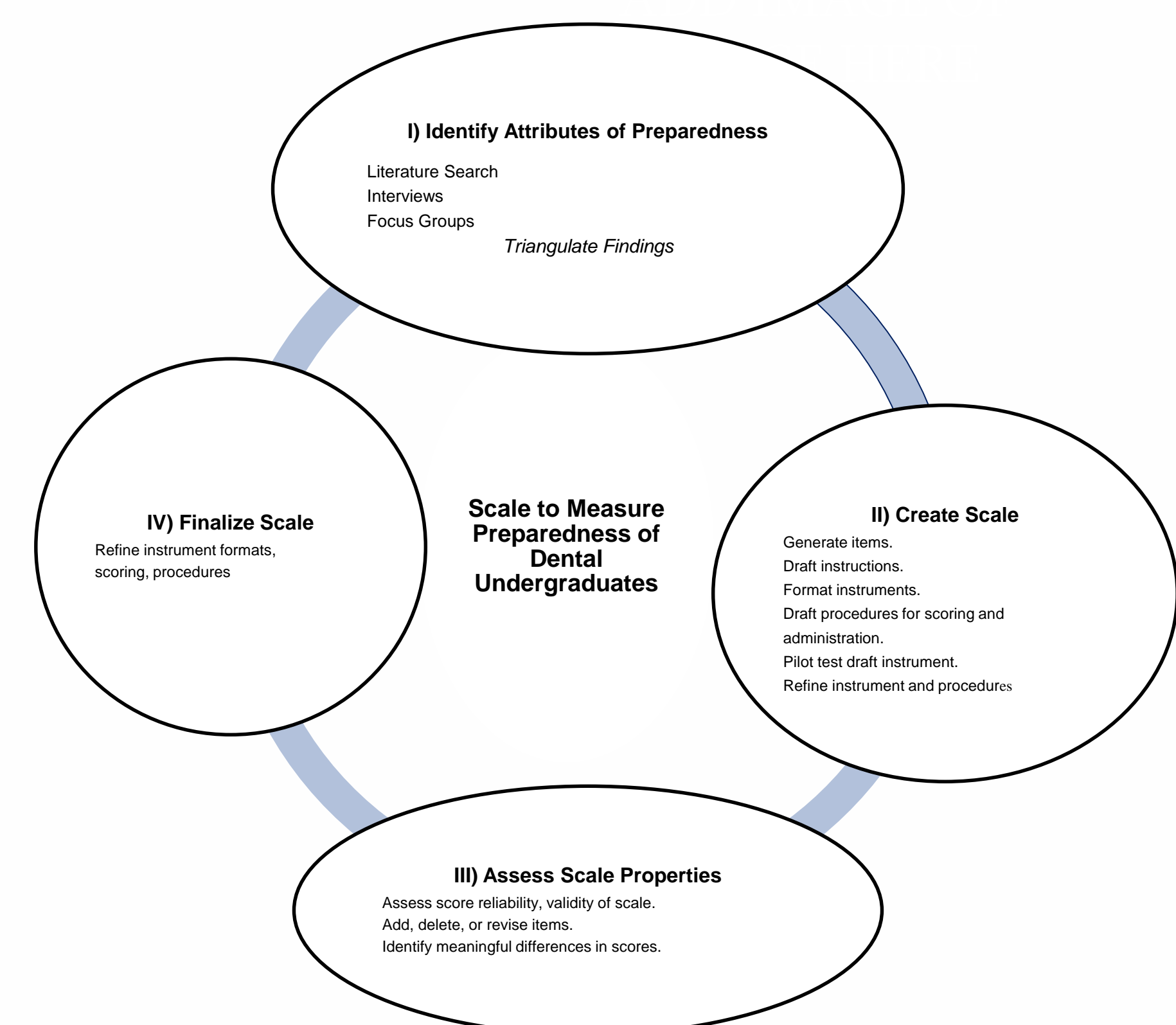


Figure 1 Steps in Scale Development

### 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  $r = 0.847$ )

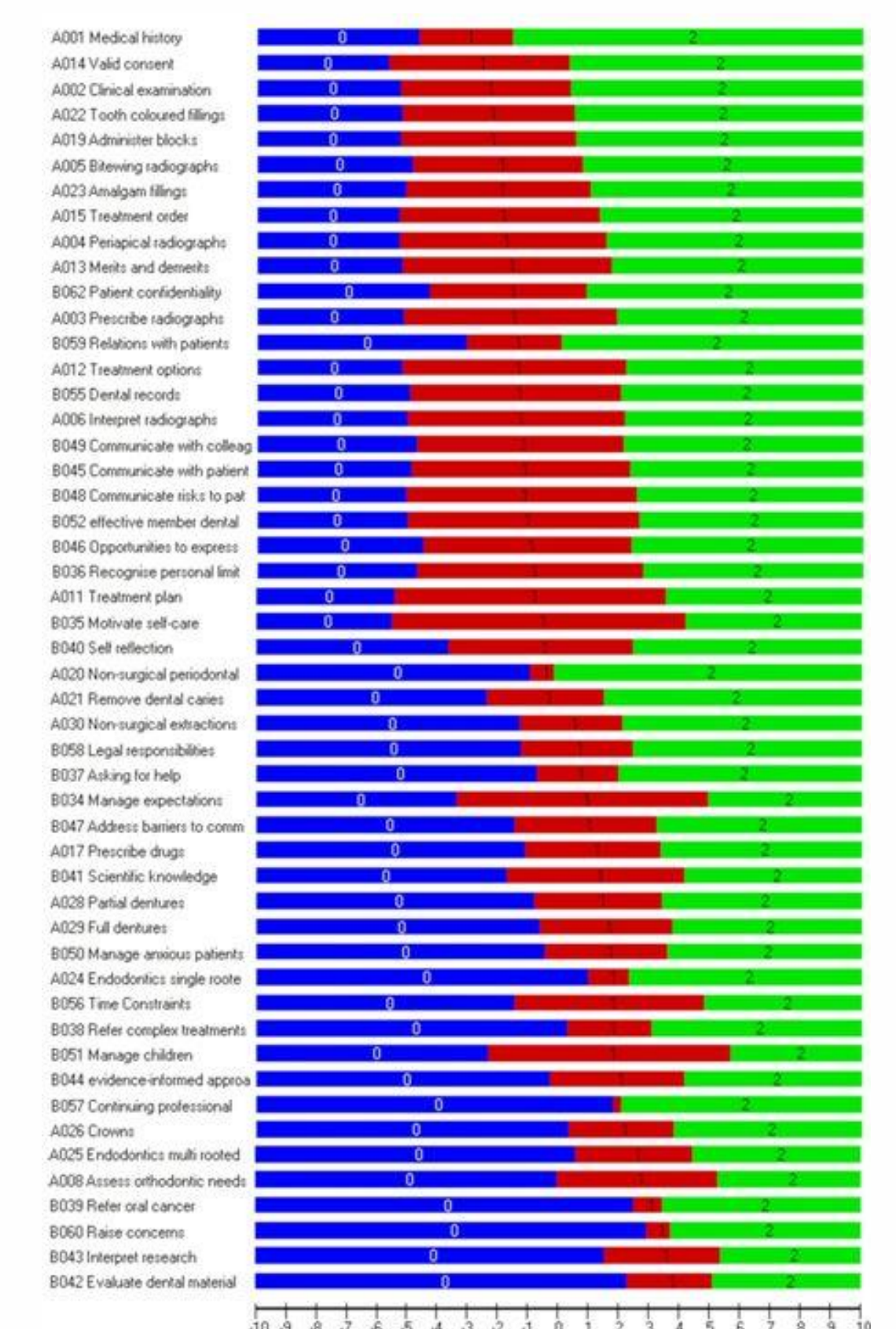


Figure 2 Item Threshold Map of Final Scale

### 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