ISTEP Exams: Leveling the Playing Field by Controlling for Demographics and Changing Student Demographics

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Outline

• Introduction and Error Bars on Single-Year Pass Rates of Performance and on Two-Year Comparison Measures of Improvement
• Demographics, Changing Demographics, and Methods for Evaluating Trends
• Evidence of Need to Control for Demographics and Changing Demographics
• Research Models, Methodology, and Local Examples of Model Predictions
• Summary, Recommendations, and the Wise Words of a "Famous" Football Coach
• One Final (and Very Important) Question
Timelines of ISTEP, PL 221, and NCLB

- Indiana Statewide Tests for Educational Progress (ISTEP) since 1988
- ISTEP Redesigned in 1995 to Measure Student Achievement of State Content Standards
- Grade 10 ISTEP Exam used as Graduation Requirement since 1998
- Indiana Public Law 221 (PL 221) since 1999
- No Child Left Behind (NCLB) since 2001
Basis for initiating our research: According to PL 221, IDOE uses 1-yr to 3-yr for Assessing (1%, 2%, ....) Year-to-Year Improvement in ISTEP Exam Pass Rates

<table>
<thead>
<tr>
<th>PERFORMANCE (% passing ISTEP+)</th>
<th>Exemplary Progress</th>
<th>Commendable Progress</th>
<th>Academic Progress</th>
<th>Academic Watch (Priority)</th>
<th>Academic Probation (High Priority)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 90%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 80%</td>
<td>≥ 1%</td>
<td>&lt; 1%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 70%</td>
<td>≥ 3%</td>
<td>≥ 2%</td>
<td>≥ 1%</td>
<td>&lt; 1%</td>
<td></td>
</tr>
<tr>
<td>≥ 60%</td>
<td>≥ 4%</td>
<td>≥ 3%</td>
<td>≥ 2%</td>
<td>&lt; 2%</td>
<td></td>
</tr>
<tr>
<td>≥ 50%</td>
<td>≥ 5%</td>
<td>≥ 4%</td>
<td>≥ 3%</td>
<td>&lt; 3%</td>
<td>&lt; 0%</td>
</tr>
<tr>
<td>≥ 40%</td>
<td>≥ 6%</td>
<td>≥ 5%</td>
<td>≥ 4%</td>
<td>≥ 1%</td>
<td>&lt; 1%</td>
</tr>
<tr>
<td>&lt; 40%</td>
<td>≥ 6%</td>
<td>≥ 5%</td>
<td>≥ 3%</td>
<td>&lt; 3%</td>
<td>&lt; 3%</td>
</tr>
</tbody>
</table>
An Introduction to Error Analysis
Error Bars 101 - Sample Size and Inherent Statistical Uncertainty in Pass Rates

• Political Pollsters, Education Researchers, and 95% Confidence Levels

• Uncertainty in a One-Year Pass Rate

• Uncertainty in Difference of Two Successive Pass Rates

• Multiple-Year Trendlines and Annualized Gain
What do Political Pollsters and Indiana Department of Education Assessment Specialists have in Common?

- CNN, MSN, and Fox News Political Pollsters quote **Margins of Error**:
  
  How many citizens/voters must be interviewed to yield a Margin of Error of +/- 3%?

- Education Researchers report **Standard Errors and 95% Confidence Levels**; IDOE Assessment Officials acknowledge **Statistical Uncertainty** (sometimes):

  How many students must be "interviewed" for a Standard Error at 95% Confidence of +/- 3%?

- The answer to both questions is about N = 900 voters or students!!
Uncertainties in One-Year Pass Rates and Polls of N = 900 at 95% Confidence

If Pass Rate is p, and Class Size is n, then the Standard Error (S.E.) or Statistical Uncertainty is given by

\[ S.E. = \sqrt{\frac{p(1 - p)}{n}} \]

Examples for Political Pollsters and Average School Sizes:

\[ p = 0.60 \text{ (60\%)} \text{ and Sample Size } n = 900 \]

\[ S.E. = \sqrt{0.6(1 - 0.6)/900} \times 100\% = 1.6\% \]

95% Confidence = 1.96 x 1.6 = 3.2%
Uncertainties in One-Year Pass Rates for Average Grade 3 and Grade 10 Schools

Average Grade 10: \( p = 0.60 \) (60%) and Enrollment \( n = 232 \)

\[
\text{S.E.} = \sqrt{0.6(1 - 0.6)/232} \times 100\% = 3.2\%
\]

Average Grade 3: \( p = 0.60 \) (60%) and Enrollment \( n = 77 \)

\[
\text{S.E.} = \sqrt{0.6(1 - 0.6)/77} \times 100\% = 5.6\%
\]

(Above Statistical Uncertainties "One Sigma" - 68% Confidence)
Uncertainties in Differences of Pass Rates for Two Successive Years

If pass rates $p_1 \approx p_2$ and enrollments $n_1 \approx n_2$ are about same in successive years, and assumed to be $p$ and $n$, respectively, Standard Error (S.E.) of difference in $(p_2 - p_1)$ is

$$S.E. = \left( \frac{p_1(1-p_1)}{n_1} + \frac{p_2(1-p_2)}{n_2} \right)^{1/2}$$

Using examples of average sized grades 10 and 3, S.E. for differences in successive years become

S.E. = $\sqrt{2} \sqrt{0.6(1-0.6)/232}$ x 100% = 4.5% (grade 10)
S.E. = $\sqrt{2} \sqrt{0.6(1-0.6)/77}$ x 100% = 7.9% (grade 3)
Statistical Uncertainties associated with Small Sample Sizes Mask Improvement

- Smallest NCLB subgroups (30 students) have Standard Errors of 8.9% and 12.6% associated with Pass Rates and Differences in Pass Rates, respectively, between two successive years.

- Large Standard Errors mask policy and instructional changes implemented for average size schools and smaller.

- For average size schools, five or more years of tracking the ISTEP scores required before meaningful statistical data obtained.
Ordinary Least Squares – Slopes, Intercepts, Correlations, and Annualized Gains

Data Points \((x_1, y_1), (x_2, y_2), \ldots\ldots\ldots\) etc., with "model" straight line given by \(y = f(x)\);

\(y_1 - f(x_1) = \text{difference}_1\) between observed \(y_1\) and "model" value \(f(x_1)\); similarly for \(\text{difference}_2\) and other differences.
Differences or Differences of Squares?

\[ \sum_{i=1}^{4} [y_i - f(x_i)] = \text{sum of 4 differences} \]

Problem: 2 are +, 2 are -, and, therefore, the sum could = 0.

Next consider a sum of the squares of the 4 differences:

\[ \sum_{i=1}^{4} [y_i - f(x_i)]^2 = \text{sum of squares of 4 differences} \]

We want to pick the line f(x) for which the squares of the differences is least.
.... now the “best” Slope (m) and Intercept (b) .... for the straight line \[ y = \mathbf{m} \times x + \mathbf{b} \]

\[
\sum_{i=1}^{4} [y_i - mx_i - b]^2
\]

has 2 unknowns: m and b

In general,

\[
H(m,b) = \sum_{i=1}^{4} [y_i - mx_i - b]^2
\]

can be solved (by Differential Calculus) to obtain equations for m and b which produce the "BEST" line for our purposes by minimizing the squares thus determining the \textbf{LEAST SQUARES FIT}
Displaying Six-Year Trends in Grade 10 ISTEP Pass Rates for a Local County School (Wes Del HS)
... with Error Bars Added ...
... and a “Bill Gates” Trendline Added ...
... and Fall 2008 Result Added to 2002-2007 Trend ...
Current Study: Provides Pass Rate Models that Account for Family and Education Variables

- **Family**: Free-Reduced Lunch, Ethnicity (American Indian, Black, Asian, Hispanic, White, Multi-Racial)
- **Parent Education**: (Less Than HS Education, HS Education, Some College, and BS Degree), Household Head (Married Couple, Single Male, and Single Female), Median Income
- **Percentages of ESL–LEP and Special Education**, Teachers (Age, Salary, and Experience), Expenditure per Student, Student Teacher Ratio, K to 1st Ratio, Pre-K to 1st Ratio
- **Dummy Variables for Annualized State Gains and Corporation Type** (Metropolitan, Suburban, Town, Rural)
Correlations between Variables and Pass Rates of BOTH (EnLA and Math)

<table>
<thead>
<tr>
<th>Strong (R &gt; 0.5)</th>
<th>Moderate (0.2 &lt; R &lt; 0.5)</th>
<th>Weak (R &lt; 0.2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free Reduced Lunch</td>
<td>Hispanic</td>
<td>preKG to 1st Ratio</td>
</tr>
<tr>
<td>Married Couple</td>
<td>Expenditure/Student</td>
<td>Asian</td>
</tr>
<tr>
<td>White</td>
<td>Less than HS Education</td>
<td>Teacher Age</td>
</tr>
<tr>
<td>Single Female Parent</td>
<td>Special Education</td>
<td>Teacher Salary</td>
</tr>
<tr>
<td>Black</td>
<td>Student Teacher Ratio</td>
<td>Some College</td>
</tr>
<tr>
<td>Single Male Parent</td>
<td>ESL-LEP</td>
<td>Teacher Experience</td>
</tr>
<tr>
<td>Median Family Income</td>
<td>Multi Racial</td>
<td>American Indian</td>
</tr>
<tr>
<td></td>
<td>BS Degree</td>
<td>HS Education</td>
</tr>
<tr>
<td></td>
<td></td>
<td>KG to 1st Ratio</td>
</tr>
</tbody>
</table>
Grade 10 Fall 2007 ISTEP Pass Rates vs Percentage Free-Reduced Lunch Students

(Slope: -0.72% decrease in pass rate per 1% increase in Free/Reduced lunches)

(OLS “best fit” for 334 schools)
Grade 10 Fall 2007 ISTEP Pass Rates vs Percentage Free-Reduced Lunch Students

(y = -0.72 x + 80.0)

(More about Wapahani and Daleville later!)
State Trends in Free/Reduced Lunch Percentages

State Free/Reduced Lunch Enrollment Trends at Grades 3, 6, 8, and 10
Fall 2002-Fall 2007

- Grade 3: 1.6%/yr, $R^2 = 0.97$
- Grade 6: 1.3%/yr, $R^2 = 0.94$
- Grade 8: 1.7%/yr, $R^2 = 0.95$
- Grade 10: 1.9%/yr, $R^2 = 0.98$
State does NOT Control (for) Year to-Year Changes in Free/Reduced Lunches – Grade 10 Trends (2002-2007)
... %/yr Free/Reduced Lunch Trends (2002-2007) for Grade 10 Delaware County Schools ...
Ethnicity Trends

**Ethnicity changes** across grades between 2002 and 2007:

- **White** population ≈ -1%/yr
  83% in grade 10 in 2002
  74% in grade 3 in 2007

- **Hispanic** population grew
  from 4% to 7% grade 3;
  from 3% to 5% in grade 10

- **Black** population stable at
  11-12% over same period
State White Enrollment Trends at Grades 3, 6, 8, and 10
Fall 2002-Fall 2007

- Grade 10: -1.0%/yr, $R^2 = 0.98$
- Grade 8: -1.1%/yr, $R^2 = 0.99$
- Grade 6: -1.0%/yr, $R^2 = 0.97$
- Grade 3: -1.1%/yr, $R^2 = 0.98$
## Number of Students by Grade Level and Ethnicity Below Pass in EnLA and Math (Fall 2007)

<table>
<thead>
<tr>
<th>Grade</th>
<th>White EnLA</th>
<th>White Math</th>
<th>Black EnLA</th>
<th>Black Math</th>
<th>Hispanic EnLA</th>
<th>Hispanic Math</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>11287</td>
<td>14072</td>
<td>3486</td>
<td>4166</td>
<td>1615</td>
<td>1766</td>
</tr>
<tr>
<td>6</td>
<td>13791</td>
<td>9274</td>
<td>4294</td>
<td>3273</td>
<td>1913</td>
<td>1293</td>
</tr>
<tr>
<td>8</td>
<td>15433</td>
<td>12201</td>
<td>4961</td>
<td>4895</td>
<td>1927</td>
<td>1685</td>
</tr>
<tr>
<td>10</td>
<td>15134</td>
<td>15609</td>
<td>5004</td>
<td>5259</td>
<td>1726</td>
<td>1611</td>
</tr>
</tbody>
</table>
Trends in State Pass Rates for Students Passing BOTH (EnLA and Math)

ISTEP Percentage Pass Rates in Grades 3, 6, 8, and 10 for BOTH (EnLA and Math) 2002-2007

- +0.6%/yr
- +1.6%/yr
- +0.9%/yr
- -0.6%/yr

BOTH (EnLA and Math) in Grades 3, 6, 8, and 10
Evidence for Need to Control for Demographics and Changing Demographics

• Characteristics of High Performing (90%) and Low Performing (10%) Schools

• Significant Variables in Predicting Pass Rates

• State Trends in Significant Predictors of Success/Pass Rates
## Average Family, Education, and School Variables Across Grade Levels (3, 6, 8, and 10, N = 2029) of Lowest 10% and Highest 10% Performing Schools

<table>
<thead>
<tr>
<th>Variable</th>
<th>Lowest 10%</th>
<th>Highest 10%</th>
<th>Difference Low-High</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISTEP Pass Rates</td>
<td>36%</td>
<td>85%</td>
<td>-49%</td>
</tr>
<tr>
<td>Free Reduced Lunch</td>
<td>67%</td>
<td>17%</td>
<td>50%</td>
</tr>
<tr>
<td>White</td>
<td>41%</td>
<td>89%</td>
<td>-48%</td>
</tr>
<tr>
<td>Black</td>
<td>36%</td>
<td>2%</td>
<td>34%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>16%</td>
<td>3%</td>
<td>13%</td>
</tr>
<tr>
<td>Multi Racial</td>
<td>6%</td>
<td>3%</td>
<td>3%</td>
</tr>
</tbody>
</table>
### Average Family Marital and Level of Education Variables of **Lowest 10%** and **Highest 10%** Performing Schools

<table>
<thead>
<tr>
<th>Variable</th>
<th>Lowest 10%</th>
<th>Highest 10%</th>
<th>Difference Low-High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married Couple</td>
<td>62%</td>
<td>82%</td>
<td>-20%</td>
</tr>
<tr>
<td>Single Female</td>
<td>30%</td>
<td>13%</td>
<td>17%</td>
</tr>
<tr>
<td>Single Male</td>
<td>8%</td>
<td>5%</td>
<td>3%</td>
</tr>
<tr>
<td>Less than HS Ed</td>
<td>23%</td>
<td>14%</td>
<td>9%</td>
</tr>
<tr>
<td>BS Degree</td>
<td>12%</td>
<td>21%</td>
<td>-9%</td>
</tr>
<tr>
<td>Median Fam Income</td>
<td>$44k</td>
<td>$62k</td>
<td>-$18k</td>
</tr>
</tbody>
</table>
## Average Community - School Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Lowest 10%</th>
<th>Highest 10%</th>
<th>Difference Low-High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metropolitan</td>
<td>70%</td>
<td>22%</td>
<td>48%</td>
</tr>
<tr>
<td>Suburban</td>
<td>16%</td>
<td>46%</td>
<td>-30%</td>
</tr>
<tr>
<td>Town</td>
<td>6%</td>
<td>2%</td>
<td>4%</td>
</tr>
<tr>
<td>Rural</td>
<td>7%</td>
<td>30%</td>
<td>-23%</td>
</tr>
</tbody>
</table>

### Examples
- **Metro**: Muncie, Indianapolis, Kokomo, Lafayette, and Anderson
- **Suburban**: Cowan, Yorktown, Delta, and Hamilton Southeastern
- **Towns**: Marion, Richmond, Logansport, New Castle, and Greensburg
- **Rural**: Wes-Del, Wapahani, Daleville, and Blue River Valley
ISTEP Pass Rates by Community Classifications for Metropolitan, Suburban, Town and Rural Schools

2007 ISTEP Pass Rate Differences from State Average of BOTH for Grades 3, 6, 8, and 10

(Metro starts below state average and “gaps” widen with time)
Regression Methods and Model Development
## Summary of Indiana Public Schools Studied in this Investigation

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>Number of Schools</th>
<th>Range of School Sizes</th>
<th>Average Size</th>
<th>Students per Year in Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>862</td>
<td>30-190</td>
<td>77</td>
<td>67,380</td>
</tr>
<tr>
<td>6</td>
<td>455</td>
<td>30-701</td>
<td>135</td>
<td>62,250</td>
</tr>
<tr>
<td>8</td>
<td>378</td>
<td>30-663</td>
<td>192</td>
<td>74,750</td>
</tr>
<tr>
<td>10</td>
<td>334</td>
<td>30-1084</td>
<td>232</td>
<td>74,350</td>
</tr>
</tbody>
</table>
Might we **Regress** for a bit?

- **Linear Regression** - a technique in which a straight line is fitted to a set of data points to measure the effect of a single independent variable. The slope $m$ of the line is the measured impact of that variable.

  $$y = mx + b = A_0 + A_1 x_1$$

- **Multiple Regression** - a statistical technique that predicts values of one variable on the basis of two or more other variables; our “ISTEP models” are designed to predict ISTEP pass rates based on family, school, and community variables.

  $$y = A_0 + A_1 x_1 + A_2 x_2 + A_3 x_3 + A_4 x_4 + \ldots$$
Regression Equation Predicts **State** Annualized Gains, **School** Grade-Level Pass Rates, & **Controls for Demographics**

\[ y_{ij} = a + \sum_{k=1}^{15} f_k F_{ijk} + \sum_{l=1}^{10} c_l E_{ijl} + g_j d_{2001+j} + e_{ij} \]

*(Family term + Education term + State growth)*

\[ y_{ij} \] is **% pass rate** of i-th school (i = 1, ... 2029) in j-th year (j = 1,6);

\[ F_{ijk} \] is k-th **family variable** (k=1,15) for i-th school in j-th year;

\[ E_{ijl} \] is l-th **education variable** (l=1,10) of i-th school in j-th year;

\[ d_{2001+j} \] is the j-th **state gain variable** (j = 1,6) with \( d_{2002} = 0; \)

\[ e_{ij} \] is **error term** for the i-th school in j-th year;

a, \( f_k \), \( c_l \), and \( g_j \) are **coefficients** of **regression** – the strength effect.
Compare Grade 3 *State Annualized Gains* in Pass Rates to Yearly Gains and Regression Gains (Control for Demographics)

\[ y_{ij} = a + \sum_{k=1}^{15} f_k F_{ijk} + \sum_{l=1}^{10} c_l E_{ijl} + g_j d_{2001+j} + e_{ij} \]

Grade 3 State Annualized Gains in Pass Rates Fall 2002-2007 for BOTH (EnLA and Math) by Raw Data and Regression

Grade 3 – 862 Schools
...... Grade 10 **State Annualized Gains** in Pass Rates
Comparing Yearly Gains and Regression Gains ..........
Model Calculation Examples
(and Leveling the Playfield)

Following are some model calculations for a high performing (90th percentile) rural school, a low performing (5th percentile) metropolitan school, and some local schools from Muncie and Delaware County.
Regression Model Predictions of F2007 BOTH (%) with State Family Variables - Grade 10

<table>
<thead>
<tr>
<th>Regression Variable</th>
<th>CASCADE</th>
<th>INDIANAPOLIS</th>
<th>MUNCIE CENTRAL</th>
<th>MUNCIE SOUTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>75.6</td>
<td>75.6</td>
<td>75.6</td>
<td>75.6</td>
</tr>
<tr>
<td>d-2007 (year)</td>
<td>2.7</td>
<td>2.7</td>
<td>2.7</td>
<td>2.7</td>
</tr>
<tr>
<td>Spec Ed</td>
<td>-4.8</td>
<td>-5.8</td>
<td>-7.4</td>
<td>-6.7</td>
</tr>
<tr>
<td>Free Reduced</td>
<td>-3.5</td>
<td>-27.6</td>
<td>-21.9</td>
<td>-29.7</td>
</tr>
<tr>
<td>Black</td>
<td>0.0</td>
<td>-16.7</td>
<td>-5.9</td>
<td>-3.4</td>
</tr>
<tr>
<td>Asian</td>
<td>4.3</td>
<td>0.9</td>
<td>2.4</td>
<td>0.0</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.0</td>
<td>-0.5</td>
<td>-0.1</td>
<td>0.0</td>
</tr>
<tr>
<td>White</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Prediction</td>
<td>74.3</td>
<td>28.0</td>
<td>45.5</td>
<td>38.6</td>
</tr>
<tr>
<td>Actual</td>
<td>74.6</td>
<td>27.2</td>
<td>46.2</td>
<td>38.5</td>
</tr>
<tr>
<td>Difference</td>
<td>0.3</td>
<td>-0.8</td>
<td>0.8</td>
<td>-0.1</td>
</tr>
<tr>
<td>State Percentile</td>
<td>90</td>
<td>5</td>
<td>14</td>
<td>8</td>
</tr>
</tbody>
</table>
Muncie Central HS Model Prediction (in red) and Trend Data (2002-2007) ..... with Fall 2008 Result

Grade 10 Central HS and Predicted Pass Rate of BOTH (EnLA and Math) with State Family Variables 2002-2007

- Muncie Central
- State Predicted
- Fall 2008

Linear (Muncie Central)
Linear (State Predicted)

Raw Gain
\[ y = -1.97x + 54.23 \]

Predicted Gain
\[ y = -1.12x + 47.86 \]
Muncie Southside HS Model Prediction (in red) and Trend Data (2002-2007) ..... with Fall 2008 Result

Grade 10 Southside HS and Predicted Pass Rate of BOTH (EnLA and Math) with State Family Variables 2002-2007

- Muncie Southside (Blue)
- State Predicted (Red)
- Fall 2008 (Green)

Raw Gain
\[ y = -0.25x + 38.73 \]

Predicted Gain
\[ y = -0.47x + 41.34 \]
... Delta HS Model Prediction (in red) with Actual Trend Data ... and with Fall 2008 Result

Grade 10 Delta HS and Predicted Pass Rate of BOTH (EnLA and Math) with State Family Variables 2002-2007

- Delta HS
- State Predicted
- Fall 2008

Linear (Delta HS)

Linear (State Predicted)

Raw Gain
\[ y = -0.43x + 65.34 \]

Predicted Gain
\[ y = -0.24x + 66.70 \]
... Yorktown HS Model Prediction (in red) and Actual Trend Data ... with Fall 2008 Result
Muncie Northside Grade 8 Prediction (in red), Actual Trend Data, Fall 2008, Spring 2009 and 2010 Results ... and 2011 Predictions

Grade 8 Northside MS and Predicted Pass Rate of BOTH (EnLA and Math) with State Family Variables 2002-2007

- Muncie Northside MS
- State Predicted
- F08, S09, S10
- + Sigma Band
- - Sigma Band

Raw Gain
\[ y = -0.38x + 52.47 \]

Predicted Gain
\[ y = 1.38x + 44.46 \]
Muncie Wilson Grade 8 Prediction (in red), Actual Trend Data, Fall 2008, Spring 2009 and 2010 Results ... and 2011 Predictions
The Case for Regression Analysis and Controlling for Changing Student Demographics over Multiple Years
Summary: State and Local Policy

• Indiana's Performance and Improvement criteria (PL 221 and NCLB) do not control for changing demographics. OLS identifies 22% of schools with stat sig gains; by controlling for demographics, Regression Analysis identifies an additional 100 schools (5%) with stat sig gains.

• Current study demonstrates that schools are being unfairly judged in determining Academic Yearly Progress when it is known that factors outside the control of teachers and administrators are the largest factors determining their pass rates.

• Schools are being closed, administrators are being replaced and teachers are being unfairly evaluated without using five to six years of trend data or controlling for demographics.
What do the results of this study suggest should be done to improve Performance and Improvement?

- "Lifelong Learning" must begin at “pre-preK” and be the highest priority of parents through grade 12 (and even grade 16)
- Identify at-risk students in preK and K to better prepare them to learn at rates equal to their grade 1 peers
- Increase resources for preK and K programs, or reallocate more resources to this need; this recommendation is consistent with data and research to either “pay me now, or pay me later.”
- The parent(s) of at-risk students must be challenged and/or motivated to take greater responsibility and assume more active roles in the education of their students; will a Parent’s Pledge or a Family Covenant help?
Quote from a “Famous” Football Coach

• “If there were ever areas in which we seem to have switched the price tags, it is in the areas of education and athletics.”

• “If we could choose the future of our young sons, how many of them (parents) would choose that they get a Ph.D. in physics over becoming the starting shortstop for the New York Yankees?”

......... Coach Tony Dungy
(whose Parents were both Teachers)
Thank You for Your Attention

Questions?
Slides NOT USED
Carmel HS Grade 10 Prediction (in red) and Actual Trend Pass Rates (in blue) of BOTH for 2002-2007

Carmel HS Grade 10 Predicted BOTH Pass Rate with State Family & School Variables 2002-2007

Year

2001  2003  2005  2007

Percentage Pass Rate BOTH (EnLA and Math)

100
90
80
70
60
50
40
30

Raw Gain
\[ y = -0.03x + 90.24 \]

Predicted Gain
\[ y = -0.19x + 93.09 \]
Hamilton SE HS Grade 10 Prediction (in red) and Actual Trend Pass Rates (in blue) of BOTH for 2002-2007

- **Hamilton SE HS**: 
  - **Raw Gain**: $y = -0.11x + 84.85$
  - **Predicted Gain**: $y = -0.65x + 87.27$

- **State Predicted**
Burris HS Grade 10 Prediction (in red) and Actual Trend Pass Rates (in blue) of BOTH for 2002-2007
Burris MS Grade 8 Prediction (in red) and Actual Trend Pass Rates (in blue) of BOTH for 2002-2007
Burris MS Grade 6 Prediction (in red) and Actual Trend Pass Rates (in blue) of BOTH for 2002-2007
Burris ES Grade 3 Prediction (in red) and Actual Trend Pass Rates (in blue) of BOTH for 2002-2007

Burris ES Grade 3 ISTEP Model Predictions of BOTH Pass Rates - Family Variables F2002-F2007

\[ y = 0.165 \times + 69.4 \]  
Actual

- Actual
- Model
- Fall 2008
- Spring 2009