NEW AND POWERFUL WAYS TO MEASURE LEARNING

A Presentation to
MSBA/MASA Annual Conference

Bill Elder and Howard Jones
Office of Social and Economic Data Analysis
University of Missouri
October 22, 2010
SESSION GOALS

• Explore the power of data to inform instructionally relevant decisions – Getting focused.

• Explore different ways of looking at student performance to view progress over time at the district, school, class and individual student levels – “Growth Models”
Office of Social and Economic Data Analysis
University of Missouri

- Data
- Information
- Knowledge
- Wisdom

“The construction of knowledge involves more the orderly loss of information than it’s meaningless accumulation.”

-- Kenneth Boulding

Http://WWW.OSEDA.MISSOURI.EDU
OSEDA Mission:

Collaborate with partners to conduct analysis that contributes to improvements in the health, education and well-being of people and communities in Missouri and the world.
Utilization Focused Information

“Answers” are “useful” when they reduce the risks of making the wrong decision.

To know you have asked the “right” questions and produced “useful” answers….focus on decision makers and decision-making ….. In particular…

Instructional decision-making …. Governance, Administration, Teachers Parents and Students
Educational Decision-Making

• **Formative**
  – “Improve”
  – Periodic and timely
  – Focus on program activities and outputs
  – Leads to early recommendations for program improvement

• **Summative**
  – “Prove”
  – Were resources committed worthwhile?
  – Focus on outcomes and impact
  – Measures value of program based on impact
"Summative" Result

Plotting a Course ➔ Estimating Position ➔ Choosing and Getting to Port
(Making a plan) (Where we might be) (Where we’re going)

Taking a “FIX”
(Where we really are)
“Set and Drift”

Adjusting Course

“Formative” Information

OSEDA Office of Social and Economic Data Analysis

University of Missouri Extension
Challenging Times….

The MSIP Educational Framework

- Resources
- Processes
- Performance

Demographic Context
Educational Resources
## Maximum Calendar Days and Hours, 2005-2009

<table>
<thead>
<tr>
<th>Year</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Calendar Days</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year</td>
<td>2005</td>
<td>2006</td>
<td>2007</td>
<td>2008</td>
<td>2009</td>
</tr>
<tr>
<td><strong>Total Calendar Hours</strong></td>
<td>1,095</td>
<td>1,100</td>
<td>1,099</td>
<td>1,092</td>
<td>1,095</td>
</tr>
<tr>
<td><strong>Length of the Day (Hours)</strong></td>
<td>6.2</td>
<td>6.2</td>
<td>6.2</td>
<td>6.3</td>
<td>6.3</td>
</tr>
</tbody>
</table>
Demographic Context
Quick Review of Demographics

Numeric Change in Population for States and Puerto Rico:
April 1, 2000 to July 1, 2009

U.S. Increase  9%
Missouri  7%
Six States account for 55%

Total Population 2009
World:  6.8 Billion
U.S.:    307 Million
Mo.:   5,987,580
Diverse Trends: Regions within Regions – and within urban areas
Challenging Times....
Challenging Times ... Regional Differences

Unemployment Rates - August 2010
Not Seasonally Adjusted

Unemployment Rate
- 11.2% - 13.4%
- 10.1% - 11.1%
- 9.0% - 10.0%
- 7.8% - 8.9%
- 6.2% - 7.7%
State Avg: 9.4%
Patterns of Growth

Percent Change in Total Population by County, 2000-2009

Missouri = 7.0%

Map Prepared By: University of Missouri Extension. Office of Social and Economic Data Analysis (OSEDA)
Map Generated On: 15 Jun 2010
Patterns of Growth

K-12 Relative Density of Student Enrollment by School District, 2010

Data Source: Department of Elementary and Secondary Education, 2010
Map Prepared By: University of Missouri Extension, Office of Social and Economic Data Analysis (OSEDA)
Map Generated On: 21 Sep 2010

University of Missouri Extension
Expanding Stakeholder Groups

African American Population, 2009

Legend
- 1 Dot = 10 People

Missouri = 713,001

Data Source: U.S. Census Bureau, Population Division, Population Estimates, 2010
Map Prepared By: University of Missouri Extension, Office of Social and Economic Data Analysis (OSEDA)
Map Generated On: 26 Sep 2010

Office of Social and Economic Data Analysis

University of Missouri Extension
Latino Growth

Hispanic or Latino Population, 2009

Legend
1 Dot = 10 People

Missouri = 203,907

Data Source: U.S. Census Bureau, Population Division, Population Estimates, 2010
Map Prepared By: University of Missouri Extension, Office of Social and Economic Data Analysis (OSEDA)
Map Generated On: 23 Sep 2010
Missouri Kids Count, 2009 Composite County Rankings

Composite Rankings

- 1 - 23
- 24 - 46
- 47 - 69
- 70 - 92
- 93 - 115

Data Source: Missouri Kids Count, 2009
Map Prepared By: University of Missouri Extension, Office of Social and Economic Data Analysis (OSEDAA)
Map Generated On: 02 Feb 2010
New Census Estimates

On the Brink of New Data

• New American Community Survey
• New (5 year) ACS in December
• New 2010 counts in December
• Be careful with small areas
  – Plus and Minus of Estimates is large
Educational Processes
Professional Practice
The Advance Questionnaire (AQ)

- Perceptual data obtained through a questionnaire(s)
- Provides a voice for all key stakeholder groups
- Includes questions based on critical research-based elements
- Allows development of additive scales consistent with Effective Schools Research
Selected Additive Scales/Definitions

• **Leadership:** This scale identifies the degree to which leadership is perceived as effective in improving student learning.

• **School Climate:** This scale identifies the degree to which all students feel respected and valued.

• **Efficacy and Expectations:** This scale identifies the degree to which teachers and students believe that they are capable of impacting student achievement.
Efficacy/Expectations Scale
(Faculty)

1. There are effective supports in place to assist students who are in jeopardy of academic failure.

2. I emphasize the importance of effort with students.

3. I have the skills necessary to meet the needs of all learners in my classroom.

4. I believe that I can positively impact student performance.
**FACULTY:** Efficacy & expectations explains 10.9% of the variance in communication arts achievement
Efficacy/Expectations Scale (Students)

1. If I do well in school, it will help me when I grow up.
2. Being successful in school today will help me in my future.
3. I can do well in school.
4. I learn a lot in this school.
Efficacy/Expectations Scale
(Students)

5. My teachers think I can learn.
6. My family believes that I can do well in school.
7. My teachers expect very good work from me.
STUDENTS: Efficacy & expectations explains 17.2% of the variance in communication arts achievement.
CLASSROOM OBSERVATION TOOL

• Provides a means to maintain a longitudinal record of prevailing instructional practice

• Provides a means to look at instructional practice by subject area, grade level, school, etc.

• Provides a means to examine instructional leadership within each school
Educational Performance

Student Growth Models

Student Growth Percentiles
PERFORMANCE DATA

• Annual Performance Report (APR)
• APR and AYP disaggregated by gender, race, free and reduced lunch, etc.
• MAP/EOC Results
• Benchmark or Common Assessments
• Student Growth Data
Growth Models Explored to Date

- Missouri AYP “Increment” Model
- Student Growth Percentiles using R (SGP)
- Hierarchical Linear Models (HLM)
- Ordinary Square Regression (OLS)
- Mixed Models

All of these have advantages depending on the question and the audience
Spearman’s Rho Correlations of Growth Percentiles among Growth Models

Data: MAP 2006-2008 Communication Arts, Cohort Grade 5 in 2008 (N=56,231)

<table>
<thead>
<tr>
<th>Growth Models</th>
<th>SGP</th>
<th>HLM</th>
<th>OLS</th>
<th>Mixed Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGP_Betebenner</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HLM</td>
<td></td>
<td>.990</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>OLS</td>
<td>.986</td>
<td></td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Mixed Model</td>
<td>.986</td>
<td>.989</td>
<td>.999</td>
<td>1.000</td>
</tr>
</tbody>
</table>

*Note.* SGP = Student Growth Percentile; HLM = Hierarchical Linear Modeling; OLS = Ordinary Least Squares.
What is a Student Growth Percentile (SGP)?

- A student’s progress compared to other students with similar MAP score history
- A student’s growth percentile indicates the percentage of students, starting at the same place, that the student’s growth exceeded
- Typical growth is equal to 50th percentile
- Similar to pediatric growth charts
Questions Answered by Growth Model

• How much growth did a child make in one year? (What is?)

• How much growth is enough to reach proficient or advanced? (What should be?)

• How much growth is the best in Missouri (What could be?)
Relationship of Status to Growth

- High Status, High Growth
- High Status, Low Growth
- Low Status, Low Growth
- Low Status, High Growth

Achievement Level (Status)

Low → Low Growth → High Growth → High
A growth plan for every student

Expanding to include more current Benchmark and Authentic Assessment
Student Growth versus 2007 Student Achievement by Free/Reduced Lunch Percentage

Percent Free/Reduced Lunch:
- Less than 20 percent
- 20 to 40 percent
- 40 to 60 percent
- 60 to 80 percent
- More than 80 percent

School Size:
- 50 Students
- 100 Students
- 200 Students
- 500 Students
- 1,000 Students

- Sustaining
- Excelling
- Underperforming
- Improving
What is Next -- Pilots

• Explore Various Types of Growth Models

• Explore Student Growth Percentiles to Inform Instructional Decision-making

• Explore Practical Data Visualization Options for Student Growth Percentiles
  – Missouri Pilot Project 2010-2011
  – Include Benchmark and Local Assessments
The Colorado Growth Model

Explore Growth and Achievement of Colorado Districts and Schools

Colorado Growth Model Quickstart (Video)
Short video guiding users through the kinds of data displays available to the public accessing school level data in the Colorado Growth Model.

Frequently Asked Questions

This set of frequently asked questions will help you to understand more about how the Colorado Growth Model works.

- General Growth Model FAQs
- Public Growth Model FAQs
COLORADO GROWTH MODEL RESOURCES

http://www.schoolview.org/learningcenter.asp
CONCLUDING THOUGHTS YOURS AND OURS

• What about leadership?
• How can we make evidence based instructional decision making more accessible and meaningful?
THE POWER OF DATA ANALYSIS TO INFORM IMPROVEMENT

A Presentation to
MSBA/MASA Annual Conference

Bill Elder and Howard Jones
Office of Social and Economic Data Analysis
University of Missouri
October 22, 2010