Grade 3 FCAT - Test Construction & Equating

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"Experience teaches only the teachable."
Aldus Huxley (1894-1963)

Topics

- The Grade 3 Test in 2006
- Test Construction
  - Process and Product
  - Science and Art
- Psychometric Primer
- Test Calibration and Equating

The Grade 3 Test in 2006

- Passages – Questions – Forms
- Student scores based on 5 passages & 45 questions
- 30 different forms, each with 1 passage & 7-8 questions
- Forms are used for anchor and field test questions
- One of the 6 passage positions is used for anchor and field test questions

2006 Grade 3 FCAT Test Passages and Positions					
Day 1 – Session 1			Day 2 – Session 2		
1	2	3	4	5	6

The Grade 3 Test in 2006

2006 Grade 3 FCAT Test Passages and Positions			
Day/ Session	**Passage Position**	**Number of Questions**	**Passage Description**
1	1	8	Ladybird, Ladybird, Fly Away Home (Lit.)
	2	7 or 8	Anchor and Field Test Passages (Varies)
	3	10	A Gift of Trees (Inform.)
2	4	13	Swim, Baby, Swim (Lit.)
	5	8	Slip, Slop, Slap/Sunny Sidebar (Inform.)
	6	6	Making Spring (Lit.)
	TOTAL	52-53	

"Test Construction"

- Process of building the test
  - Occurs the summer before a test
  - Based on available passages, questions, and statistics
- Guidelines for building the test
  - *Test Construction Specifications*
- Building the test is an iterative process

Test Construction Cycles

1999	2000	2001	2002	2003	2004	2005	2006
						June Test Construction	2006 Test Admin.
				Oct/Nov Item Review Meetings	June Field Test Construction	March Field Test	
					June Test Construction	2005 Test Admin.	
			Oct/Nov Item Review Meetings	June Field Test Construction	March Field Test		
				June Test Construction	2004 Test Admin.		
		Oct/Nov Item Review Meetings	June Field Test Construction	March Field Test			
			June Test Construction	2003 Test Admin.			
	Oct/Nov Item Review Meetings	June Field Test Construction	March Field Test				
		June Test Construction	2002 Test Admin.				
Nov/Dec Item Review Meetings	June Field Test Construction	March Field Test					
	June Test Construction	2001 Test Admin.					
May/Aug Item Review Meetnigs	March Field Test						
Sept/Oct Field Test Construction							

Test Construction Specifications - 1

- Guidelines for building the test
  - Ranges for each category
  - Iterative process
- Content Guidelines
  - Reading Passages (type and word counts)
  - Benchmark Coverage
  - Reporting Category (Strand) Coverage
- Multicultural & Gender Representation
- Cognitive Level Guidelines

Test Construction Specifications - 2

Statistical Guidelines for Questions

- Classical Item Difficulty and Discrimination
- IRT Difficulty, Discrimination, and Guessing
- Differential Item Functioning (DIF)
- IRT Model Fit Statistics

Statistical Guidelines for Tests

- Test Characteristic Curves
- Test Information Functions
- Standard Error Curves

Test Construction Specifications – 3

Anchor Item Guidelines

- Number and position of questions
- Content Representation – Mini Test
- Performance Characteristics (range of difficulty)
- Previous use as a Core or Anchor
- No change in wording
- Passage position

Test Construction
Review and Approval Process

- 1st Draft of Content – Harcourt Content Staff
- Review of Content – DOE Content Staff
- Review of Statistics – Harcourt Psychometric Staff
- Review of Statistics – DOE Psychometric Staff
- Approval by DOE FCAT team leadership

Psychometric Primer -1

Classical Item Statistics:

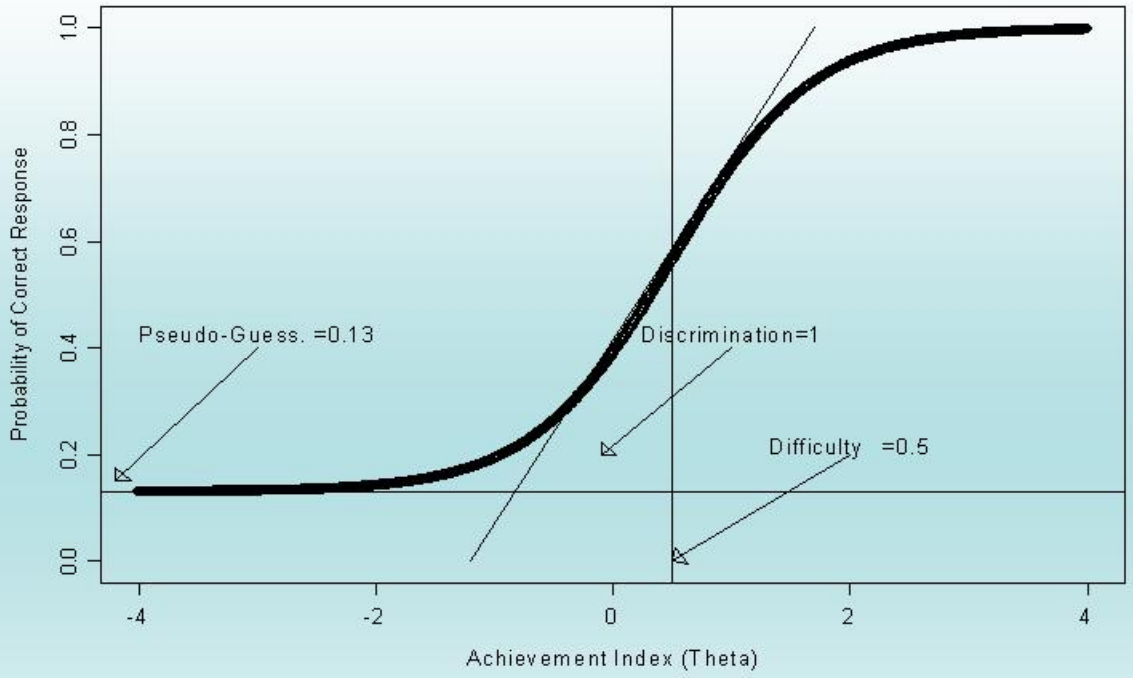
- P-value or difficulty - the percent (P) who answer the question correctly.
- Discrimination (point-biserial) - the degree to which students who get high scores answer the question correctly and vice versa (similar to correlation).

Psychometric Primer -2

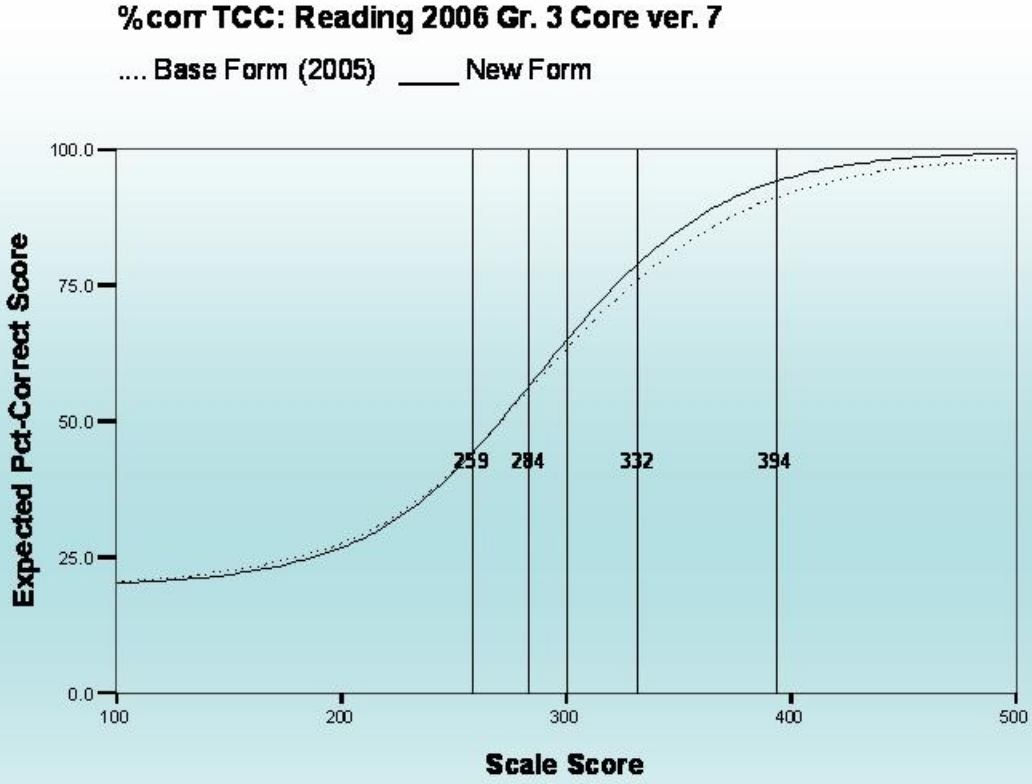
Item Response Theory (IRT) Statistics –

- A-parameter - discrimination or how well the question differentiates between lower and higher performing students.
- B-parameter - difficulty or the level of ability on the 100-500 scale required to answer the question correctly.
- Guessing - the probability of examinees with extremely low ability levels getting a correct answer.
- FIT - how well the scores for a given item fit, or match, the expected distribution for the model.
- DIF (Differential Item Functioning) - the degree to which the question performs similarly for all demographic groups based on ability.

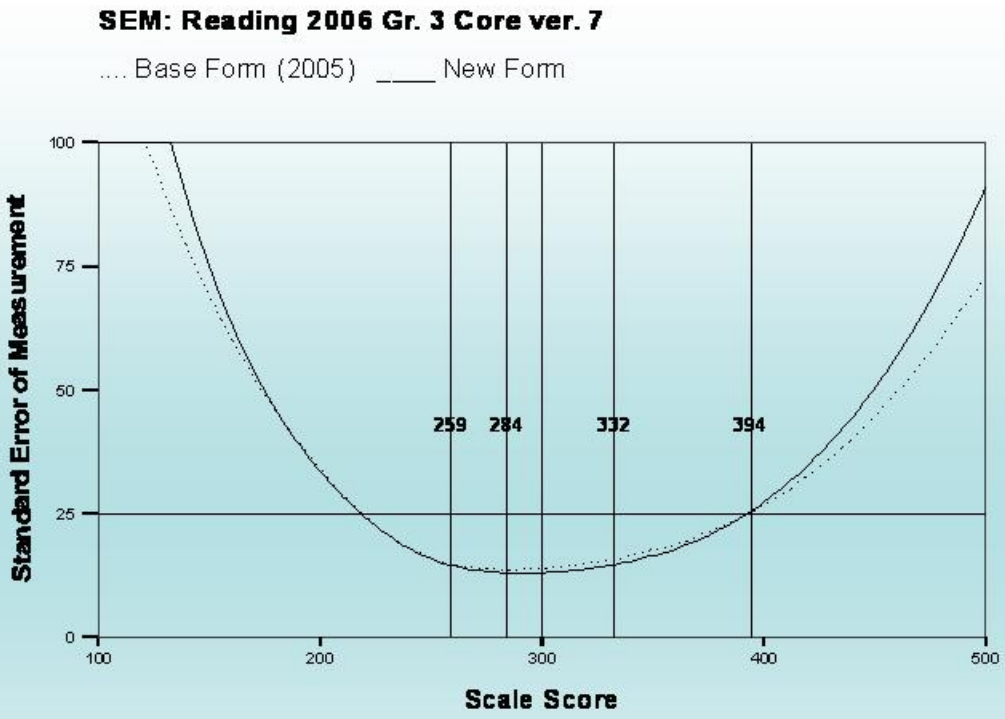
Item Characteristic Curve – Figure 1



Test Characteristic Curve - Figure 2



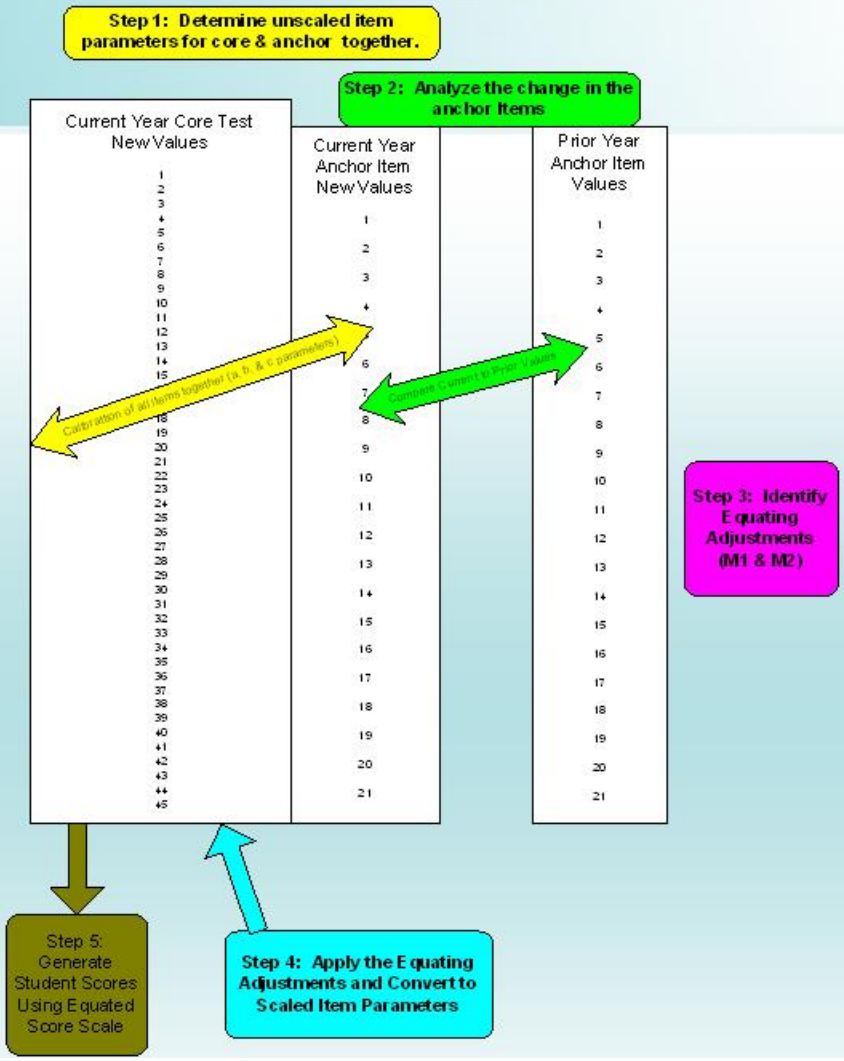
Standard Error Curve - Figure 3



Test Calibration and Equating

- Calibration - Converting from Raw Scores to IRT scores
- Equating - Making Scores Comparable Across Years
- Florida uses Item Response Theory (IRT) to score and equate FCAT results from year to year.

FCAT Calibration and Equating Process



Equating Solutions

- 2006 equating solution – anchor questions ???
- Identify a "better" equating solution
- Define "better"
- Process considerations
  - Select anchor questions
  - Follow the guidelines
  - Evaluate the quality of the anchor