Validating Accuplacer: A Status Report

Norbert Elliot and Colleagues
March 26, 2008
The Way We Were

- Once ETS-based, state-of-the-art, now a very dated placement test
- Impossible to refresh test with new items
- Difficult to establish item performance
- “Inconsistency formula” based on desire for equivalent value, not on established performance weights.
The Way We Are

- Effort to build an independent (predictor) / dependent (outcome) variable model.
- Historical Relationships: NJBSPT and SAT Verbal
- Innovative Relationships: SAT-V, SAT-W, Accuplacer (Reading Comprehension, Sentence Skills, WritePlacer)
- Preliminary Placement: April 1, 2008
- Analysis: Until approximately 50% of students placed for fall 2008 entering class
- Placement Finalized and Released to Students: End of June 2008
- Further Study and Refinement: Fall 2008

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### Correlations

<table>
<thead>
<tr>
<th>Test</th>
<th>Predictor</th>
<th>Rho Fall</th>
<th>Rho Spring</th>
<th>Rho Fall-Spring</th>
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<tr>
<td>BTC</td>
<td>Fall</td>
<td>0.68</td>
<td>0.70</td>
<td>0.91</td>
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<tr>
<td>BTC</td>
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### Preliminary Placement:
- April 1, 2008

### Analysis:
- Until approximately 50% of students placed for fall 2008 entering class
- Placement finalized and released to students: End of June 2008
- Further study and refinement: Fall 2008
Accuplacer Validation Team

• John Coakley
• Jerry Paris
• Chuck Brooks
• Elena Alexander
• Theresa Hunt
• Jonathan Curley
• Mike Tress
• Perry Deess
• Oleksandr (Alex) Rudniy
• Margo Gilchrist
• Sharon Morgan
The Spring 2008 Field Test: Participants

• Note that 95 students took the NJBSPT and the Accuplacer.
• Background information not available for all students
  – SAT-V for 69 students in the Spring 08 Field Test
  – SAT-W for 66 students
The Spring 2008 Field Test: Ability

Descriptive Statistics

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<tr>
<th></th>
<th>N</th>
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- **Indicative of Basic Skills**
  - NJBSPT RC: 27 or below in Basic Writing
  - NJBSPT SS: 26 or below in Basic Writing
  - NJBSPT Essay: 6 or below in Basic Writing
- **Indicative of Basic Skills and Lower Level Traditional Writing**
  - Accuplacer Reading Comprehension: About 80 in Traditional Writing
  - Accuplacer Sentence Skills Comprehension: About 86 in Traditional Writing
  - Accuplacer Write Placer: 7 or above in Traditional Writing
- **SAT-Verbal** for 56 of the students who took the Acuplacer test: 479.64 (SD = 90.45). (Average SAT-Verbal Score in fall of 2007 = 536)
Correlations: NJBSPT, Accuplacer, SAT-V, and SAT-W

A series of promising relationships:

- Accuplacer Read Comp with NJBSPT RC: .669, \( p = .01 \)
- Accuplacer Sentence Skills with NJBSPT RS: .688, \( p = .01 \)
- Accuplacer WritePlacer with NJBSPT Essay: .342, \( p = .01 \)
- Accuplacer Read Comp with fall SAT-V: .759, \( p = .01 \)
- Accuplacer Sentence Skills with fall SAT-V: .555, \( p = .01 \)
- Accuplacer Read Comp with fall SAT-W: .555, \( p = .01 \)
- Accuplacer Sentence Skills with fall SAT-W: .546, \( p = .01 \)
Regression Model: Accuplacer (Predictor) and Mid-Term Grade (Outcome)

- An unsuccessful model
  - Very low mid-term grade: $M = 2.35$ ($SD = .885$)

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<th>Model Summary</th>
<th>Model</th>
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Model Summary:

- Predictors: (Constant), Default WritePlace Test, Reading Comprehension, Sentence Skills

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- Predictors: (Constant), Default WritePlace Test, Reading Comprehension, Sentence Skills
- Dependent Variable: Midterm Grade Number
Regression Model: NJBSPT (Predictor) and Mid-Term Grade (Outcome)

- An equally unsuccessful model

**Model Summary**

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- Predictors: (Constant), ESSAV_Spring, RC_Spring, SS_Spring

**ANOVA**

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<td>67</td>
<td>9.377</td>
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- Predictors: (Constant), ESSAV_Spring, RC_Spring, SS_Spring
- Dependent Variable: Midterm Grade Number
Regression Models: Accuplacer Reading Comprehension and Sentence Sense (Predictor Variables) and WritePlacer (Outcome Variable)

- An successful model:
  \[ R^2 = .134, \ p = .01 \]
Regression Models: NJBSPT Reading Comprehension and Sentence Sense (Predictor Variables) and Essay (Outcome Variable)

- An even more successful model:
  \[ R^2 = .251, p = .01 \]
A Potential Model

- SAT-V, SAT-W, Accuplacer Reading Comprehension, Accuplacer Sentence Skills (Predictor Variables) and WritePlacer Essay (Outcome Variable)
Equipercentile Equating: Concept

• “To equate scores on the new form to scores on the reference form in a group of test-takers, transform each score on the new form to the score on the reference form that has the same percentile rank in that group.” Skip Livingston, Equating Test Scores (Princeton: ETS, 2004)
Equipercentile Equating at NJIT: Patterns

- Fall 2005 Students in Basic Composition (HUM 099), Traditional Composition (HUM 101), and Honors (HUM 101H) = 809
  - 388 students (41.77%) in HUM 099
  - 397 students (40.07%) in HUM 101
  - 74 students (9.14%) in HUM 101H
- Fall 2006 Students in Basic Composition (HUM 099), Traditional Composition (HUM 101), and Honors (HUM 101H) = 895
  - 399 students (48.58%) in HUM 099
  - 415 students (46.37) in HUM 101
  - 81 students (9.05%) in HUM 101H
- Fall 2007 Students in Basic Composition (HUM 099), Traditional Composition (HUM 101), and Honors (HUM 101H) = 854
  - 314 students (36.76%) in HUM 099
  - 452 students (52.92) in HUM 101
  - 88 students (10.3%) in HUM 101H
Equipercentile Equating at NJIT: Judgment

- Fall 2007 Students in Basic Composition (HUM 099), Traditional Composition (HUM 101), and Honors (HUM 101H) = 854
  - 314 students (36.76%) in HUM 099
  - 452 students (52.92) in HUM 101
  - 88 students (10.3%) in HUM 101H

- Why use fall 2007?
  - The most current
  - The smallest number of students in basic composition
  - The greatest number of students in traditional composition
  - The greatest number of students in honors composition
Accuplacer Placement Score: Reading Comprehension

- To place 36% to 37% of the students in basic composition (HUM 099), then placement score = 72 or below
- To place 10% to 11% of the students in honors composition (HUM 101H), then placement score = 105 or above
- (Note that Accuplacer Guide identifies a score of 51 for basic writers, yet the students in the spring 08 field test performed at higher levels ($M = 77.2, SD = 21.81$)
- (Note that the Accuplacer Guide identifies a score of 103 for honors students, a score similar to ours.)
Accuplacer Reading Comprehension Correlation Analysis With NJBSPT (outliers removed): Cross Check

- Placement in Basic Composition: HUM 099
  - $Y=27.031+2.088 \times 27$
  - $Y=83.41$
  - NJBSPT of 27 = Accuplacer 83 (would place 59% of students in HUM 099)
  - ✓ Equipercentile Rating = 72 or below (to place 36% of students in HUM 099)

- Placement in Advanced Composition: HUM 101H
  - $Y=27.031+2.088 \times 31$
  - $Y=91.76$
  - NJBSPT of 31 = Accuplacer 92 (would place 23.7% of students in HUM 101H)
  - ✓ Equipercentile Rating = 105 or above (to place 10% of students in HUM 101H)
Accuplacer Placement Score: Sentence Skills

• To place 36% to 37% of the students in basic composition (HUM 099), then placement score = 80 or below
• To place 10% to 11% of the students in honors composition (HUM 101H), then placement score = 112 or above
• (Note that Accuplacer Guide identifies a score of 53 for basic writers, yet the students in the spring 08 field test performed at higher levels ($M = 87.36$, $SD = 18.36$)
• (Note that the Accuplacer Guide identifies a score of 110 for honors students, a score similar to ours.)
Accuplacer Sentence Skills Correlation Analysis
With NJBSPT (outliers removed): Cross Check

- Placement in Basic Composition: HUM 099
  - \( Y = 31.827 + 2.072 \times 25 \)
  - \( Y = 83.67 \)
  - NJBSPT of 25 = Accuplacer 83 (would place 44% of students in HUM 099)
  - ✓ Equipercentile Rating = 80 or below (to place 36% of students in HUM 099)

- Placement in Advanced Composition: HUM 101H
  - \( Y = 31.827 + 2.072 \times 30 \)
  - \( Y = 93.99 \)
  - NJBSPT of 30 = Accuplacer 94 (would place 33% of students in HUM 101H)
  - ✓ Equipercentile Rating = 112 or above (to place 10% of students in HUM 101H)
WritePlacer (Accuplacer) Placement Score: Essay

- To place 36% to 37% (up to 42%) of the students in basic composition (HUM 099), then placement score = 6 or below

- To place 10% to 11% (as low as 5%) of the students in honors composition (HUM 101H), then placement score = 9 or above

(Note that Accuplacer Guide identifies a score of 6 as a limited writing sample)

(Note that the Accuplacer Guide identifies a score of 9 as a very good writing sample.)
WritePlacer (Accuplacer) Essay Correlation Analysis With NJBSPT (outliers removed): Cross Check

• Placement in Basic Composition: HUM 099
  – Y=4.98+.318*6
  – Y=6.888
  – NJBSPT of 6= Writeplacer 7 (would place 70% of students in HUM 099)
  – ✓ Equipercentile Rating = 6 or below (to place 36% to 37% [up to 42%] of students in HUM 099)

• Placement in Advanced Composition: HUM 101H
  – Y=4.98+.318*9
  – Y=7.84
  – NJBSPT of 9= Writeplacer 8 (would place 13% of students in HUM 101H)
  – ✓ Equipercentile Rating = 9 or above (to place 10% [as low as 5%] of students in HUM 101H)
Placement Score: SAT-V

- To place 36% to 37% of the students in basic composition (HUM 099), then placement score = 500 or below
- To place 10% to 11% of the students in honors composition (HUM 101H), then placement score = 640 or above
- (Note that the present placement guidelines identify a SAT-V score of 500 for basic writers.)
- (Note that the present placement guidelines identify a SAT-V score of 610 for basic writers, yet that guide dates from 1997.)
Placement Score: SAT-W

- To place 36% to 37% of the students in basic composition (HUM 099), then placement score = 490 or below
- To place 10% to 11% of the students in honors composition (HUM 101H), then placement score = 640 or above
Placement Score: SAT-W

- Although a new measure, the correlations with other measures—especially with limited response measures—are promising.
Concerns and Resolutions

• Test Validation Issues
  – College Board has not provided item difficulty analysis or item bias analysis
  – Problem with validating test itself
  – Potential problem if test challenged by legal means
  – Time constraints to take test at NJIT

• Consequential Validity Issues
  – Alignment of composition curriculum with aims of Accuplacer test in reading comprehension and sentence skills
  – Providing placement information to students and warranting placement decisions for them
  – Continuing monitoring and analysis during fall 2008 semester

• Test Validation Issues
  – Continue to press CB and IntelliMetric for fundamental assurances of test integrity
  – Allow students CB suggested time at local high schools

• Consequential Validity Issues
  – Refresh composition curriculum, including new HUM 099 (one semester of basic writing) and new HUM 102 (researched writing)
  – Revitalize web site, perhaps with digital presentation of how placement scores are set
  – Attach full cost to remaining analyses and reporting
  – Plan to take national leadership role in placement test validation
In Process and Next Steps

• In Process
  – Expert Review
  – Cross-checking information and further archival review
  – Investigation for need (if any) of weights for predictor variables that, taken together, will result in placement score
  – Investigation for reduction (if warranted) of predictor variables

• Next Steps
  – Use final grades of all spring 2008 field test students to investigate regression model.
  – Accumulate new data on approx. 427 students
  – Test placement model—Accuplacer Reading Comprehension, Sentence Skills, WritePlacer, SAT-V, and SAT-W—against actual scores and student background information
  – Validate placement decisions end of June 2008 and release placement decisions to students
  – Use final grades in HUM composition courses in fall 2008 to investigate model.
  – Simplify model (if possible) by reducing predictor variables to employ only the most robust variables
  – Provide exemption for honors students according to best practices