Principles of Standardized Score Interpretation

For Teachers

ACSI PROFESSIONAL DEVELOPMENT FORUM
OCTOBER 2016
Questions to ask ourselves

- What are my class’s scores?
- Where are students excelling?
- What area do we need to improve?
- Where do I want students to be? Set realistic goals.
- What are realistic and manageable goals? Know your scores.
- How are we going to get there? Create a map.
- Are their special groups of students, or individual students that need additional evaluation?
- What skills do students need to master objectives?
- How can I tie these into the curriculum?
Keys to analyzing data
...our goal today

- Norm Reference Test Scores (know what they are and how to use them)
  - National Percentile
  - Normal Curve Equivalent
  - National Stanine
  - Performance Levels and Ranges

- Objective Scores (criterion referenced)
  - Use resources to connect these to subskills, competencies, and standards

- Performance
  - Overall subtests (excelling and areas of concern)
  - Evaluate objectives for a single subtest in a given grade
  - Identify key students for various populations

- Evaluate, Plan, Follow Through
Key Areas of Evaluation

Comparison
- National Percentile
- Normal Curve Equivalent
- National Stanine

Growth
- Scale Scores
- Normal Curve Equivalent
- Lexile

Performance
- Objective Performance Index
- Performance Levels
Things to think about

- **Norm-referenced**
  - Compares student performance to a group (Nationally/Locally)

- **Criterion-referenced**
  - Examines student performance on objectives and skills within a content area
  - Identifies areas of strength or to improve achievement

- **Standards Alignment**
  - National Standards
  - State Standards
  - Curriculum

- **Assessment Components**
  - Core Content Areas:
    - Reading, Language, Math, Science, and Social Studies
  - Additional Subtests
    - Vocabulary, Language Mechanics, Math Computation, Spelling, Word Analysis
Relationships: Comparisons

Key Areas of Evaluation

- Norm-referenced Comparison Scores
  - National Percentile (NP)
  - National Stanine (NS)
  - Normal Curve Equivalent (NCE)
- Growth Scores
  - Scale Score (SS)
  - Normal Curve Equivalent (NCE)
  - Lexile
- Performance
  - Criterion Referenced
  - Performance Levels/Bands
Comparison Scores
Percentile Rank (NP), Normal Curve Equivalent, Stanine
Comparison Scores
Percentile Rank (NP)

The relative standing of a student compared to other students

- Ranking (1\textsuperscript{st}, 2\textsuperscript{nd}, 3\textsuperscript{rd} place) IN REVERSE

Useful for evaluating student performance on a particular test

- Reading score of 76NP = Student scored higher than 76\% of students who took the test
- Grade 4 Math scored higher than 67\% (67NP) of students who took the test
- Cannot be averaged, non-equal interval

Useful for evaluating student/group performance on a particular test (see chart below)

<table>
<thead>
<tr>
<th>Achievement Ranges</th>
<th>Traditional Ranges Percentiles</th>
<th>Traditional Ranges NCEs</th>
<th>More Common Ranges Percentiles</th>
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<tbody>
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<td>1-44 NCE</td>
</tr>
</tbody>
</table>
Comparison Scores
Stanine (NS or S)

A mean of 5 and a standard deviation of 2

Represents equal units of achievement

• Below Average (1-3)
• Average (4-6)
• Above Average (7-9)

Can be averaged
Comparison Scores
Normal Curve Equivalent (NCE)

Conversion from Percentile Rank

99 equal units of the normal curve

Used to compute percentile rank for the typical student in a group

Can also be used to measure growth

• Andrew scored 2 NCEs higher in Math than Reading
• Grade 4 scored 6 NCEs higher this year in Reading
Relationships: Growth

Key Areas of Evaluation

Norm-referenced Comparison Scores
- National Percentile (NP)
- National Stanine (NS)
- Normal Curve Equivalent (NCE)

Growth Scores
- Scale Score (SS)
- Normal Curve Equivalent (NCE)
- Lexile

Performance
- Criterion Referenced
- Performance Levels/Bands
Growth Scores...

**SCALE SCORE**

- Derived from raw score, Rasch, or IRT scoring methods
- Basis for all other norm-referenced scores
- Describes achievement on a continuum from kindergarten through grade 12
- Equal interval, range from 100 – 900
- Scale scores in different content areas are not comparable.
Growth Scores...

NORMAL CURVE EQUIVALENT (NCE)

- NORMAL GROWTH: SAME NCE FROM ONE YEAR TO NEXT
- EXCEPTIONAL GROWTH: 2-3 NCE GAIN FROM ONE YEAR TO NEXT
- SIGNIFICANT GAIN/LOSS: MORE THAN 7 NCES
- USED TO COMPUTE PERCENTILE RANK FOR THE TYPICAL STUDENT IN A GROUP

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<thead>
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Growth Scores cont.

LEXILE MEASURE

• A MEASUREMENT OF A STUDENT’S READING ABILITY OR THE DIFFICULTY OF TEXT

• HELPS A READER FIND BOOKS AND ARTICLES AT AN APPROPRIATE LEVEL OF DIFFICULTY AND DETERMINE HOW WELL THAT READER WILL LIKELY COMPREHEND A TEXT.

• USE TO MONITOR A READER’S GROWTH IN READING ABILITY OVER TIME.

• EXHAUSTIVE LISTS AND BANDS: HTTPS://WWW.LEXILE.COM/
Relationships: Performance

Key Areas of Evaluation

Norm-referenced Comparison Scores
- National Percentile (NP)
- National Stanine (NS)
- Normal Curve Equivalent (NCE)
- Scale Score (SS)
- Normal Curve Equivalent (NCE)
- Lexile
- Criterion Referenced
- Performance Levels/Bands

Growth Scores

Performance
Categorizing Data Activity
Performance Scores...

CRITERION-REFERENCED

- REPORTED FOR EACH INSTRUCTIONAL OBJECTIVE
- CONTENT MASTERY LEVELS BY OBJECTIVE (I.E. MASTERY, PARTIAL MASTERY, NON-MASTERY)
Performance Scores...

**Performance Levels by Grade or Band**

- Scale Score Example of Five Performance Levels

  - Starting Out
  - Progressing
  - Nearing Proficiency
  - Proficient
  - Advanced

<table>
<thead>
<tr>
<th>LEVEL 11+</th>
<th>Reading</th>
<th>Language</th>
<th>Math</th>
<th>Science</th>
<th>Social Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proficient (4)</td>
<td>581–621</td>
<td>598–648</td>
<td>542–584</td>
<td>566–616</td>
<td>590–628</td>
</tr>
<tr>
<td>Nearing Prof. (3)</td>
<td>545–580</td>
<td>557–597</td>
<td>505–541</td>
<td>530–565</td>
<td>552–589</td>
</tr>
<tr>
<td>Progressing (2)</td>
<td>519–544</td>
<td>530–556</td>
<td>471–504</td>
<td>498–529</td>
<td>529–551</td>
</tr>
<tr>
<td>LOSS/HOSS</td>
<td>407/701</td>
<td>400/680</td>
<td>324/680</td>
<td>345/692</td>
<td>385/651</td>
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<table>
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<th>Language</th>
<th>Math</th>
<th>Science</th>
<th>Social Studies</th>
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<tbody>
<tr>
<td>Nearing Prof. (3)</td>
<td>581–615</td>
<td>588–620</td>
<td>549–580</td>
<td>557–593</td>
<td>574–607</td>
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<tr>
<td>LOSS/HOSS</td>
<td>423/722</td>
<td>424/706</td>
<td>347/720</td>
<td>361/743</td>
<td>395/720</td>
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Where are we... know your Scores

High Mastery

Moderate Mastery

Low Mastery

Norm Reference Test Ranges

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What are we looking at?

WHERE ARE WE?

NORM-REFERENCED SCORES

• LOOK AT NP OF THE MEAN NCE, OR NCE.
  • How does the score compare to the national average (50th percentile)?
    • Similar? Different? Why?
  • Which content areas are closest to the national group?
  • What content areas are highest?
  • What content areas are lowest?
  • Compare to the traditional and/or common achievement ranges (High, Average, and Low)
    • How do my high achievers compare to the national high achievers?
    • How do my low achievers compare to the national low achievers?

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CRITERION-REFERENCED SCORES

- **FOCUS ON SUBTESTS IDENTIFIED AND DRILL DOWN TO THE OBJECTIVES AND SKILLS**
- **WHERE IS MY SCHOOL’S MASTERY LEVEL COMPARED TO THE MASTERY RANGES OF THE ASSESSMENT?**
  - Low Mastery: serious review of objectives (1-42%)
  - Moderate Mastery: almost there, reteaching/review needed (43-69%)
  - High Mastery: what we strive for, students are prepared for next grade level (70-100%)
Let’s look at some sample data...

<table>
<thead>
<tr>
<th>Subtest Name</th>
<th># of Students</th>
<th>Mean SS</th>
<th>NP of Mean NCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading</td>
<td>41</td>
<td>674.0</td>
<td>70</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>41</td>
<td>676.1</td>
<td>74</td>
</tr>
<tr>
<td>Reading Composite</td>
<td>41</td>
<td>675.4</td>
<td>74</td>
</tr>
<tr>
<td>Language</td>
<td>41</td>
<td>686.4</td>
<td>80</td>
</tr>
<tr>
<td>Language Mechanics</td>
<td>41</td>
<td>681.7</td>
<td>81</td>
</tr>
<tr>
<td>Language Composite</td>
<td>41</td>
<td>684.3</td>
<td>82</td>
</tr>
<tr>
<td>Mathematics</td>
<td>41</td>
<td>676.7</td>
<td>74</td>
</tr>
<tr>
<td>Math Computation</td>
<td>41</td>
<td>669.2</td>
<td>74</td>
</tr>
<tr>
<td>Math Composite</td>
<td>41</td>
<td>673.2</td>
<td>76</td>
</tr>
<tr>
<td>Total Score</td>
<td>41</td>
<td>679.0</td>
<td>78</td>
</tr>
<tr>
<td>Science</td>
<td>41</td>
<td>667.3</td>
<td>61</td>
</tr>
<tr>
<td>Social Studies</td>
<td>41</td>
<td>664.2</td>
<td>62</td>
</tr>
<tr>
<td>Spelling</td>
<td>41</td>
<td>676.6</td>
<td>77</td>
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Scaled Scores and National Percentile Ranks
Let's look at some sample data...

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<td>669.2</td>
<td>63.6</td>
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<tr>
<td>Math Composite</td>
<td>41</td>
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<td>64.8</td>
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<tr>
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<td>41</td>
<td>679.0</td>
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<tr>
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<td>56.5</td>
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<tr>
<td>Spelling</td>
<td>41</td>
<td>676.6</td>
<td>65.4</td>
</tr>
</tbody>
</table>

Scaled Scores and Normal Curve Equivalent
Let’s look at some sample data…

<table>
<thead>
<tr>
<th>Objective Title</th>
<th>Mastery</th>
<th># in Mastery Category</th>
<th>% in Mastery Category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
<td>27</td>
<td>66</td>
</tr>
<tr>
<td>Sentence Structure</td>
<td>Moderate</td>
<td>11</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Writing Strategies</td>
<td>High</td>
<td>26</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>12</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Editing Skills</td>
<td>High</td>
<td>29</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td></td>
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<td>3</td>
<td>7</td>
</tr>
</tbody>
</table>
Let’s look at some sample data…
Where are we? cont.

- IDENTIFY PATTERNS USING OBJECTIVES
  - Group results
    - Where are the areas that the group is generally strong?
    - Are there patterns of low mastery?
  - Individual student results patterns
    - Which students are at low/mid/high mastery? Is this expected? A surprise?
    - Who are my at-risk students? (students with low mastery in multiple objectives)
Where are we? cont.

CRITERION-REFERENCED SCORES CONT.

• WHERE ARE STUDENTS WITHIN THEIR MASTERY RANGE?
  
  • For example, some students may be in the mid-mastery range, but almost in the high-mastery range. This will allow you to determine the instructional needs for each objective. How much instruction is needed to move into high-mastery? Some? A lot?

• IN WHICH OBJECTIVES ARE MY STUDENTS EXCELLING? WHY?

• IN WHICH OBJECTIVES DO MY STUDENTS NEED TO IMPROVE? WHAT CAN WE PULL FROM AREAS OF STRENGTH?

Criterion Referenced Scores (TerraNova3 Objectives and Scale Scores levels)

<table>
<thead>
<tr>
<th>Grade-Level Expectation</th>
<th>TerraNova 3 Performance Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>At or Above Grade Level</td>
<td>Advanced Proficient</td>
</tr>
<tr>
<td>Not Yet at Grade Level</td>
<td>Nearing Proficiency Progressing</td>
</tr>
<tr>
<td>Well-Below Grade Level</td>
<td>Step 1 (grades 3–12) Starting Out (grades 1–2)</td>
</tr>
</tbody>
</table>

High Mastery (70-100)

Moderate Mastery (43-69)

Low Mastery (0-42)
Where do we want to be?

- Keep it simple!
- SMART goals

- Specific
- Measurable
- Attainable
- Realistic
- Timely
Where do we want to be? cont.

NORM-REFERENCED SCORES

USE THE NORM COMPARISONS DISCUSSED PRIOR, SET GOALS TO MOVE STUDENTS TOWARD AVERAGE OR HIGH ACHIEVEMENT

- Maintain the same NCE to display a year’s worth of growth (longitudinal/cohort summaries)
- 4th grade Science Mean NCE will increase from 62 to 63
- Increase Math scores for K-12 by an average of 1-2 NCEs
- 5th grade will meet or exceed the 50th NP for Reading, Language, and Mathematics
- At-risk learners will move from Starting Out to Progressing (based on Scale Scores)

SMART
- Specific
- Measurable
- Attainable
- Realistic
- Timely
Where do we want to be? cont.

CRITERION-REFERENCED SCORES

IDENTIFY AREAS

• % of students at high mastery is less than 65%
• Average for a specific objective score is less than 80% (use subskills & competencies)

REALISTIC GOALS

• 6th grade will increase the number of students at high mastery by 10% for the Math Objectives: Measurement and Operations Concepts for K-12
• K-12 will reach 50% high mastery in Reading: Reading and Writing Strategies
• 1st grade will increase moderate mastery by 5% (increase from 25-30%)
• 3rd grade at-risk students will improve Language: Writing Strategies, with a 10% increase (37% to 47% objective score)
What are we looking at?
Where are we?
Where do we want to be?

How are we going to get there?

NORM-REFERENCED SCORES

- WHAT DOES THIS MEAN FOR:
  - Curriculum?
    - Modify, implement, pull in ancillary materials, pacing
  - Instruction?
    - Pair-Share, questioning techniques, Thinking Maps, GOs, DEAR
  - Student Competency
  - School Culture
  - Special Circumstances/ELL/Special Populations
How are we going to get there?

NORM-REFERENCED SCORES

- INTERVENTION STRATEGIES?
  - Small group, pull-out, tutoring, afterschool, online resources

- ENRICHMENT STRATEGIES? WHAT CAN WE DO TO STRETCH ABOVE AVERAGE STUDENTS?
  - Extension activities, outside projects, special activities with key pullout group
CRITERION-REFERENCED SCORES

- WHAT ARE SOME ADDITIONAL RESOURCES WE MIGHT USE FOR THESE PURPOSES?
- WHAT ARE THE INSTRUCTIONAL STRATEGIES THAT MAY HAVE LED TO THESE SUCCESSES? HOW CAN THEY BE MODIFIED TO IMPROVE AREAS OF NEED?
- IDENTIFY OBJECTIVES WHERE STUDENTS ARE NOT QUITE AT, OR ARE BELOW, GRADE LEVEL?
  - Examine how target objectives are currently taught.
  - How can this be modified?
- COMPARE OBJECTIVES WITH THOSE IN YOUR INSTRUCTIONAL PROGRAM USING YOUR ASSESSMENT RESOURCES.
  - Are there gaps? Where? What do the gaps affect? If so, how will we supplement them?
- IS THE PACING APPROPRIATE FOR THE COURSE?
Other Assessment Resources

• Practice Materials, sample items (i.e. Classroom Connections)
• List of Standards, Key Objectives, Subskills, blueprints (i.e. Teacher’s Guide to TerraNova3)
• Assessment Accommodations Supplement
• ACSI Data Online for Administrators/Teachers and ACSI Data Online for Parents, Other online system
• Academic Vocabulary for TN3: Building Foundational Skills for Success
• Critical Thinking Skills (Levels)
• Depth of Knowledge for Questions
  ➢ Recall and recognition
  ➢ Interpret and apply skills
  ➢ Explain and support with evidence
  ➢ Evaluate and extend
Additional suggestions

- Performance Levels (Scale Scores)
- Boom’s, or Modified Bloom’s, Taxonomy Levels
- Test Taking Strategies
- Reading and Writing Programs
- Lexile Scores Suggested Use:
  - Teachers: customize their instruction to their students.
- Professional Development Opportunities:
  - Regular session for teachers to collaborate about any form of assessment
  - Thinking Maps, Questioning Technique, Test Administration, Workshop to Analyze, Plan, and Implement instructional improvements to increase student achievement
  - Free resources available through (www.purposefuldesign.com) select TerraNova 3 and then Professional Development
Thank you!

Questions?

ACSI Assessment Support
Purposeful Design Online Store: www.purposefuldesign.com
Email: order@acsi.org
Call: 1.800.367.0798