Development and Large-Scale Validation of an Instrument to Assess Chinese Elementary Students' Attitudes Toward Science

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Introduction

Students' attitudes toward science is a major concern in science education and should be paid attention to since primary school. High quality instruments measuring students' attitude towards science is needed when cultivating them. However, existing instruments show problems like: nebulous concept and constructs of attitudes toward science, uncertain psychometric property of instrument, Inappropriate method of data analysis and interpretation, few instruments measuring attitudes toward science of Chinese elementary school students.

Objectives

To develop a high quality instrument for measuring primary school students' attitude toward science in Chinese context using both factor analysis and Rasch analysis.

Methodology

⑤ If the reliability and validity results cannot meet the standard, repeat②-④ to validate the instrument.

④ Large scale test and data analysis using factor analysis and Rasch model

1st round sample: 1819 Grade 5 students from Jiangxi
2nd round sample: 899 Grade 5 students from Sichuan

③ Small scale pilot test and student interview

1st round sample: 32 Grade 5 students from Shandong
2nd round sample: 184 Grade 5 students from Beijing with 45 interviewed

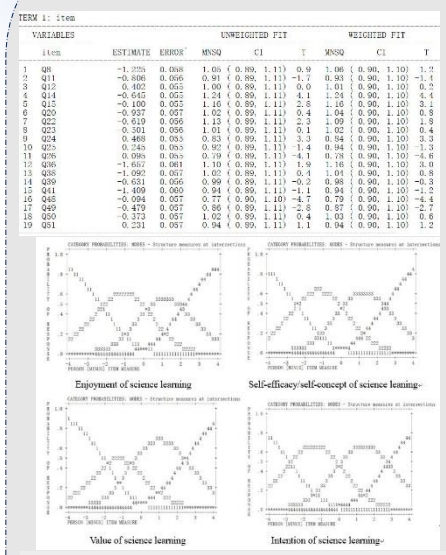
Some items with similar difficulty were moved out and new items were added in. The scale were changed into four point from five point in the 2nd round.

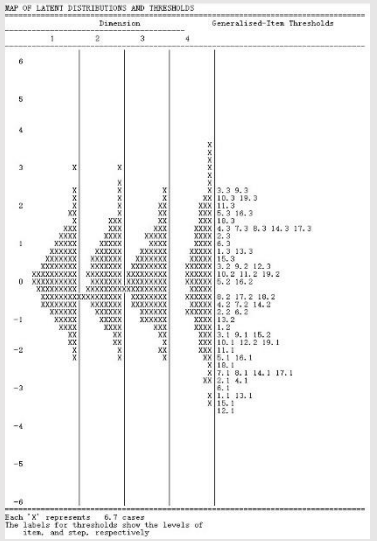
② Creating item pool and expert review

① Conceptualizing attitudes toward science

- Cognition
  - Value of learning science
  - Self-efficacy of learning science
- Affection
  - Enjoyment of learning science
- Behavior
  - Intention of learning science

Results





The separation reliability of the instrument is 0.992. The EAP/PV reliability of each dimension is above 0.6.

χ2	Df	χ2/df	CFI	TLI	RMSEA
573.296	146	3.93	0.951	0.943	0.065

The factor loading in each dimension are all above 0.5

Conclusion

The instrument has good reliability and validity. It can be used to measure Chinese elementary students' attitude toward science effectively.