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Indiana Department of Education

Glenda Ritz, Superintendent of Public Instruction

**TO:** Indiana State Board of Education
**FROM:** Indiana Department of Education; Center for Education and Career Innovation
**RE:** Accountability Panel Update
**DATE:** June 30, 2014

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## SUMMARY

The Indiana Department of Education and Center for Education and Career Innovation continue to work to provide prospective methods and data analysis for Accountability A-F updates. The Accountability Panel reconvened June 26th to address outstanding items. Topics discussed are as follows:

1) Assessment Updates
    - Superintendent Ritz presented the slideshow from the June 2014 Education Roundtable meeting, which included the following recommendations:
        - Recommendation for assessments from grade 03 thru 10 using a vertical scale.
        - Recommendation for the use of grade 10 ISTEP as the GQE.
        - Recommendation to include a grade 11-12 CCR test participation metric in the Accountability System.
            - Identified as a new component for A-F.
            - Discussed implications for the Accountability framework.
        - Recommendation for a full reading score as part of the ISTEP test.
    - Updates for all recommendations were provided concerning timing and transition to the new assessments.

2) College and Career Readiness Indicators and Improvement
   - Guest speakers Sam Snideman (CHE) and Marie Mackintosh (DWD) attended the panel meeting as subject matter experts.
   - Following elements were discussed:
     - College and Career Readiness Indicators
       - Discussed pros and cons of the use of additional indicators such as PSAT and WorkKeys.
       - Discussed other possible indicators and national trends.
       - Final decisions were not made concerning additional indicators recommendations.

     - College and Career Readiness Improvement Metric
       - Reviewed data for three potential methods for calculating College and Career Readiness Improvement:
         - AMO percent attainment
         - CCR status improvement from 10th grade to Graduation
         - ECA/GQE Status at Grade 10 CCR status
       - Of the three presented options, the panel favored the use of the GQE Status over other options.
       - After careful review of various options, the panel voted to remove the CCR Improvement component from the Accountability Framework.

3) Graduation Improvement
   - Reviewed data for three potential methods for calculating Graduation Improvement:
     - AMO percent attainment
     - Graduation to Membership or Graduation to Attendance ratio
     - Five year graduation rate
   - Of the three presented options, the panel did not particularly favor any one option.
   - The panel still values a way to show improvement in Graduation; therefore, additional analysis will be performed on the data element.

4) Categorical Improvement and Trajectory Growth
   - Per outcome of previous Panel meeting and SME advice, the value table has been re-evaluated to add additional sub-categories and establish new cut scores between each sub-category. Table values have been reassigned to reflect the new sub-categories. The category bands are new broken into 8 sub-categories as follows:
     - Did Not Pass 3 sub-categories

    - Pass 3 sub-categories
    - Pass Plus 2 sub categories
- Additional data runs and analysis has been performed using the latest version of the value tables.
- Results were reviewed under two options:
    - Option B: Categorical Improvement only
    - Option C: Categorical Improvement and Targeted Growth
- Outcome for revised value table was improved for student distribution, category movement, and performance correlations; with particular improvement in correlation under option C.
- Analysis by Dr. Betebenner provided that:
    - "Compared to results in others states, the correlations associated with value tables A3, B1, and B3 are higher than what one commonly sees and are likely the sign of model bias."
    - "The correlations associated with value tables C1 and C2 are high but not out of range of what is generally seen."
    - Summary: "This report presents results associated with achievement level transitions using an equal achievement level partitioning of the current ISTEP 3 achievement levels to 8 achievement levels. The results suggest marked improvement over the first iteration of value-table results with a fairly uniform distribution across the 8 achievement levels that have been defined. In addition, reasonable yet ambitious growth targets for students to reach the next level were also shown for the newly defined 8 achievement levels. Depending upon the value-table chosen, high correlations between the school values derived from the value-tables and key indicators should be examined with regard to stakeholders understanding of schools' performance statewide.
- Accountability panel requested additional council from Dr. Betebenner and Dr. Briggs concerning potential growth components for the Accountability model.

# Accountability A-F Revision Work Plan

| Component | Indicator | Grade Span | Recommendation | Status | Notes | Remaining Work | Component Introduction Date | Component Removal Date | Goal Completion Date |
|---|---|---|---|---|---|---|---|---|---|
| **Performance** | | | | | | | | | |
| | ELA | 3-10 | Pass percent point | Complete | | | September 2013 | | December 2013 |
| | | 3-10 | Participation factor | Complete | | | September 2013 | | December 2013 |
| | Math | 3-10 | Pass percent point | Complete | | | September 2013 | | December 2013 |
| | | 3-10 | Participation factor | Complete | | | September 2013 | | December 2013 |
| | Reading | 3-10 | Pass percent point | Pending Data Availability | | | September 2013 | | December 2013 |
| | | 3-10 | Participation factor | Pending Data Availability | | | September 2013 | | December 2013 |
| | CCR Tests | 11-12 | Participation rate | In-Progress | Use of CCR participation introduced in June 2014 Education Roundtable resolution. | Define business rule and applicable tests. | June 2014 | | August 2014 |
| | Graduation | 12 | Four year graduation rate points | Complete | | | September 2013 | | December 2013 |
| | CCR | 12 | Percent of graduates achieving a CCR indicator | In-Progress | Continue to review and revise indicators of CCR. Allow guest speakers as Subject Matter Experts to inform final list of CCR indicators. | DOE: Invite additional SME.<br>Panel: Select final list. | September 2013 | | August 2014 |

# Accountability A-F Revision Work Plan

| Component | Indicator | Grade Span | Recommendation | Status | Notes | Remaining Work | Component Introduction Date | Component Removal Date | Goal Completion Date |
|---|---|---|---|---|---|---|---|---|---|
| **Growth** | | | | | | | | | |
| | ELA<br>Math<br>Reading | 4-10 | Categorical Improvement points for lowest performing student and highest performing student subgroups | In-Progress | Additional Pass sub-status and revised cut scores allow 60% of students to show movement in Categories. Revised run of data is complete and has been analyzed by experts. Outcome shows increased student distribution and improved correlations, especially in options utilizing Targeted Growth as well.<br><br>Panel would like Dr Betebenner and Dr Briggs to provide additional recommendation for Growth.<br><br>**Component will be affected by outcome of assessment selection. | CECI: Provide recommendation from Growth experts.<br>Panel: Select model for Growth | September 2013 | | June 2014 |
| | | 4-10 | Targeted growth points | In-Progress | Data run executed in conjunction with CI data. Panel uncertain if they wish to keep this component in framework.<br><br>Panel would like Dr Betebenner and Dr Briggs to provide additional recommendation for Growth.<br><br>**Component will be affected by outcome of assessment transition. | CECI: Provide recommendation from Growth experts.<br><br>Panel: Select model for Growth | September 2013 | | June 2014 |
| | | 12 | Performance improvement | Complete | | | September 2013 | | December 2013 |
| | Graduation | 12 | Improvement in Graduation points | In-Progress | Options for metric calculation provided to panel June 2014. Continued review of component required. Panel unsure if they want to keep component. | DOE: Prepare additional option.<br>Panel: Select methodoloy. | September 2013 | | June 2014 |
| | CCR | 12 | Improvement in CCR points | Removed | Options for metric calculation provided to panel June 2014. Panel voted to remove component. | | September 2013 | June 2014 | June 2014 |

# An analysis of growth to modified standards on Indiana's ISTEP Assessment

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## Overview

This report presents results from an analysis of longitudinal ISTEP data using a value-table/transition matrix approach applied to a refinement of the current 3 level performance standards (Did Not Pass, Pass, Pass +) to 8 levels (Did Not Pass 1, 2, and 3, Pass 1, 2, and 3, and Pass + 1, 2). Together with descriptive statistics of empirical achievement level transitions, the report includes SGP target information showing single and multi-year growth trajectories for students in both ELA and Mathematics. Resetting of cutscores allowed for much more uniform distribution of students across 8 achievement levels used for value table calculations.

## Data & Results

Data used for this report was supplied by the Indiana Department of Education and includes ISTEP results for ELA and Mathematics for Grades 3 to 8 across the past 2 years (2012 and 2013). Currently, the ISTEP assessment reports criterion-referenced achievement on a 3 level scale: Did Not Pass, Pass, and Pass +. As part of a re-analysis of student progress, the state is implementing a value-table model with 8 achievement levels and awarding points for transitions between achievement levels from the previous year to the current year. For an initial investigation, the state established cutpoints between the initial achievement levels by *equally* subdividing the current 3 achievement levels into 3, 3, and 2 sub-achievement levels, respectively.

For the 2012 to 2013 growth analyses using the refined categories, achievement level transitions of 382,690 students were analyzed in mathematics and 380,818 in ELA in grades 3 to 4, 4 to 5, 5 to 6, 6 to 7, and 7 to 8. Tables 1 and 2 show frequency counts together with conditional probabilities (the probability of observing the 2013 achievement level given the the 2012 achievement level) for the data.

The row totals for both the mathematics and ELA result show much better dispersion of students across the 8 achievement levels than was previous reported. In terms of value table calculations, movement between the 8 categories will have at least some consequence given that are a meaningful number of students in all 8 categories. Students primarily remain in the same category or move to an adjacent category. It is much rarer to see student jumping more than 1 category from year to year. For example, in ELA of the 10,417 students starting in Did Not Pass 1, only 893 (8.6 percent) of those student moved to Did Not Pass 3 and even fewer moved to the Pass category in a single year.

| 2012 Achievement Level | 2013 Achievement Level | | | | | | | | Row Totals |
|---|---|---|---|---|---|---|---|---|---|
| | Did Not Pass 1 | Did Not Pass 2 | Did Not Pass 3 | Pass 1 | Pass 2 | Pass 3 | Pass + 1 | Pass + 2 | |
| Did Not Pass 1 | 5,274 (0.506) | 3,710 (0.356) | 893 (0.086) | 434 (0.042) | 85 (0.008) | 15 (0.001) | 3 (0.000) | 3 (0.000) | 10,417 (0.027) |
| Did Not Pass 2 | 4,371 (0.159) | 11,266 (0.410) | 6,263 (0.228) | 4,582 (0.167) | 820 (0.030) | 135 (0.005) | 8 (0.000) | 3 (0.000) | 27,448 (0.072) |
| Did Not Pass 3 | 1,376 (0.046) | 7,692 (0.255) | 7,956 (0.263) | 9,972 (0.330) | 2,606 (0.086) | 548 (0.018) | 55 (0.002) | 13 (0.000) | 30,218 (0.079) |
| Pass 1 | 1,002 (0.013) | 7,962 (0.097) | 13,323 (0.167) | 33,151 (0.415) | 17,673 (0.221) | 5,854 (0.073) | 818 (0.010) | 130 (0.002) | 79,913 (0.209) |
| Pass 2 | 142 (0.002) | 1,546 (0.020) | 4,203 (0.054) | 21,860 (0.280) | 26,903 (0.345) | 17,956 (0.230) | 4,481 (0.057) | 979 (0.013) | 78,070 (0.205) |
| Pass 3 | 33 (0.000) | 297 (0.004) | 917 (0.012) | 7,925 (0.100) | 20,347 (0.257) | 29,556 (0.373) | 14,233 (0.180) | 5,849 (0.073) | 79,157 (0.208) |
| Pass + 1 | 3 (0.000) | 27 (0.001) | 110 (0.003) | 1,161 (0.026) | 5,142 (0.117) | 15,012 (0.342) | 13,129 (0.299) | 9,364 (0.213) | 43,948 (0.115) |
| Pass + 2 | 0 (0.000) | 4 (0.000) | 8 (0.000) | 151 (0.004) | 1,069 (0.033) | 5,724 (0.180) | 9,595 (0.303) | 15,096 (0.477) | 31,647 (0.083) |

Table 1: 2012 to 2013 cross tabulation frequencies and (conditional probabilities) of ELA achievement level progressions using the modified 8 achievement levels.

| 2012 Achievement Level | 2013 Achievement Level | | | | | | | | Row Totals |
|---|---|---|---|---|---|---|---|---|---|
| | Did Not Pass 1 | Did Not Pass 2 | Did Not Pass 3 | Pass 1 | Pass 2 | Pass + 1 | Pass + 2 | Pass + 3 | |
| Did Not Pass 1 | 4,038 (0.390) | 3,976 (0.384) | 1,361 (0.132) | 782 (0.076) | 144 (0.014) | 35 (0.003) | 12 (0.001) | 1 (0.000) | 10,349 (0.027) |
| Did Not Pass 2 | 3,367 (0.127) | 9,072 (0.343) | 6,246 (0.236) | 6,114 (0.231) | 1,274 (0.048) | 321 (0.012) | 47 (0.002) | 4 (0.000) | 26,445 (0.069) |
| Did Not Pass 3 | 1,044 (0.038) | 5,397 (0.194) | 6,495 (0.234) | 10,239 (0.369) | 3,529 (0.127) | 882 (0.032) | 149 (0.005) | 15 (0.001) | 27,750 (0.072) |
| Pass 1 | 620 (0.009) | 4,942 (0.072) | 9,606 (0.140) | 27,894 (0.406) | 17,524 (0.255) | 6,702 (0.098) | 1,316 (0.019) | 80 (0.019) | 68,684 (0.180) |
| Pass 2 | 110 (0.002) | 840 (0.012) | 2,682 (0.039) | 16,749 (0.242) | 24,776 (0.242) | 17,781 (0.357) | 5,726 (0.256) | 685 (0.083) | 69,349 (0.181) |
| Pass 3 | 19 (0.000) | 152 (0.002) | 517 (0.007) | 5,580 (0.077) | 17,300 (0.237) | 27,284 (0.374) | 17,746 (0.244) | 4,265 (0.059) | 72,863 (0.190) |
| Pass + 1 | 3 (0.000) | 32 (0.001) | 57 (0.001) | 909 (0.014) | 5,008 (0.080) | 17,720 (0.281) | 24,626 (0.391) | 14,624 (0.232) | 62,979 (0.164) |
| Pass + 2 | 0 (0.000) | 3 (0.000) | 4 (0.000) | 43 (0.001) | 438 (0.010) | 3,438 (0.078) | 12,332 (0.279) | 28,013 (0.633) | 44,271 (0.116) |

Table 2: 2012 to 2013 cross tabulation frequencies and (conditional probabilities) of mathematics achievement level progressions using the modified 8 achievement levels.

In terms of moving up to the next category, students from an initial achievement level do not have a uniform chance of moving up. The SGP methodology (Betebenner, 2009; Betebenner, Iwaarden, Domingue, & Shang, 2014) includes a criterion-referenced component for calculating growth targets for students that indicate what level of growth (in the SGP metric) is required for students to reach pre-defined achievement outcomes in a specified amount of time. In the context of the current transition table approach to looking at growth, the implicit goal is for students to move up (at least) 1 achievement at a time. For example, a student currently in Did Not Pass 2 wouldn't be expected to move to Pass 1 in a single year but would be expected to move to Did Not Pass 3 in year 1 and then to Pass 1 in the following year.

To quantify the likelihood of this happening, SGP targets were calculated for all 2013 students with the goal of them reaching the next higher achievement level within the next year. Tables 3 and 4 provide descriptive summaries of the SGP targets for students in ELA and mathematics, respectively, based upon their initial achievement level. For example, in Table 3, the median SGP target for students with an initial achievement level of *Did Not Pass 3* was 56. This indicates that 50 percent of students starting in the *Did Not Pass 3* category had a 1 year growth target to reach *Pass 1* of less than or equal to 56 and 50 percent of students had growth targets of greater than 56. The 3rd quartile for the SGP targets for this group of students was 62.0 indicating that 25 percent of the students starting in the *Did Not Pass 3* category needed SGPs in excess of 62 to reach *Pass 1* — an high, but not unreasonable, rate of growth reached by approximately 2 in 5 students.[1]

In general, tables 3 and 4 show, especially for students at Pass 1 or above, that reaching the next level is often an ambitious but not unreasonable expectation for the majority of students. This

[1]Note that a percentile can be converted to a probability by simply subtracting the percentile from 100. For example, a growth percentile of 62 corresponds to a rate of progress reached or exceeded by 38 percent of students. That is, the probability of observing that rate of growth or higher is 0.38, approximately 2 in 5 would demonstrate that rate of growth based upon current rates of student growth observed in the state.

| 2013 Achievement Level | 2013 SGP Target Summary | | | | | |
|---|---|---|---|---|---|---|
| | Minimum | 1st Quartile | Median | Mean | 3rd Quartile | Maximum |
| Did Not Pass 1 | 3 | 35 | 44 | 45.2 | 54 | 99 |
| Did Not Pass 2 | 3 | 45 | 53 | 52.2 | 60 | 99 |
| Did Not Pass 3 | 2 | 48 | 56 | 54 | 62 | 98 |
| Pass 1 | 4 | 58 | 67 | 65.3 | 73 | 99 |
| Pass 2 | 7 | 56 | 67 | 69.9 | 86 | 99 |
| Pass 3 | 10 | 56 | 67 | 69.9 | 86 | 99 |
| Pass + 1 | 18 | 64 | 76 | 76.2 | 89 | 99 |
| Pass + 2 | | | | | | |

Table 3: 2013 ELA SGP targets to next higher achievement level based upon initial starting point using the modified 8 achievement levels.

| 2013 Achievement Level | 2013 SGP Target Summary | | | | | |
|---|---|---|---|---|---|---|
| | Minimum | 1st Quartile | Median | Mean | 3rd Quartile | Maximum |
| Did Not Pass | 2 | 28 | 36 | 35.7 | 43 | 87 |
| Did Not Pass 2 | 4 | 34 | 44 | 43.7 | 52 | 96 |
| Did Not Pass 3 | 3 | 32 | 42 | 43 | 54 | 95 |
| Pass 1 | 7 | 46 | 57 | 56.7 | 67 | 99 |
| Pass 2 | 5 | 49 | 59 | 59.4 | 69 | 99 |
| Pass 3 | 5 | 52 | 63 | 63.4 | 75 | 99 |
| Pass + 1 | 12 | 61 | 67 | 68.2 | 76 | 99 |
| Pass + 2 | | | | | | |

Table 4: 2013 Mathematics SGP targets to next higher achievement level based upon initial starting point using the modified 8 achievement levels.

compare favorably to previous distributions where the transitions to higher achievement levels were often too steep. For example, in Mathematics (table 4) students starting at *Pass 1* have a median SGP target to reach *Pass 2* in 1 year of 57. That is, half of the students starting at *Pass 1* need to grow at or above an SGP of 57 to reach *Pass 2*.

## Value Table Results and Comparison

Following recommendations made to the board of education in a presentation in November, 2013 and the establishment of value-tables from the working group in February, 2014, Table 5 shows correlations between status and demographic metrics commonly used to evaluate growth models and the value-table summaries derived from the four value-tables proposed to the working group. In general, the correlations are unacceptable and an indication that the value-tables selected thus far (particularly value tables B1 and B2 which were favored by working group participants) are highly correlated with status/proficiency as well as school poverty. Value table A1 is a slight exception in ELA.

| | | 2013 | | | | | |
|---|---|---|---|---|---|---|---|
| | | A3 | B1 | B3 | C1 | C2 | Median SGP |
| ELA | Prior Percent at/above Proficient | 0.597 | 0.597 | 0.597 | 0.404 | 0.365 | 0.311 |
| | Prior Mean Scale Score Standardized | 0.545 | 0.545 | 0.545 | 0.382 | 0.336 | 0.281 |
| | Percent Free/Reduced Lunch | -0.381 | -0.381 | -0.381 | -0.283 | -0.251 | -0.169 |
| Mathematics | Prior Percent at/above Proficient | 0.43 | 0.43 | 0.43 | 0.271 | 0.217 | 0.232 |
| | Prior Mean Scale Score Standardized | 0.463 | 0.463 | 0.463 | 0.321 | 0.266 | 0.265 |
| | Percent Free/Reduced Lunch | -0.268 | -0.268 | -0.268 | -0.189 | -0.147 | -0.128 |

Table 5: Correlation between status and demographic summaries and value-table growth results.

If taken as fact, the results in Table 5 indicate that, depending upon the value table chosen, the Indiana schools showing the highest student growth are, to a greater or lesser extent, predominantly the higher achieving schools and the Indiana schools showing the lowest growth are the lower achieving schools. i In such a scenario it will be rare to find a high achieving school showing low student growth or a low achieving school showing high student growth. The validity of that finding needs to be empirically confirmed with Indiana stakeholders as to whether it reflects what they believe to be the case. Compared to results in others states, the correlations associated with value tables A3, B1, and B3 are higher than what one commonly sees and are likely the sign of model bias. The correlations associated with value tables C1 and C2 are high but not out of range of what is generally seen. As a point of comparison, the correlations between median SGP and the prior achievement and free and reduced lunch indicators are shown and are generally lower than those indicated by the value-table results which is consistent with what has been found in other states.

### Summary

This report presents results associated with achievement level transitions using an equal achievement level partitioning of the current ISTEP 3 achievement levels to 8 achievement levels. The results suggest marked improvement over the first iteration of value-table results with a fairly uniform distribution across the 8 achievement levels that have been defined. In addition, reasonable yet ambitious growth targets for students to reach the next level were also shown for the newly defined 8 achievement levels. Depending upon the value-table chosen, high correlations between the school values derived from the value-tables and key indicators should be examined with regard to stakeholders understanding of schools' performance statewide.

## References


Betebenner, D. W. (2009). Norm- and criterion-referenced student growth. *Educational Measurement: Issues and Practice*, *28*(4), 42–51.

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