

# Identifying High-Performing, High-Growth, and High-Needs Schools:

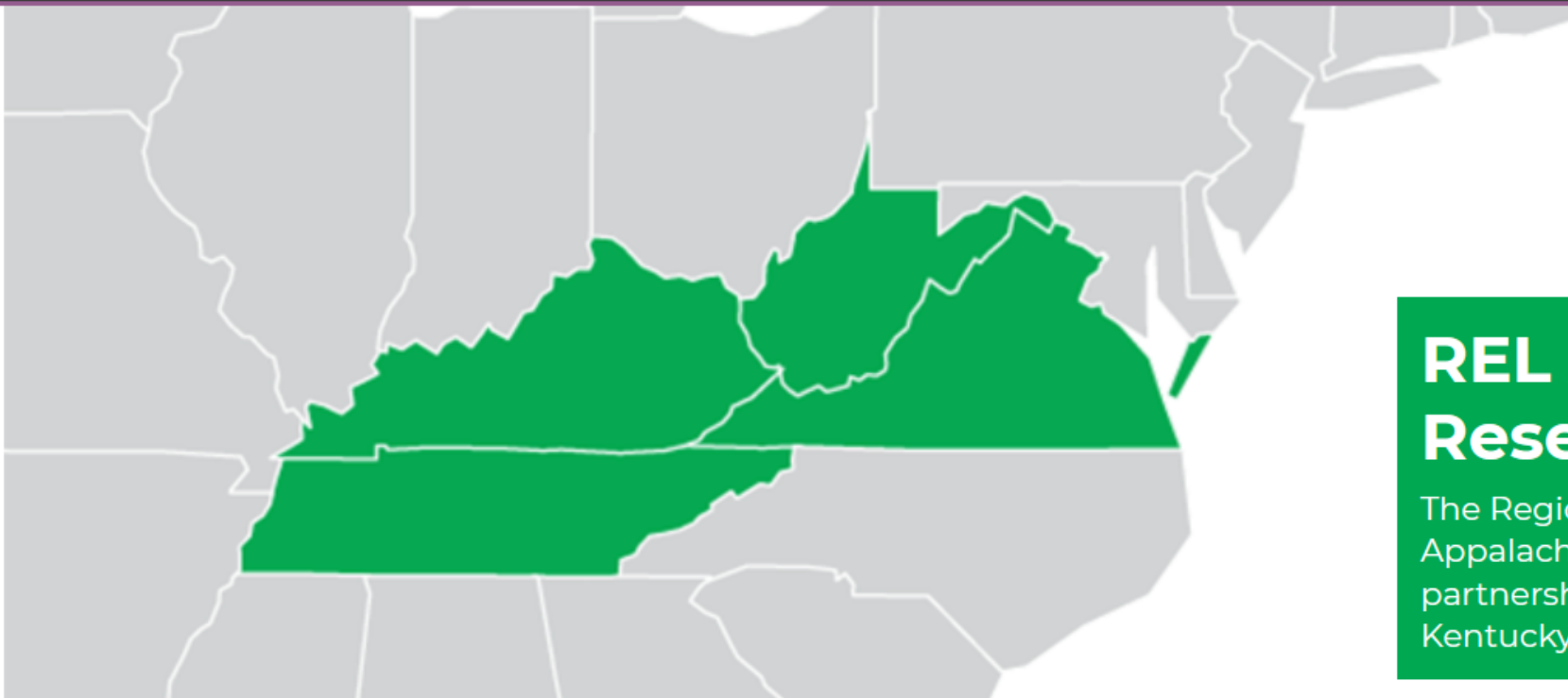
Lessons learned from a data-use capacity-building collaboration in Kentucky

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## REL Appalachia: Putting Research into Action

The Regional Educational Laboratory (REL) Appalachia translates research to practice in partnership with policymakers and practitioners in Kentucky, Tennessee, Virginia, and West Virginia.

The ten Regional Educational Laboratories (RELs) work in partnership to conduct applied research and trainings with a mission of supporting a more evidence-based education system.

# Overview of Kentucky Early Mathematics and Reading Project

- The Kentucky Department of Education (KDE) strategic plan aimed to increase grade 3 student proficiency rates for mathematics and reading.
- As part of this effort, KDE worked in partnership with the Regional Educational Laboratory Appalachia (REL AP) to identify schools with strong performance or substantial gains in grade 3 mathematics and reading to inform educator development and school improvement efforts throughout Kentucky.

# Goal and research questions

Goal: Identify **high-performing and high-growth schools** to inform school improvement efforts

## Status

Using data from 2017 and 2018, how did each school's actual grade 3 mathematics and reading performance compare to a set of predictions based on student and school demographics characteristics?

Predicted reading score	205
Estimated true reading score	215

**Status**                       **$215 - 205 = +10$**

## Growth

Using data from 2014-2018, how did each school's change in performance over time compare with the average school's change in performance over time, accounting for demographics?

Predicted school-level change	2.5
Estimated true school-level change	7.5

**Growth**                                       **$7.5 - 2.5 = +5$**

# Dataset and sample

- Dataset

- Obtained data from Kentucky Center for Statistics (KYSTATS)
- Examined grade 3 student scale scores on Kentucky Performance Rating for Educational Progress (K-PREP) mathematics and reading tests
- Included key demographic information
  - Age
  - Gender
  - Race
  - English learner status
  - Free and reduced-price lunch (FRPL) status indicating economic disadvantage
  - Individualized education program (IEP) status indicating students with disabilities

- Sample

- First-time grade 3 students who attended a school for at least 100 days between 2014 and 2018
  - Created school-level measures for 727 schools from student averages

# Analysis

- Determined relationships between student and school demographics and outcomes.
- Computed predicted outcomes for each school based on its demographic composition.
- Compared the actual outcomes to the outcomes predicted by the model.

# Two-year status model

- **Level 1**

$$Y_{ijk} = \beta_{0j} + \beta_{1j}AGE_{ij} + \beta_{2j}ELL_{ij} + \beta_{3j}FRPL_{ij} + \beta_{4j}IEP_{ij} + \beta_{5j}MALE_{ij} + \beta_{6j}BLACK_{ij} + \beta_{7j}HISP_{ij} + \beta_{8j}OTHRACE_{ij} + \beta_{9j}\overline{AGE}_{jt} + \beta_{10j}\overline{ELL}_{jt} + \beta_{11j}\overline{FRPL}_{jt} + \beta_{12j}\overline{IEP}_{jt} + \beta_{13j}\overline{MALE}_{jt} + \beta_{14j}\overline{BLACK}_{jt} + \beta_{15j}\overline{HISP}_{jt} + \beta_{16j}\overline{OTHRACE}_{jt} + \beta_{17j}Y2018_t + r_{ijt} \quad (1)$$

- **Level 2**

$$\beta_{0j} = \gamma_{00} + u_{0j} \quad (2)$$

$$\beta_{1j} = \gamma_{10} \quad (3)$$

⋮

$$\beta_{17j} = \gamma_{17,0} \quad (4)$$

# Two-year status model

- **Level 1**

$$\begin{aligned}
 Y_{ijk} = & \beta_{0j} + \beta_{1j}AGE_{ij} + \beta_{2j}ELL_{ij} + \beta_{3j}FRPL_{ij} + \beta_{4j}IEP_{ij} + \beta_{5j}MALE_{ij} + \beta_{6j}BLACK_{ij} + \beta_{7j}HISP_{ij} + \\
 & \beta_{8j}OTHRACE_{ij} + \beta_{9j}\overline{AGE}_{jt} + \beta_{10j}\overline{ELL}_{jt} + \beta_{11j}\overline{FRPL}_{jt} + \beta_{12j}\overline{IEP}_{jt} + \beta_{13j}\overline{MALE}_{jt} + \\
 & \beta_{14j}\overline{BLACK}_{jt} + \beta_{15j}\overline{HISP}_{jt} + \beta_{16j}\overline{OTHRACE}_{jt} + \beta_{17j}Y2018_t + r_{ijt}
 \end{aligned} \tag{1}$$

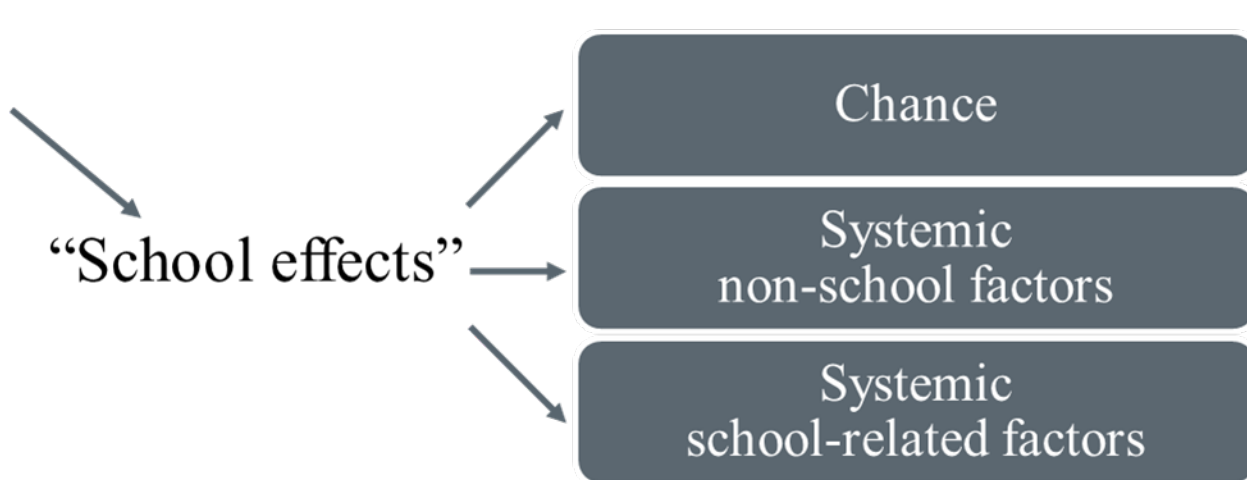
- **Level 2**

$$\beta_{0j} = \gamma_{00} + u_{0j} \tag{2}$$

$$\beta_{1j} = \gamma_{10} \tag{3}$$

⋮

$$\beta_{17j} = \gamma_{17,0} \tag{4}$$





# Five-year growth model

- **Level 1**

$$Y_{ijk} = \beta_{0j} + \beta_{1j}AGE_{ij} + \beta_{2j}ELL_{ij} + \beta_{3j}FRPL_{ij} + \beta_{4j}IEP_{ij} + \beta_{5j}MALE_{ij} + \beta_{6j}BLACK_{ij} + \beta_{7j}HISP_{ij} + \beta_{8j}OTHRACE_{ij} + \beta_{9j}\overline{AGE}_{jt} + \beta_{10j}\overline{ELL}_{jt} + \beta_{11j}\overline{FRPL}_{jt} + \beta_{12j}\overline{IEP}_{jt} + \beta_{13j}\overline{MALE}_{jt} + \beta_{14j}\overline{BLACK}_{jt} + \beta_{15j}\overline{HISP}_{jt} + \beta_{16j}\overline{OTHRACE}_{jt} + \beta_{17j}YEAR_t + r_{ijt} \quad (1)$$

- **Level 2**

$$\beta_{0j} = \gamma_{00} + u_{0j} \quad (2)$$

$$\beta_{1j} = \gamma_{10} \quad (3)$$

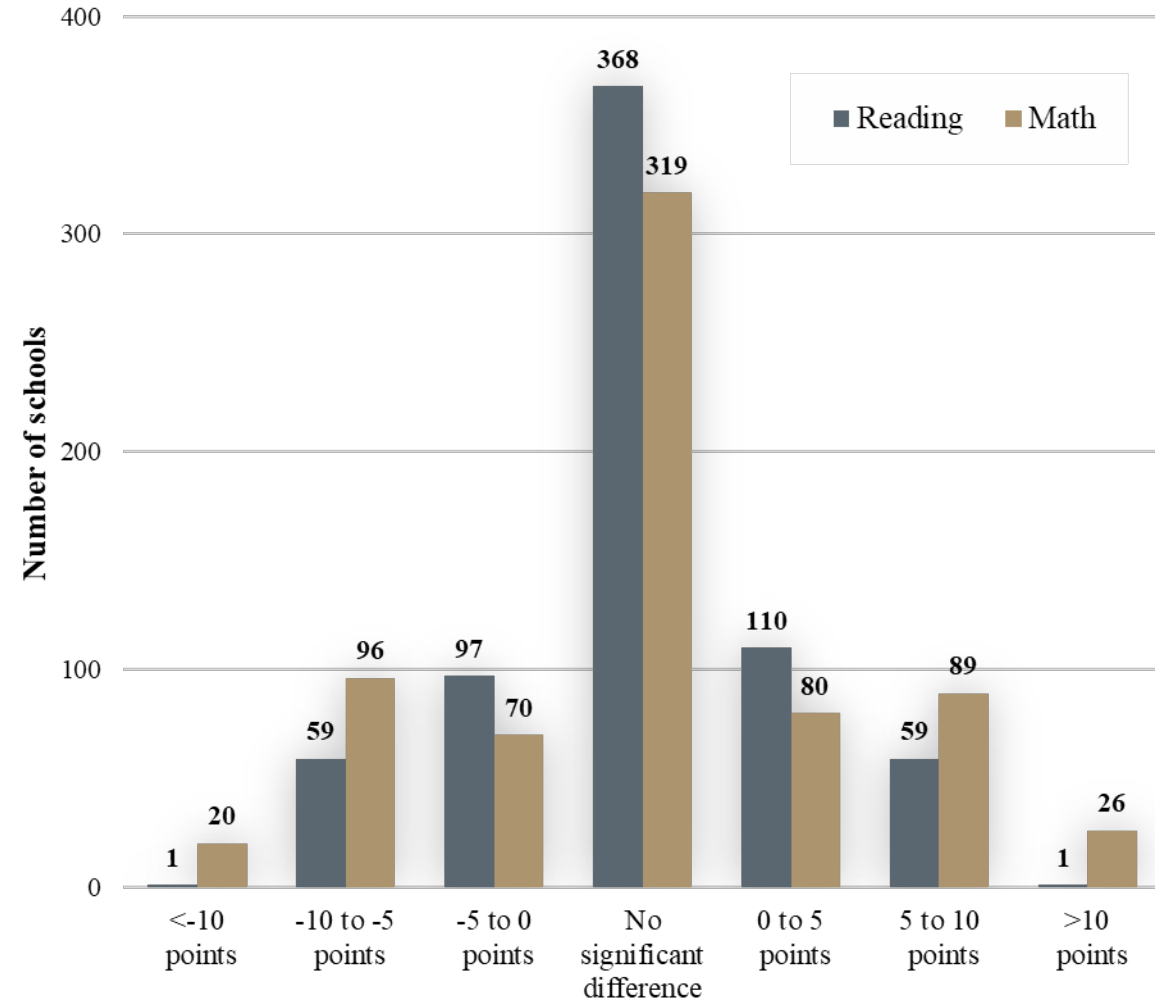
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$$\beta_{17j} = \gamma_{17,0} + u_{17j} \quad (4)$$

# Findings

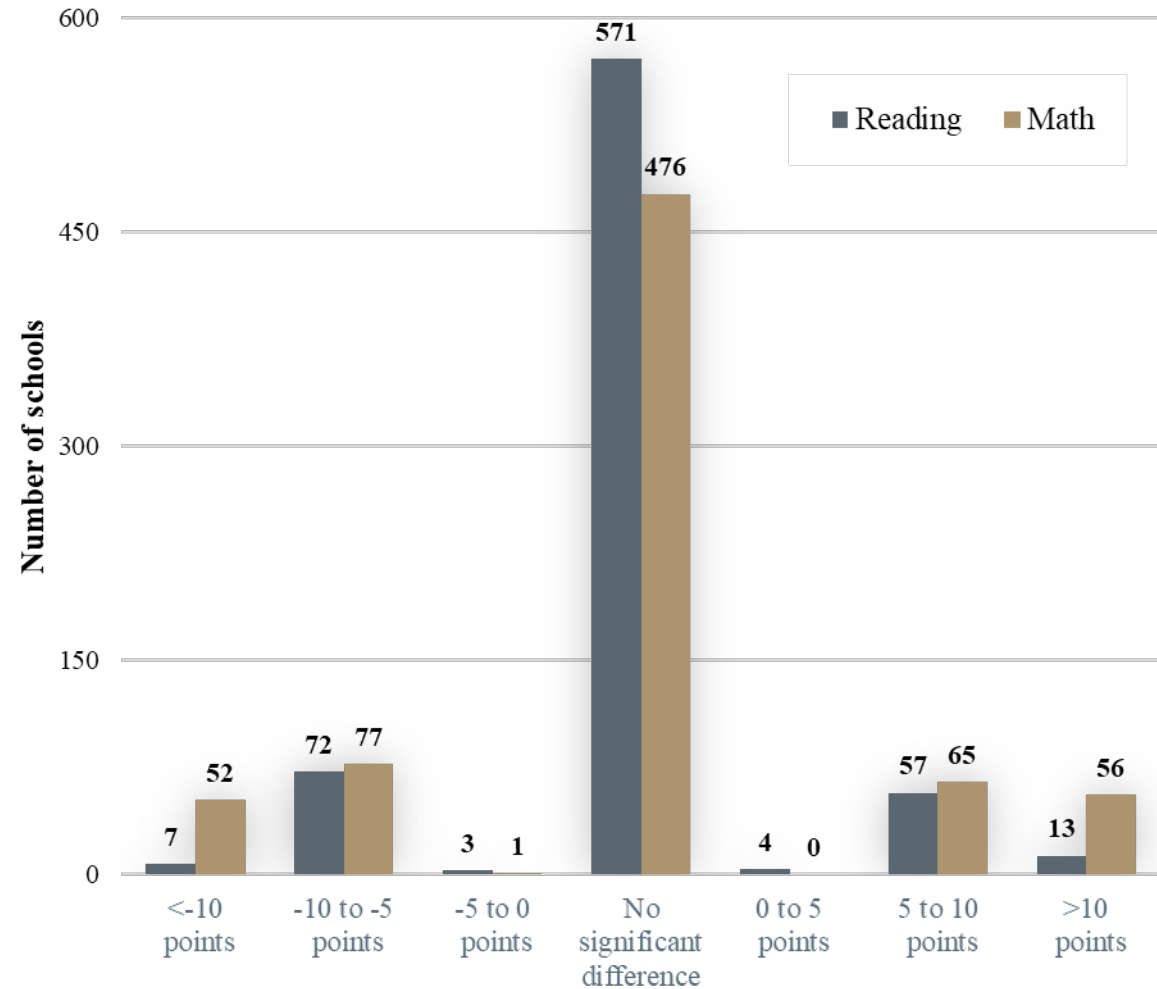
# One in four schools outperformed predictions in the status model.

- Difference of 10 points or above
  - About  $\frac{1}{2}$  standard deviation
  - Example: 205 to 215 is a move from lower end of Apprentice High to Proficient for reading
- Difference of 5 to 10 points
  - About  $\frac{1}{4}$  standard deviation
- Difference of less than 5 points
  - Less than  $\frac{1}{4}$  standard deviation



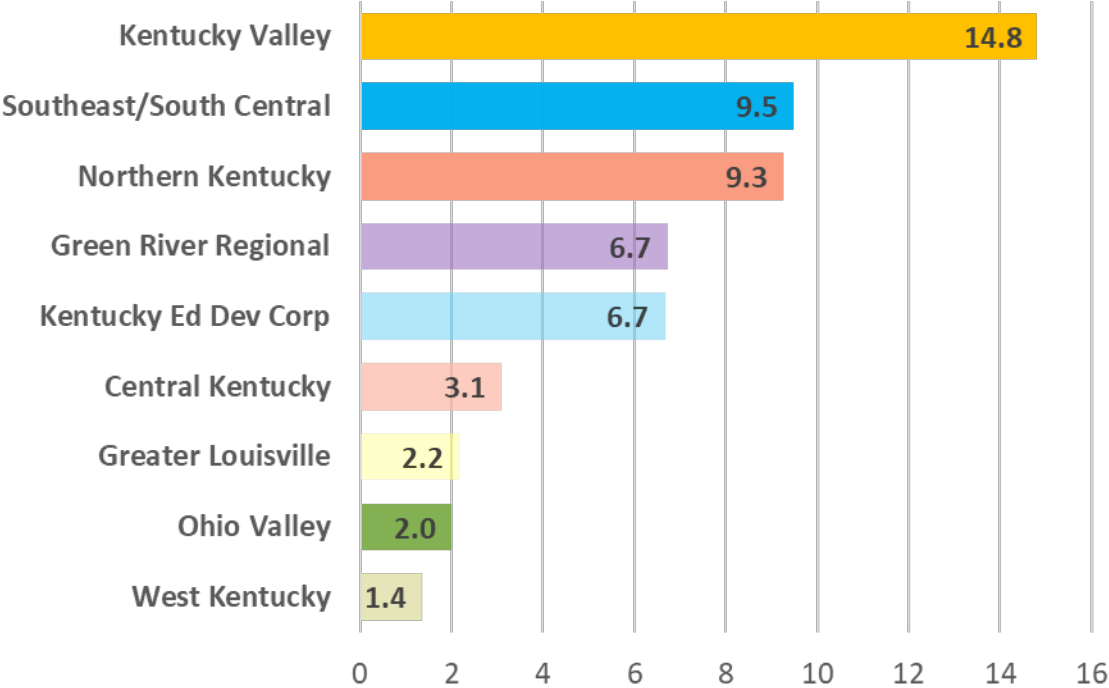
# One in eight schools outperformed predictions in the growth model.

- Change categories over five years on same scale as status
  - Difference of 10 points or above
  - Difference of 5 to 10 points
  - Difference of less than 5 points, but significant



# The percentage of schools within each educational cooperative that were high-growth varied across regions of Kentucky based on 2018 data.

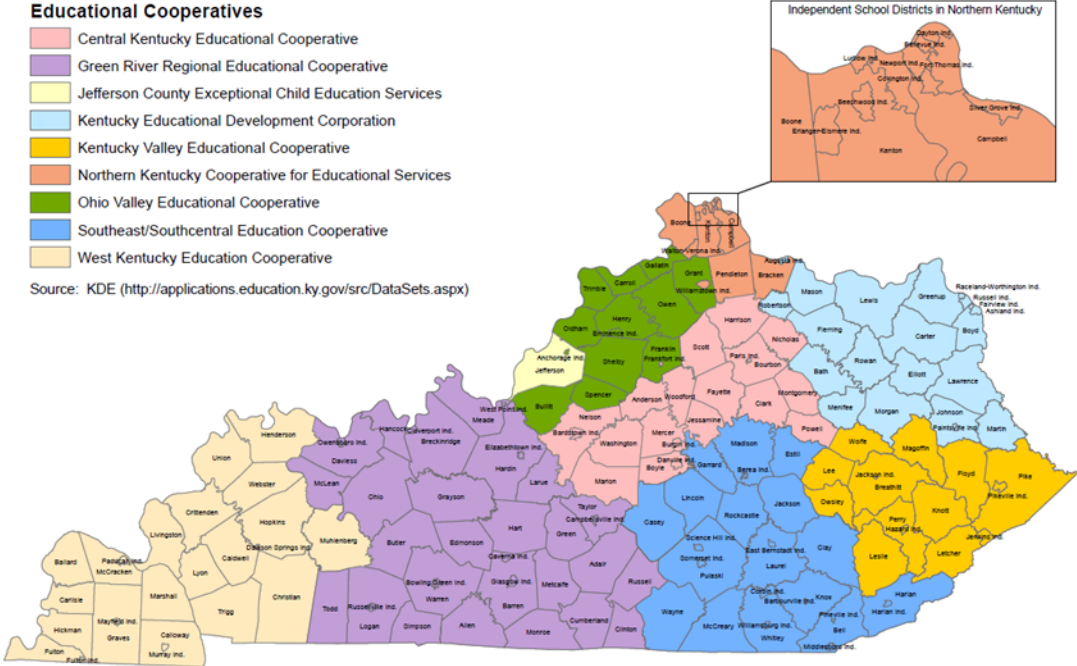
Percentage of schools within each educational cooperative that were high-growth



## Educational Cooperatives

- Central Kentucky Educational Cooperative
- Green River Regional Educational Cooperative
- Jefferson County Exceptional Child Education Services
- Kentucky Educational Development Corporation
- Kentucky Valley Educational Cooperative
- Northern Kentucky Cooperative for Educational Services
- Ohio Valley Educational Cooperative
- Southeast/Southcentral Education Cooperative
- West Kentucky Education Cooperative

Source: KDE (<http://applications.education.ky.gov/src/DataSets.aspx>)



Prepared by: Kentucky Center for Education and Workforce Statistics (KCEWS) KCEWS KENTUCKY CENTER FOR EDUCATION & WORKFORCE STATISTICS

# Summary

- The study identified numerous schools outperforming predictions in grade 3 mathematics and reading performance (195 schools in mathematics and 170 in reading ) and growth (121 schools in math growth and 74 schools in reading growth)
- There were 41 schools that demonstrated substantial growth in both mathematics and reading.
- Next, KDE could investigate whether these schools have adopted different practices or policies from other schools that could help generate and test hypotheses about possible reasons for their gains.
- If appropriate, this information could eventually help leaders and educators in *other Kentucky schools* adopt practices and policies to improve student outcomes.
- Soon after the identification of high-performing and high-growth schools, however, the COVID pandemic struck, leading to a shift in KDE and REL AP's efforts.

# Limitations of the study

- Predictive analyses are not causal.
  - Identified schools that had larger school-level gains than statistically predicted, but no explanation for *why* it happened.
  - Attributing solely to school effectiveness would be inaccurate.
  - Factors omitted from the models or outside the school's control could affect estimates.
- The availability of baseline academic measures is limited.
  - Cannot account for student cohort effects.
  - Incorporating demographic variables associated with outcomes of interest helps but does not resolve.
- Results are not necessarily generalizable to years beyond those included in the analysis.

# Questions and Answers



# Contact Information

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