Education Policy Innovation Collaborative

## Student Achievement Growth During the COVID-19 Pandemic

Katharine O. Strunk, Ph.D.
Clifford E. Erickson Distinguished Professor of Education Faculty Director, EPIC

College of Education | Michigan State University

## BACKGROUND ON EPIC



CLOSE PARTNERSHIPS

TIMELY RESEARCH


ACTIONABLE FINDINGS

- The Education Policy Innovation Collaborative (EPIC) at Michigan State University is an independent, non-partisan research center that operates as the strategic research partner to the Michigan Department of Education (MDE) and works to provide evidence to education policymakers and stakeholders across Michigan.
- EPIC is devoted to research with consequence and the idea that rigorous evidence can improve education policy and practice and, ultimately, students' lives.
- EPIC conducts original research using a variety of methods to produce new insights that decision-makers can use to create and implement policy.


## EPIC

# OUR RESPONSIBILITY AS RESEARCHERS 

## Research With Consequence

As the COVID-19 pandemic continues to disrupt education across the country, educators in every school, district, and state have been working tirelessly to provide students with high quality learning experiences and plan for instruction in the midst of great uncertainty and challenges.


We believe it is critical for those of us engaged in research to help educators with this daunting task. At EPIC, that means doing what we can in Michigan to help policymakers and practitioners use the best available evidence to make the most informed choices possible.

## EPIC

## RESEARCH QUESTIONS

## EPIC's evaluation of student performance during the pandemic asks four main questions:



How do recent achievement
trends for MI students compare to
pre-pandemic national/state trends?


Did students make progress toward and/or reach the appropriate growth targets from fall 2020 to fall 2021?


How much and in what ways did achievement trends differ across subgroups of students?


How did students' trajectories toward M-STEP proficiency compare to those of similar students before the pandemic?

## EPIC

## Timeline: State testing in MI during COVID



## DATA SOURCES

|  | Source/Provider | Additional Details |
| :---: | :---: | :---: |
| Benchmark Assessments <br> Fall 2020, Spring 2021, Fall 2021 | NWEA: MAP Growth | Math \& Reading ( $\mathrm{K}-8$ ) |
|  | Curriculum Associates: i-Ready | Math \& Reading ( $\mathrm{K}-8$ ) |
|  | Renaissance Learning: Star 360 | Math (1-8), Reading (K-8), Literacy (K-3) |
|  | DRC: Smarter Balanced ICA | Math \& ELA (3-8) |
|  | MDE K-2 Benchmark | Math \& Early Literacy (K-2) |
|  | M-STEP | Math \& ELA (3-7) |
| Student Characteristics | MDE/CEPI administrative datasets and district-provided aggregate datasets | Gender, race/ethnicity, economically disadvantaged status, special education status, prior M-STEP performance |
| District Mode of Instruction Sept 2020 - May 2021 | Reconfirmed COVID-19 Learning Plan Monthly Questionnaire | District-reported instructional modality (fully in-person, hybrid, and/or fully remote) for each month |

## EPIC

## BENCHMARK ASSESSMENT DATA AND SAMPLE

Students in the analysis differ from the statewide K-8 student population and differ across assessments. Low-income, Black, and special education students are underrepresented.

|  | Statewide | NWEA <br> MAP <br> Growth | Curriculum <br> Associates <br> i-Ready | Renaissance <br> Learning <br> Star 360 | DRC <br>  <br> Smarter <br> Balanced ICA |
| :--- | :---: | :---: | :---: | :---: | :---: |
| NUMBER OF K-8 STUDENTS |  |  |  |  |  |
| Total included in analysis | 750,789 | 566,547 | 128,629 | 61,241 | 5,066 |
| Percent of MI K-8 enrollment | $80 \%$ | $61 \%$ | $14 \%$ | $7 \%$ | $1 \%$ |
| STUDENT CHARACTERISTICS |  |  |  |  |  |
| Black | $18 \%$ | $16 \%$ | $36 \%$ | $8 \%$ | $18 \%$ |
| Latino/a/x | $9 \%$ | $9 \%$ | $9 \%$ | $9 \%$ | $4 \%$ |
| Special education | $13 \%$ | $12 \%$ | $12 \%$ | $13 \%$ | $10 \%$ |
| English learners | $7 \%$ | $7 \%$ | $9 \%$ | $4 \%$ | $2 \%$ |
| Economically disadvantaged | $54 \%$ | $53 \%$ | $60 \%$ | $52 \%$ | $52 \%$ |

## MSTEP DATA AND SAMPLE

## Students in the pre-pandemic and pandemic cohorts are somewhat similar demographically, but not in terms of initial achievement.

## Pre-Pandemic

 Cohort:Students who took the M-STEP in spring 2017 and spring 2019.

Pandemic Cohort:
Students who took the M-STEP in spring 2019 and spring 2021.

EPIC

Pre-Pandemic Cohort Pandemic Cohort

## STUDENT DEMOGRAPHICS

| Economically disadvantaged | $51 \%$ | $49 \%$ |
| :--- | :---: | :---: |
| Black | $17 \%$ | $11 \%$ |
| Latino/a/x | $8 \%$ | $8 \%$ |
| Special education | $12 \%$ | $13 \%$ |
| English learners | $8 \%$ | $8 \%$ |
| M-STEP MATH | 0.02 |  |
| Initial scores (standardized) | -0.02 | 0.12 |
| Average growth | 302,041 | -0.25 |
| Number of tested students |  | 201,800 |
| M-STEP ELA | 0.02 | 0.11 |
| Initial scores (standardized) | -0.07 | -0.16 |
| Average growth | 301,117 | 202,543 |
| Number of tested students |  |  |

Research Question \#1:
How do recent achievement trends for MI students compare to pre-pandemic national/state trends?

## EPIC

## TRENDS IN BENCHMARK ASSESSMENT SCORES (FALL 2020, SPRING 2021, AND FALL 2021)

- We examined trends in average scores for students with comparable benchmark assessment data from fall 2020, spring 2021, and fall 2021.
- We compared average scores for this population with norms that each assessment vendor established before the pandemic.
- Pre-pandemic norms: median scores from nationallyrepresentative norming samples from fall 2019 or earlier, depending on the assessment.
- Given the differences between students who take the i-Ready assessment and the overall population of students (in Michigan and nationwide), rather than a national norm we use median scores from Michigan students who took i-Ready assessments in 2018-19.

MAP Growth Mathematics


MAP Growth Reading


In fall 2020, MI students scored close to prepandemic national norms.

By fall 2021, average scores fell below the norms.

Fall 2020 scores for early elementary students were unusually high, possibly due to an "at-home advantage."
i-Ready Mathematics

i-Ready Reading


> We find similar patterns for the i-Ready assessment.

These reflect differences across Michigan students who took the i-Ready before and during the pandemic.


Research Question \#2: Did students make progress toward and/or reach the appropriate growth targets from fall 2020 to fall 2021?

## EPIC

## STUDENT GROWTH FROM FALL 2020 TO FALL 2021

- We compared students' growth from fall 2020 to fall 2021 with "typical growth" provided by the assessment providers.
- "Typical growth" varies depending on the grade level, subject, and students' initial achievement scores.
- Growth targets in this analysis represent the median growth for students in the pre-pandemic norming sample in a given grade level and subject with similar initial fall achievement scores.
- This means that, in a typical year, we would expect 50\% of students to reach these targets.
- We compare students' actual growth to their growth targets to identify how many students...
- Met or exceeded their targets ( $\sim 50 \%$ in a typical year)
- Made progress toward, but did not reach, their targets (~40\% in a typical year)
- Did not demonstrate any growth (i.e., their scale scores decreased or did not change) from fall 2020 to fall 2021. ( $10 \%$ in a typical year)


## STUDENT GROWTH FROM FALL 2020 TO FALL 2021

On average across subjects/grades/assessments, 41\% of students met their growth targets, $35 \%$ made partial progress, and 24\% did not demonstrate any growth at all.


## STUDENTS WITH THE HIGHEST INITIAL SCORES WERE THE LEAST LIKELY TO DEMONSTRATE GROWTH



## EPIC

Research Question \#3:
How much and in what ways did achievement trends differ across subgroups of students?

## EPIC

## MEASURING ACHIEVEMENT GAPS

- Achievement gaps are the standardized difference between the average score for a subgroup of students and a reference group.
- We convert these to percentile ranks to show where the average score for the subgroup falls within the reference group's distribution.

| The average score for students in the <br> subgroup is <br> for the reference group. | Standardized gap | Relative percentile |
| :---: | :---: | :---: |
| the same as | 0 | 50 |
| lower than | Negative | Below 50 |
| higher than | Positive | Above 50 |

- We calculate gaps across student race/ethnicity categories, gender, economically disadvantaged status, special education status, and districts' mode of instruction.


## EPIC

## RELATIVE PERCENTILES BY STUDENT RACE/ETHNICITY: MATH

We find sizable achievement gaps by race/ethnicity on all benchmark assessments, similar to pre-pandemic gaps on the 2019 M-STEP.


# RELATIVE PERCENTILES BY ECONOMIC STATUS, SPECIAL EDUCATION STATUS, AND GENDER: MATH 

Similarly, socioeconomic, gender, and special education achievement gaps are comparable to pre-pandemic gaps on the M-STEP


# GAPS BETWEEN FULLY REMOTE AND FULLY IN-PERSON DISTRICTS GREW DURING 2020-21; SLIGHTLY IMPROVED IN FALL 2021 

Fall 2020 gaps in early elementary grades reversed in direction by fall 2021


## GAPS BETWEEN HYBRID AND IN-PERSON DISTRICTS WERE ALSO NEGATIVE; SMALLER THAN THOSE FOR REMOTE DISTRICTS

Students with access to some in-person instruction were less affected than those whose districts were fully remote.


Research Question \#4:
How did students' trajectories toward M-STEP proficiency compare to those of similar students before the pandemic?

## EPIC

## EMPIRICAL MODEL FOR M-STEP REGRESSION ANALYSIS

$$
\text { CYA }_{s g d}=\alpha+\theta_{1} B Y Y A_{s g d}+\theta_{2} \text { COHORT }_{s g d}+\boldsymbol{\theta}_{3}^{\prime} \boldsymbol{S C H A R}_{s}+\gamma_{g}+\delta_{d}+\varepsilon_{i}
$$

- $C Y A_{\text {sgd }}$ : Comparison-year standardized M-STEP mathematics or ELA scores for each student $s$, grade level $g$, and district $d$
- $B Y A_{s g d}$ : Base-year standardized M-STEP mathematics or ELA scores for each student $s$, grade level $g$, and district $d$
- $\mathrm{COHORT}_{\text {sgd }}$ : binary indicator that identifies students in the Pandemic cohort
- $\boldsymbol{S C H A R}_{s}$ : vector of student-level demographic characteristics (i.e., gender, race/ethnicity, and economically disadvantaged, special education, English learner, homeless, and migrant status)
- $\gamma_{g}$ : grade fixed effects
- $\delta_{d}$ : district fixed effects
- Additional models include interactions between student demographic/ instructional modality and COHORT to estimate subgroup-specific difference


## MATH AND READING ACHIEVEMENT GROWTH DURING THE PANDEMIC CONSISTENTLY LAGGED PRE-PANDEMIC GROWTH RATES

|  | Mathematics |  | ELA |  |
| :--- | :---: | :---: | :---: | :---: |
| $(1)$ | $(2)$ | $(3)$ | $(4)$ |  |
| Pandemic Cohort | $-0.218 * * *$ | $-0.223^{* * *}$ | $-0.078 * * *$ | $-0.081 * * *$ |
|  | $(0.008)$ | $(0.008)$ | $(0.007)$ | $(0.007)$ |
| Base-Year Achievement | $0.775 * * *$ | $0.764^{* * *}$ | $0.744^{* * *}$ | $0.736 * * *$ |
|  | $(0.005)$ | $(0.004)$ | $(0.003)$ | $(0.002)$ |
| Student Demographics | Y | Y | Y | Y |
| Grade Fixed Effects | Y | Y | Y | Y |
| District Fixed Effects | N | Y | N | Y |
| Observations | 503,841 | 503,841 | 503,660 | 503,660 |
| $R^{2}$ | 0.694 | 0.705 | 0.641 | 0.652 |

Notes: Columns 2 and 4 include binary indicators for each district to control for time-invariant, unobservable characteristics of each district that may influence learning trajectories. Robust standard errors, clustered at the district level, are in parentheses. $+p<0.10, * p<0.05, * * p<0.01, * * * p<0.001$

## MATH AND READING ACHIEVEMENT GROWTH DURING THE PANDEMIC CONSISTENTLY LAGGED PRE-PANDEMIC GROWTH RATES



Notes: The lines protruding from each estimate represent the 95\% confidence interval for each coefficient. If the 95\% confidence interval lines cross the zero line, the estimate is not statistically significant. All models include controls for gender and race/ethnicity, as well as economically disadvantaged, special education, English learner, homeless, and migrant status. Each model also includes grade level indicators for each sub-cohort to control for differences in learning trajectories between younger and older students, and binary indicators for each district to control for time-invariant, unobservable characteristics of each district that may influence learning trajectories.

## Key Findings and Policy Implications

## EPIC

## KEY FINDINGS

- At-home testing conditions in fall 2020 make it difficult to assess younger students' performance.
- Michigan students were scoring close to pre-pandemic national and state norms in fall 2020 but fell below these norms by fall 2021.
- Three-quarters of Michigan students demonstrated growth from fall 2020 to fall 2021, but only about 40\% reached their growth targets.
- Longstanding racial and socioeconomic achievement gaps persisted into the 2021-22 school year and are about the same size as achievement gaps on the 2018-19 M-STEP.
- Gaps between districts that were fully remote in 2020-21 and those that offered in-person instruction grew during the 2020-21 school year and improved slightly over the summer of 2021.
- Students with access to some in-person instruction in 2020-21 were less affected than those whose districts only offered fully remote instruction.


## POLICY IMPLICATIONS

- Stakeholders should interpret and use fall 2020 benchmark assessment results with caution.
- It will be especially important to continue monitoring learning outcomes for economically disadvantaged, Black, and Latino/a/x students.
- Focusing too narrowly on average learning outcomes likely masks the substantial number of students who are deeply struggling.
- The magnitude of discrepancies between expected and actual performance and achievement growth that occurred as a result of the pandemic will not be addressed quickly, or without substantial and sustained influx of resources to support education in Michigan.
- Michigan is not alone. Findings are similar in other states. We can learn from what other states are doing as we all try to navigate pandemic recovery.


## EPIC

## EPIC

Education Policy Innovation Collaborative

## Education Policy Innovation Collaborative

COLLEGE OF EDUCATION | MICHIGAN STATE UNIVERSITY

