Session 3A – Schools

National Assessment and Surveys Online Program – 2013 Tailored test design study

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National Assessment and Surveys Online Program

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► Funded by the Australian Government Department of Education

► ACARA designed the research program to assist transition of National Assessment Program – Literacy and Numeracy (NAPLAN) to a computer-based assessment.

► NAPLAN assesses all Australian students in Years 3, 5, 7 and 9 in Reading, Writing, Language Conventions and Numeracy

► The key enhancement proposed by ACARA is the use of computer adaptive test design in future NAPLAN tests – the tailored test design.

► ACARA developed and implemented a comprehensive research program:

1. 2012: Mode effect study
2. 2013: The tailored test design study
3. 2014: The development study
Why computer adaptive testing?

► Adaptive testing is based on the concept that more information can be obtained from a test if the test items match the achievement level of the student.

► **Computer adaptive testing** (CAT) – test difficulty is adjusted after response to each item

► **Multistage computer adaptive testing** – test difficulty is adjusted based on responses to a set of items

► For large-scale assessments, multistage testing offers several advantages over CAT, including:
  
  – better control over item content and exposure
  – better control over structure and administration of the final test
  – requires significantly fewer items to run and maintain the testing program.

► Consequently a multistage adaptive test design – the tailored test design – has been developed and proposed for future NAPLAN online tests.
Tailored test design: a multistage adaptive test design

A - opening items
B - easier branching items
C - easy items
D - harder branching items
E - mainstream items
F - challenging items
Tailored test design study 2013

- Main study collected empirical evidence regarding the feasibility of the proposed multistage test design for NAPLAN Online.
- Additional studies were conducted to investigate the cognitive and behavioural engagement of students with such a test design.

Main study

- Testlets were presented in either branching or fixed linear test conditions.
- Students randomly allocated to one of these two conditions.
- Testlets were constructed using existing NAPLAN items based on paper-based locations.
- Simulations were used to determine branching cut-scores.
TTD study: *Reading Year 5*

- **A:** N=1641
- **B:** 45%
- **C:** 27%
- **D:** 55%
- **E:** 50%
- **F:** 23%
TTD study: *Reading Year 5* student ability estimates
Cognitive and behavioural engagement of students

- Structured observation and interview methods were used to collect information about student interaction with multistage adaptive testing (the tailored test design).
- These methods provide rich qualitative data and about student experiences and insights.
- Studies focused on key aspects of the tailored test design such as branching and rising and falling of difficulty of items in a test.
- Studies also focused on capacity of the tailored test design to address the learning needs of Indigenous and remote students as well as those with socio-educational disadvantage.
Results of cognitive and behavioural engagement studies

- Students regard branching to be a positive enhancement of NAPLAN tests.
- Students were not affected by the raising and falling pattern of item difficulty as they move through different stages of the tailored tests.
- Tailored tests enabled educationally disadvantaged students to remain positively engaged with the full test.
- Tailored tests provided a more engaging testing situation and more appropriate test content for most Indigenous and remote students.
- Tailored tests delivered more motivating assessment to all students – including students who might be struggling with the current NAPLAN tests - all students reported an increased sense of achievement.
Summary key findings

► The delivery of multistage branching tests for NAPLAN online is sound and feasible. These tests offer better measurements of student performance, particularly for high and low achieving students.

► The tailored test design and the proposed branching mechanism work effectively to adapt to the different ability groups.

► The investigation of cognitive and behavioural engagement of students with the tailored test design showed that multistage testing will provide an opportunity to all students – the low achieving students in particular – to be assessed by tests catering more fully for their assessment and learning needs.

► Further work is required to finalise the measurement aspects of the tailored test design; in particular, testlet boundaries require further refinement.
Next steps: 2014 development study

- Refine measurement aspects of the TTD for reading and numeracy
- In-depth cognitive investigation of student interaction with the most challenging items in testlet F in reading and numeracy
- In-depth cognitive investigation of student engagement and interaction with selected technically enhanced item types
- Trial newly developed testlets for grammar and punctuation tests
- Trial newly developed testlets for spelling, including spelling items that use auditory stimuli
- Trial newly developed testlets for reading and numeracy
- Publication of reports is planned for 2015.
THANK YOU

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