# Statistical Peer Groups:
## Creating Demographically Similar Peer Groups of Schools to Aid School Improvement Efforts

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Discussion draft—analyses not final

# Agenda for Today's Presentation

- Overview of the Statistical Peer Groups Project
  - Overview and purpose
  - Analysis methods
  - Initial results
- Audience Participation!
  - Validation Check and Feedback for:
    - Inputs used in the analysis
    - Additional contexts to consider

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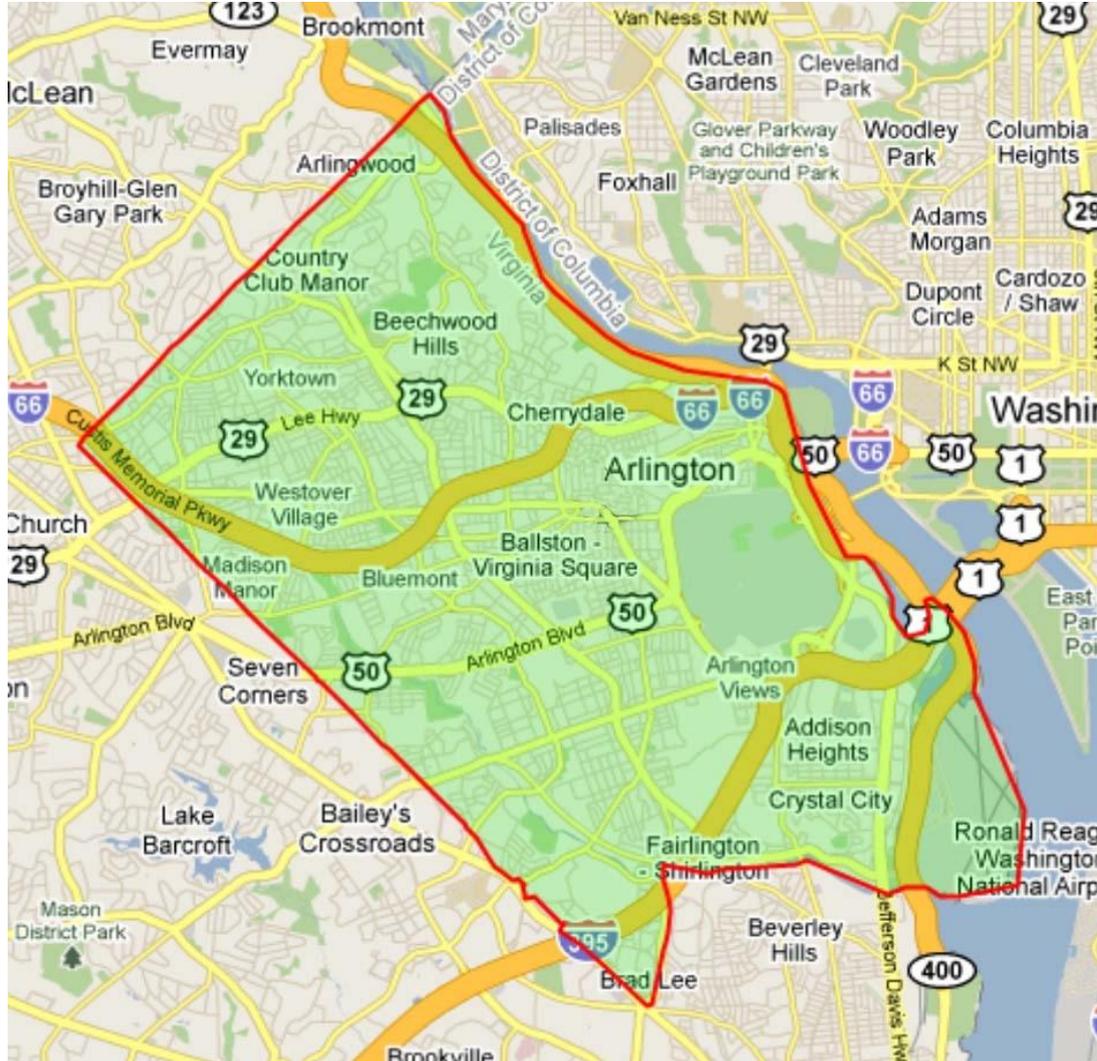
# What I Learned from the 4th Grade Social Studies SOLs

**Virginia is diverse regionally and culturally.**

- Virginia has 5 geographic regions.
- Virginia has 95 counties and 38 independent cities… So that's 133 school divisions!
- Virginia Department of Education groups the divisions into 8 regions.

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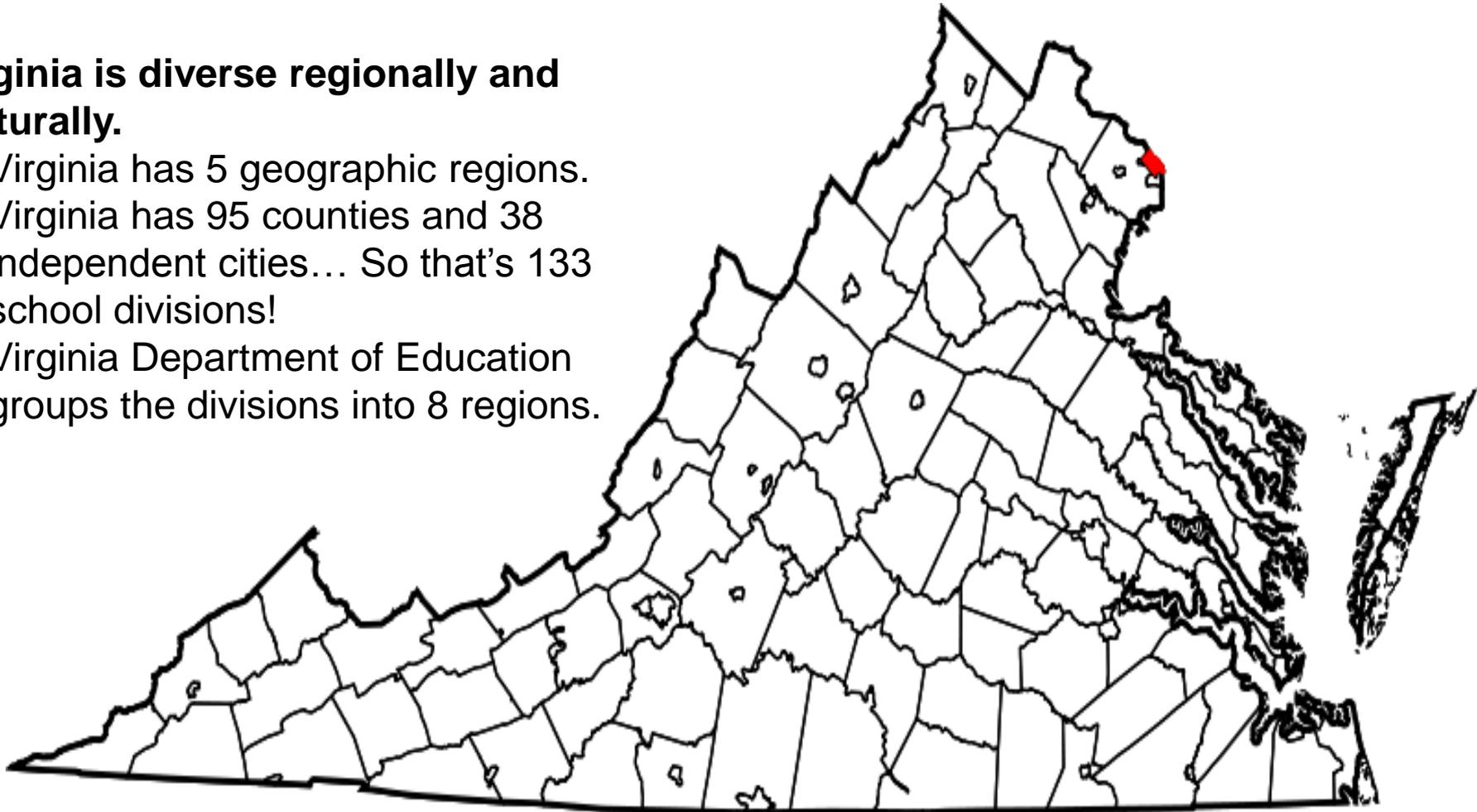
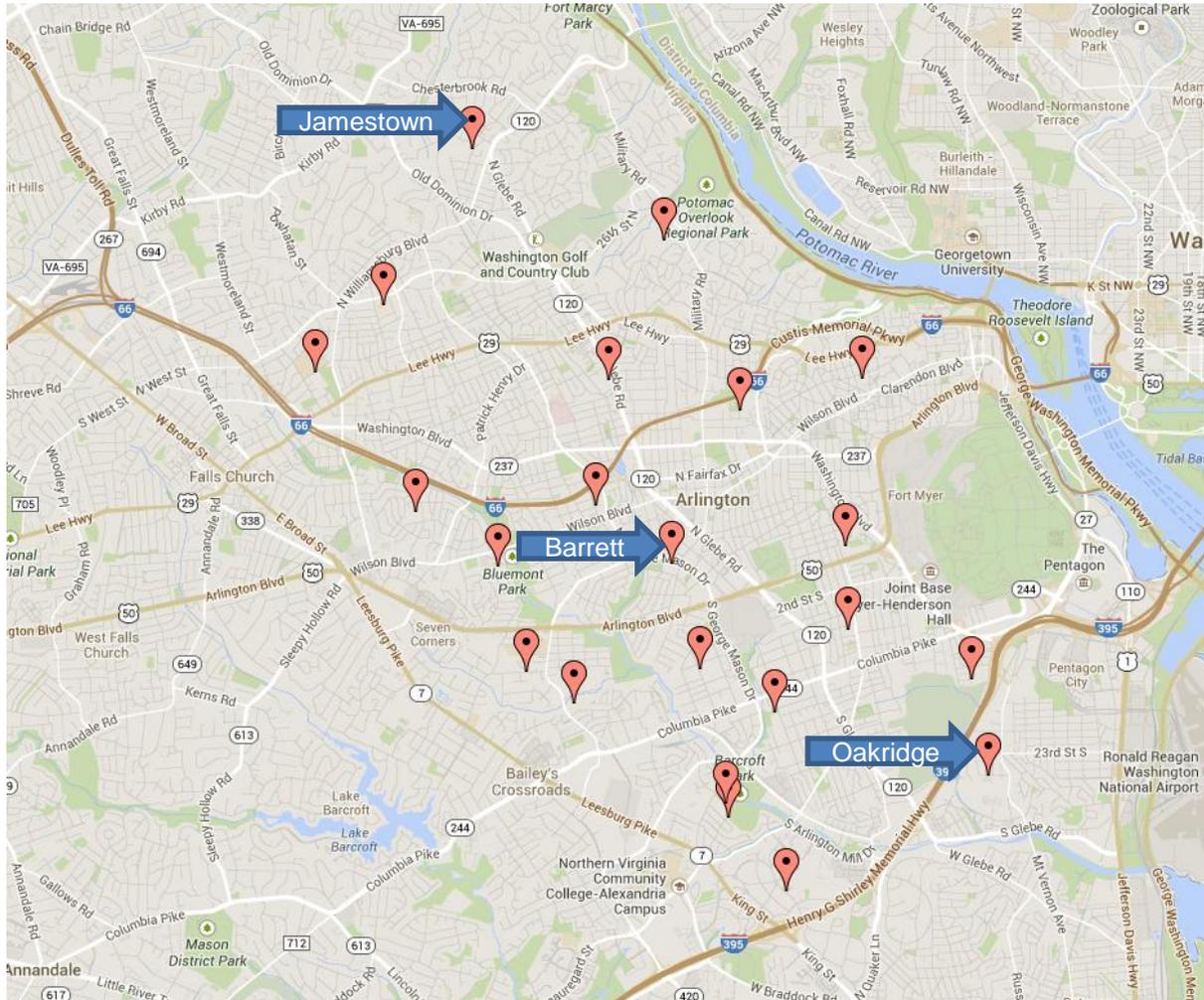# Arlington County: A Multi-tasker

It's a county!

It's a city!



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# Arlington Public School:
# 22 Elementary Schools



**Other Elementary Schools in Arlington**

Abingdon
Arlington Science Focus
Arlington Traditional
Ashlawn
Barcroft
Campbell
Carlin Springs
Claremont Immersion
Drew Model
Glebe
Henry
Hoffman-Boston
Key Immersion
Long Branch
McKinley
Nottingham
Randolph
Taylor
Tuckahoe

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# Arlington Elementary School: Report Card

| | Jamestown | Barrett | Oakridge |
|---|---|---|---|
| **Percent Passed English: Overall**<br>(2012-2013 cohort; Source: School report card) | 89 | 73 | 74 |
| -    By White | 89 | 96 | 83 |
| -    By Economically Disadvantaged | < | 50 | 52 |
| -    By Limited English Proficient | < | 54 | 66 |
| **Percent Passed Math: Overall**<br>(2012-2013 cohort; Source: School report card) | 92 | 77 | 76 |
| -    By White | 91 | 89 | 81 |
| -    By Economically Disadvantaged | < | 61 | 65 |
| -    By Limited English Proficient | < | 66 | 67 |
| **Percent Passed 3rd grade Reading: Overall**<br>(2012-2013 cohort; Source: School report card) | 82 | 62 | 75 |
| -    By White | 81 | 94 | 83 |
| -    By Economically Disadvantaged | < | 38 | 55 |
| -    By Limited English Proficient | < | 45 | 70 |

# Inputs versus Outputs/ Outcomes

## Inputs

- Exogenous… Schools cannot change these things.

- Examples:
  - Race/ ethnicity
  - Economically disadvantaged
  - Limited English proficient
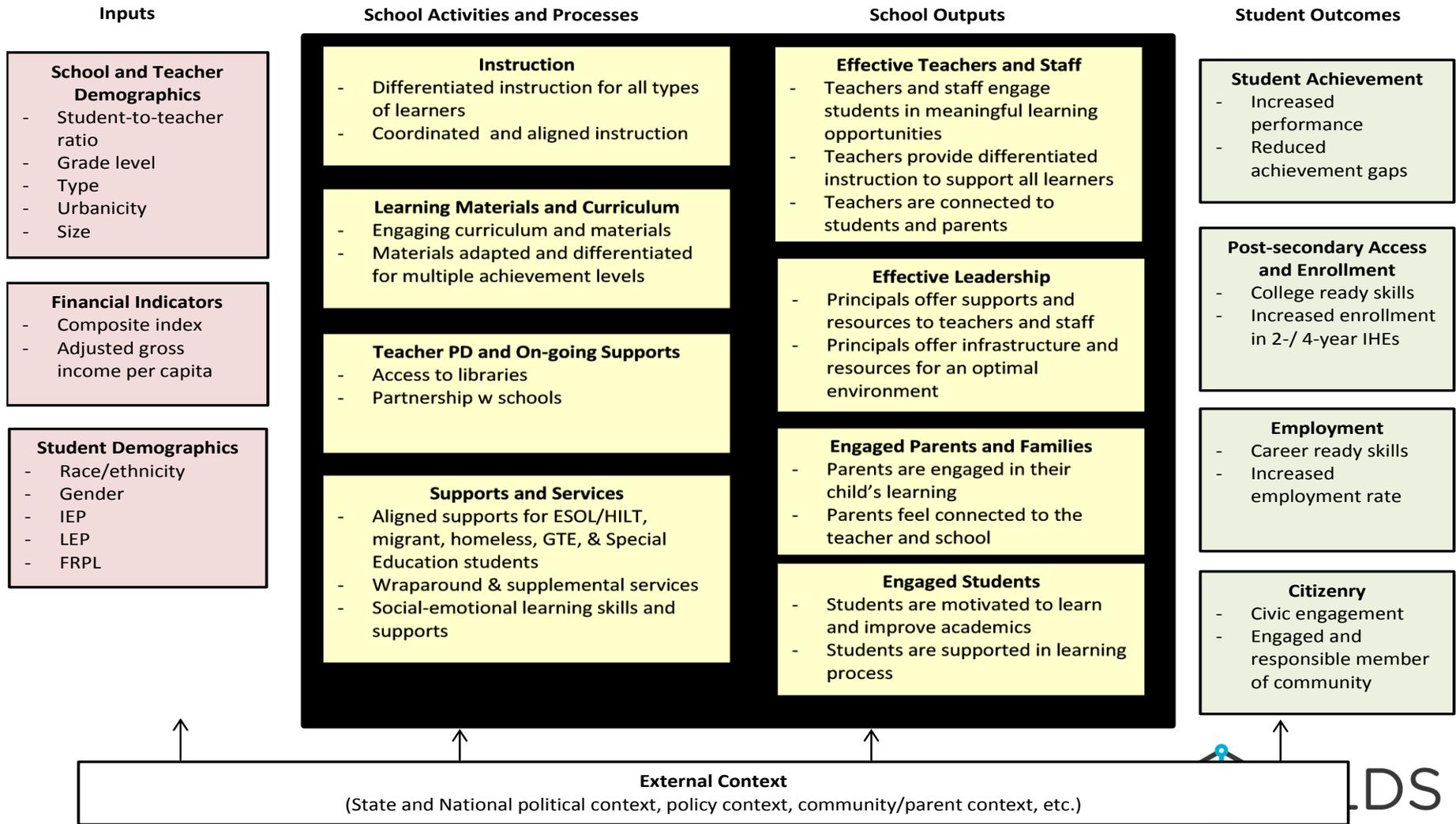
## Outputs/ Outcomes

- Endogenous… Schools CAN change these things.

- Examples:
  - 3rd grade reading scores
  - English scores
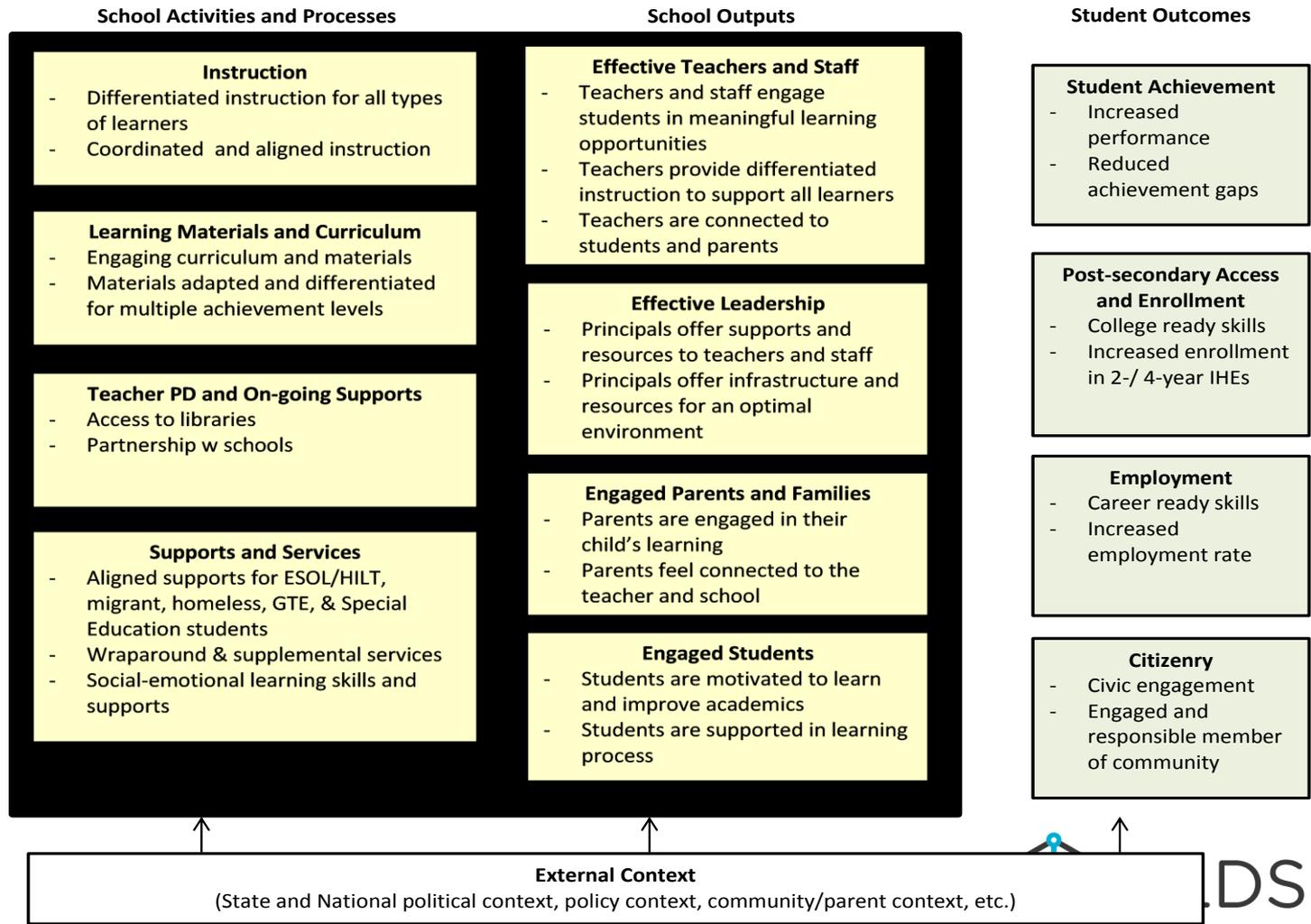  - Math scores

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# Apples To Apples?

# Can we compare these three elementary schools?

# School Improvement Efforts: A Complex System and Process

| Inputs | School Activities and Processes | School Outputs | Student Outcomes |
|---|---|---|---|

**Inputs**

**School and Teacher Demographics**
- Student-to-teacher ratio
- Grade level
- Type
- Urbanicity
- Size

**Financial Indicators**
- Composite index
- Adjusted gross income per capita

**Student Demographics**
- Race/ethnicity
- Gender
- IEP
- LEP
- FRPL

**School Activities and Processes**

**Instruction**
- Differentiated instruction for all types of learners
- Coordinated and aligned instruction

**Learning Materials and Curriculum**
- Engaging curriculum and materials
- Materials adapted and differentiated for multiple achievement levels

**Teacher PD and On-going Supports**
- Access to libraries
- Partnership w schools

**Supports and Services**
- Aligned supports for ESOL/HILT, migrant, homeless, GTE, & Special Education students
- Wraparound & supplemental services
- Social-emotional learning skills and supports

**School Outputs**

**Effective Teachers and Staff**
- Teachers and staff engage students in meaningful learning opportunities
- Teachers provide differentiated instruction to support all learners
- Teachers are connected to students and parents

**Effective Leadership**
- Principals offer supports and resources to teachers and staff
- Principals offer infrastructure and resources for an optimal environment

**Engaged Parents and Families**
- Parents are engaged in their child's learning
- Parents feel connected to the teacher and school

**Engaged Students**
- Students are motivated to learn and improve academics
- Students are supported in learning process

**Student Outcomes**

**Student Achievement**
- Increased performance
- Reduced achievement gaps

**Post-secondary Access and Enrollment**
- College ready skills
- Increased enrollment in 2-/ 4-year IHEs

**Employment**
- Career ready skills
- Increased employment rate

**Citizenry**
- Civic engagement
- Engaged and responsible member of community

**External Context**
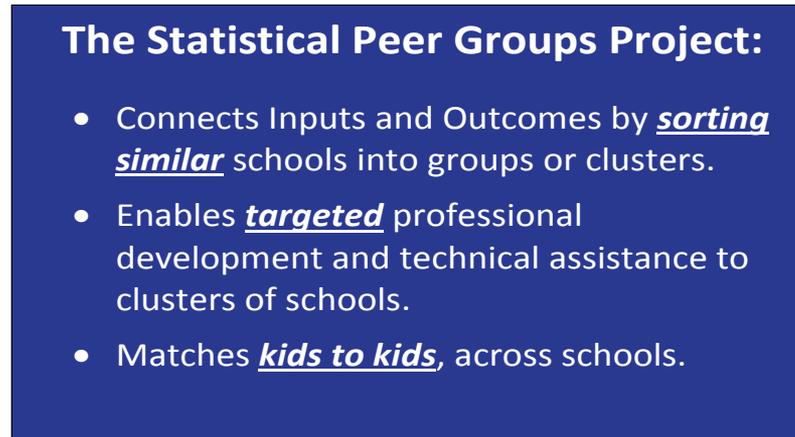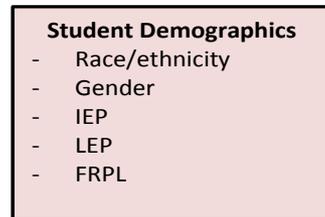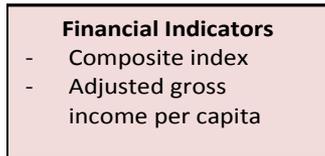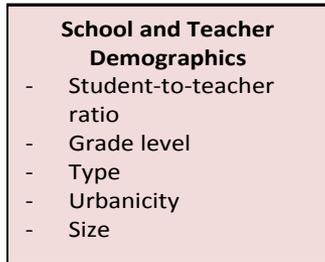(State and National political context, policy context, community/parent context, etc.)

# School Improvement Efforts: Working Inside the "Black Box"

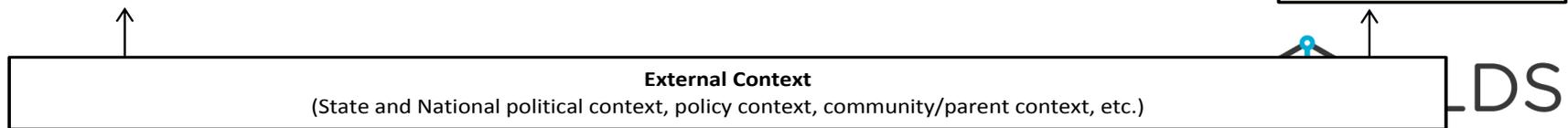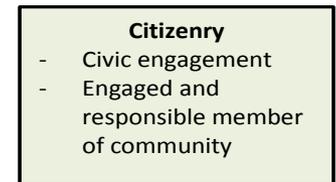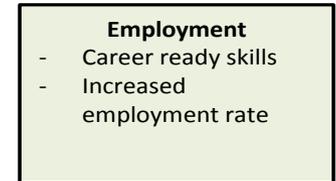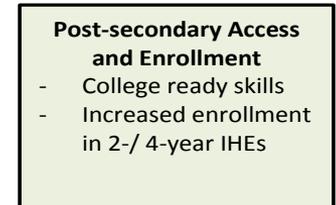**School Activities and Processes**

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### Citizenry
- Civic engagement
- Engaged and responsible member of community

**External Context**
(State and National political context, policy context, community/parent context, etc.)

# School Improvement Efforts: Focusing on Inputs

**Inputs**

**School and Teacher Demographics**
- Student-to-teacher ratio
- Grade level
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- Urbanicity
- Size

**Financial Indicators**
- Composite index
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**Student Demographics**
- Race/ethnicity
- Gender
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**The Statistical Peer Groups Project:**

- Connects Inputs and Outcomes by *sorting similar* schools into groups or clusters.
- Enables *targeted* professional development and technical assistance to clusters of schools.
- Matches *kids to kids*, across schools.

**Student Outcomes**

**Student Achievement**
- Increased performance
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**Post-secondary Access and Enrollment**
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# Why Statistical Peer Groups?

- Support school improvement efforts:
  - Target professional development and technical assistance efforts to similar groups of schools
  - Compare student outcomes with other schools serving similar student populations
  - Rapidly identify promising practices in the field

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# Statistical Peer Groups: Analytic Goal

- Identify groups of schools that serve demographically similar student populations by:

  – Identifying school inputs

  – Conducting cluster analysis of all schools in Virginia focusing on school inputs

  – Validating results with multiple stakeholders

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# Four Analytic Steps

- Step 1: Review of Methods

- Step 2: Selection of School Inputs

- Step 3: Cluster Analysis

- Step 4: Expert Validation Check

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# Step 1: Review of Methods

## School Input Variables

- School and Teacher Demographic Information
  - Student-to-teacher ratio, grade level, type, urbanicity, size
- School Finance
  - Composite index, adjusted gross income per capita
- Student Demographic Information
  - Race/ethnicity, gender, SWD, LEP, FRPL

## Analytic Method

- Propensity Score Matching
  - New Jersey Dept. of Educ.
- Peer Index Algorithm
  - New York City Dept. of Educ.
- Weighted Student Demographics
  - U.S. Dept. of Educ.
- Cluster Analysis
  - Albuquerque School District
  - Georgia Dept. of Educ.

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# Step 1: Review of Methods

## School Input Variables

- School and Teacher Demographic Information
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# Step 2: Selection of School Inputs

- Development of available school-based inputs

- Feedback from multiple stakeholders for expert validity check
  - Policymakers, practitioners, researchers
  - Past research on peer groups
  - Refinement after initial analysis

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# Step 3: Cluster Analysis

- Separate analysis for elementary, middle, and high school levels

- Two-step analysis:

  – Select number of clusters (groups of schools)

     1. Refinement of analytic model: Number of clusters

  – Select schools within each cluster

     1. Refinement of analytic model: List of variables

     2. Refinement of sample: Number of schools within each cluster

# Step 4: Expert Validation Check

**Part 1: Initial Analysis with School Inputs Only**

- Overall results
  - Are there the "right" number of clusters?
  - Are there the "right" number of schools per cluster?
- Cluster by cluster results
  - Are schools within the same cluster similar demographically?
  - Are there other variables we should include in the analysis?

**Part 2: Final Analysis with Performance Data**

- Overall results
  - Performance data should vary between clusters
  - Performance data should vary within clusters
- Cluster by cluster results
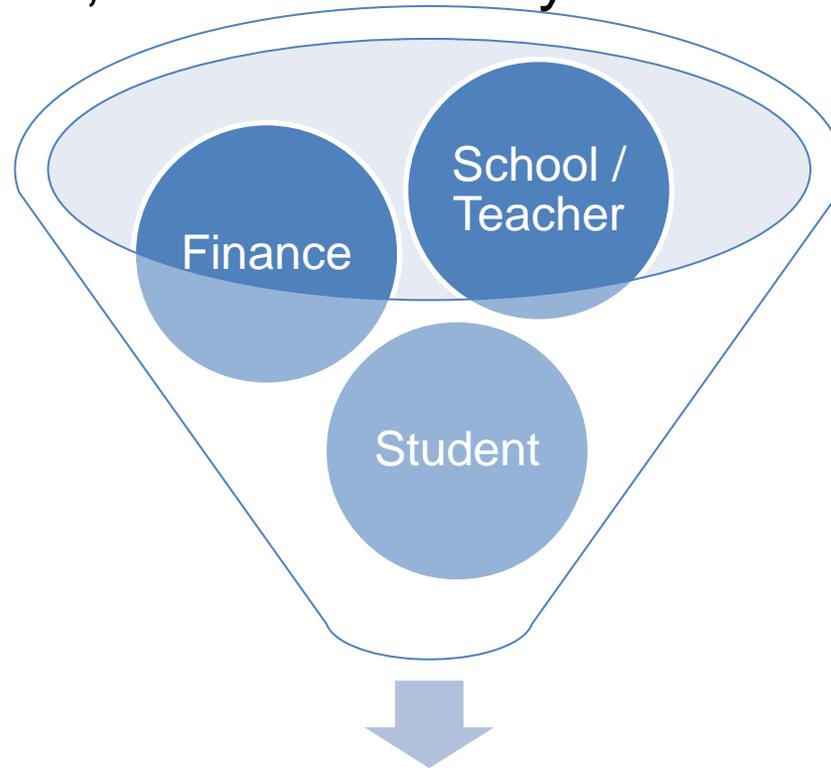  - Rank order schools within each cluster by performance data

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# Part 1 Validation Check: Initial Analysis

## Audience Participation
We welcome your feedback!

# Elementary Schools

1,154 Elementary Schools



20 Clusters of Schools

# Descriptive Information per Cluster

**-- See Handout --**

| Peer Group Number | Total Cluster Members | Fall Student Membership | Black (%) | Hispanic (%) | White (%) | SWD (%) | LEP (%) | FRL (%) | Division Composite | Adjusted Gross Income (Per Capita) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 97 | 473.0 | 72.2 | 7.9 | 13.8 | 12.9 | 4.0 | 82.2 | 0.353 | $18,873 |
| 2 | 55 | 268.7 | 8.1 | 4.9 | 83.6 | 15.9 | 2.1 | 73.8 | 0.287 | $15,655 |
| 3 | 39 | 418.5 | 48.2 | 11.4 | 35.3 | 11.7 | 8.2 | 75.6 | 0.367 | $17,317 |
| 4 | 28 | 512.7 | 74.7 | 6.0 | 14.6 | 11.4 | 2.6 | 81.2 | 0.333 | $21,232 |
| 5 | 58 | 605.9 | 19.6 | 54.4 | 15.2 | 10.8 | 49.1 | 76.3 | 0.491 | $34,898 |
| 6 | 97 | 328.4 | 7.7 | 3.3 | 85.2 | 14.1 | 0.7 | 55.2 | 0.338 | $18,435 |
| 7 | 48 | 377.8 | 10.5 | 4.7 | 79.2 | 13.3 | 1.2 | 53.2 | 0.336 | $17,727 |
| 8 | 66 | 503.0 | 28.0 | 9.2 | 53.4 | 13.2 | 4.6 | 46.0 | 0.426 | $26,061 |
| 9 | 36 | 662.9 | 22.7 | 35.3 | 27.5 | 11.0 | 27.0 | 49.2 | 0.404 | $31,819 |
| 10 | 102 | 503.0 | 30.8 | 10.1 | 47.6 | 10.8 | 3.2 | 49.8 | 0.363 | $20,431 |
| 11 | 78 | 636.9 | 23.1 | 8.4 | 61.1 | 10.5 | 3.0 | 46.7 | 0.344 | $22,264 |
| 12 | 19 | 749.8 | 18.8 | 15.7 | 54.2 | 0.6 | 6.2 | 32.0 | 0.356 | $29,103 |
| 13 | 76 | 378.5 | 8.0 | 8.5 | 78.1 | 8.4 | 4.4 | 46.3 | 0.407 | $23,929 |
| 14 | 49 | 846.7 | 5.9 | 8.4 | 48.3 | 8.1 | 11.1 | 9.5 | 0.604 | $44,866 |
| 15 | 74 | 641.1 | 9.2 | 8.0 | 70.4 | 11.2 | 4.2 | 14.9 | 0.384 | $28,644 |
| 16 | 79 | 591.5 | 6.2 | 13.5 | 59.9 | 12.6 | 12.2 | 13.7 | 0.650 | $47,173 |
| 17 | 35 | 592.4 | 7.7 | 7.3 | 71.6 | 8.8 | 3.6 | 16.0 | 0.511 | $32,879 |
| 18 | 49 | 483.0 | 7.4 | 5.2 | 80.6 | 10.1 | 1.8 | 20.2 | 0.469 | $30,330 |
| 19 | 50 | 631.0 | 13.7 | 35.2 | 29.8 | 12.8 | 36.8 | 44.9 | 0.673 | $47,669 |
| 20 | 19 | 603.8 | 19.0 | 34.2 | 35.3 | 13.1 | 32.6 | 48.1 | 0.800 | $53,134 |

# Divisions are in Multiple Cluster Groups

**-- See Handout --**

- Arlington Public School
  - 22 elementary schools     →      3 clusters
- Mecklenburg County Public School
  - 4 elementary schools      →      3 clusters
- Fairfax County Public School
  - 140 elementary schools  →      5 clusters
- Chesterfield County Public School
  - 38 elementary schools     →      7 clusters

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# Next Steps

- Obtain stakeholder feedback/ validation check on inputs

- Re-run analysis to create clusters of schools

- Connect performance data to each school within clusters

- Obtain stakeholder feedback/ validation check

- Finalize results and reporting

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# Illustrative Example of Performance Indicators within Each Cluster

| Cluster | Division Name | School Name | % Non-White | % ED | School size | % Advanced Diploma | % Grad Rate | % Fail Alg II | % Fail English |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Atlanta Public Schools | Booker T. Washington High School - Banking, Finance and Investment | | | | | | | |
| 1 | Atlanta Public Schools | Washington High School Senior Academy | | | | | | | |
| 1 | Bibb County | Southwest High School | | | | | | | |
| 1 | Bibb County | William S. Hutchings Career Center | | | | | | | |
| 1 | Chatham County | Beach High School | | | | | | | |
| 1 | Chatham County | The School of Liberal Studies at Savannah High | | | | | | | |
| 1 | DeKalb County | Cedar Grove High School | | | | | | | |
| 1 | DeKalb County | McNair High School | | | | | | | |

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# Statistical Peer Groups: Looking Ahead

- Professional development and technical assistance supports
  - Target PD and TA efforts to similar group of schools

- Data tool application
  - Compare student outcomes with other schools serving similar student populations

- "Bright spots" case studies
  - Rapidly identify promising practices in the field

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# Thank you!

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