

Effects of the Pandemic on Education in the United States





TABLE OF CONTENTS



01 Problem Statement

> Effects of the COVID-19 pandemic
on educational metrics and
disparities between racial groups
and states.

02 Data

> Census Bureau: 2019
vs 2021; NAEP

03 Visualization

> 10 visualizations

04 Analysis + Conclusions

> Summary of results
and shortcomings



01

Problem Statement





Problem Statement

The COVID-19 pandemic shed light on pervasive racial disparities, including within the education system.

- Physical, mental, social health tolls
- Unemployment, remote work vs. frontline work
- School closures, remote learning, college enrollment





Educational Metrics



School Enrollment

How did enrollment rates change? - by grade level



Educational Attainment

How does educational attainment differ between races and as a result of COVID?



Test Scores

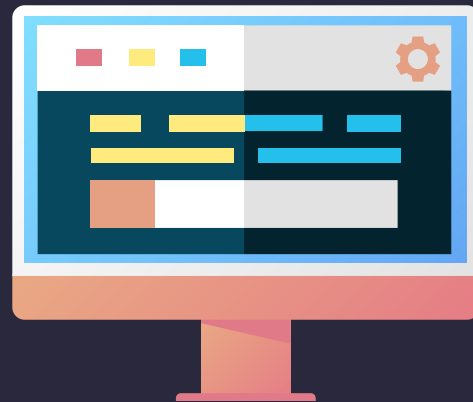
How has students' learning been affected? → 4th & 8th graders



02

DATA

U.S. Census Bureau:
2017, 2019 & 2021;
NAEP: 2019 & 2022



Data Methods

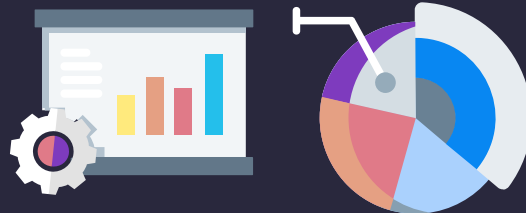
- Enrollment Data
 - Read the data set for each year in, organized each as a list of dictionaries, with a dictionary for each state for varying age level enrollments, visualizing national average change over the pandemic
- Attainment Data
 - Read the data set for attainment and population each year in, organizing each as a list of dictionaries, with a dictionary for each state for each race. Next, produce attainment percentages by race—dividing race attainment by population, then visualizing national average change in race percent attainment
- Test Scores Data
 - Read the data set for test scores, producing a list of dictionaries, with a dictionary for each state and the varying grades and subject test scores, visualizing national average change over the pandemic



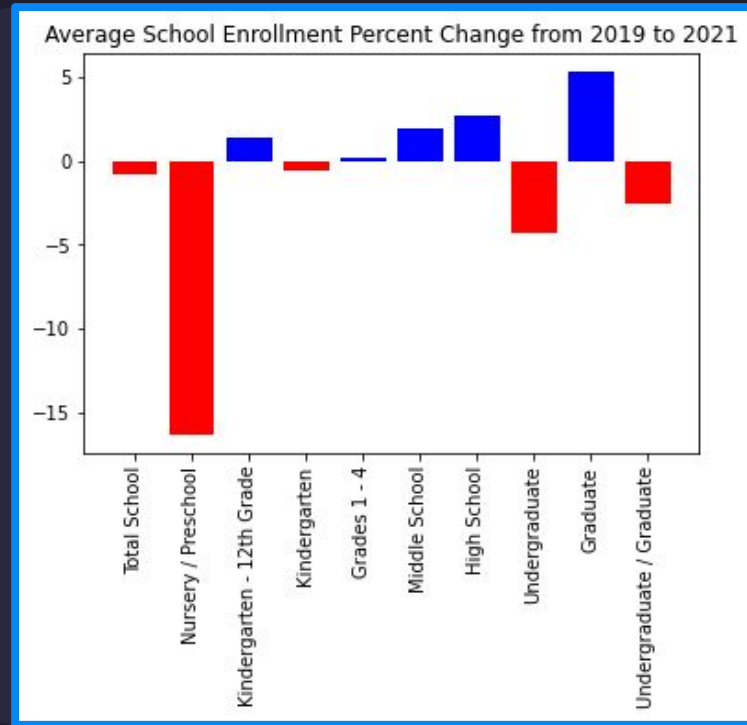


03

VISUALIZATIONS



Pandemic Effect on National School Enrollment Averages

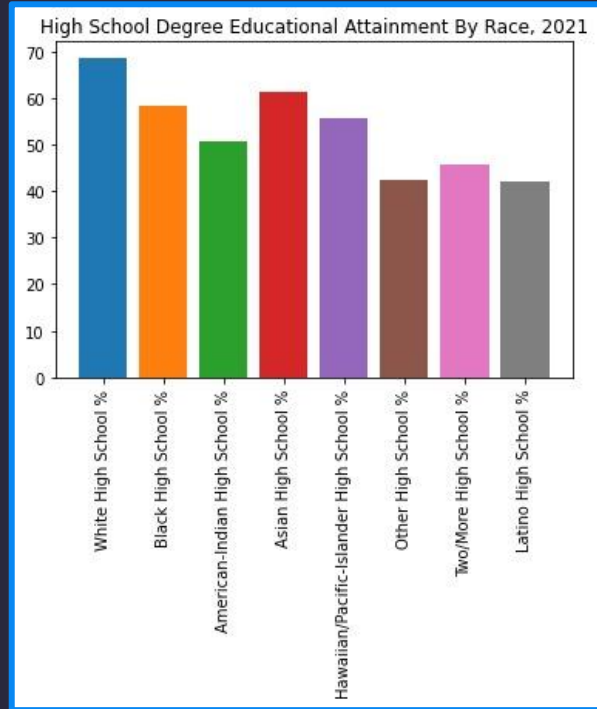


Decline: Total School, Nursery/Preschool, Undergraduate, Undergraduate/Graduate, Kindergarten

Growth: Graduate, High School, Middle School, K-12



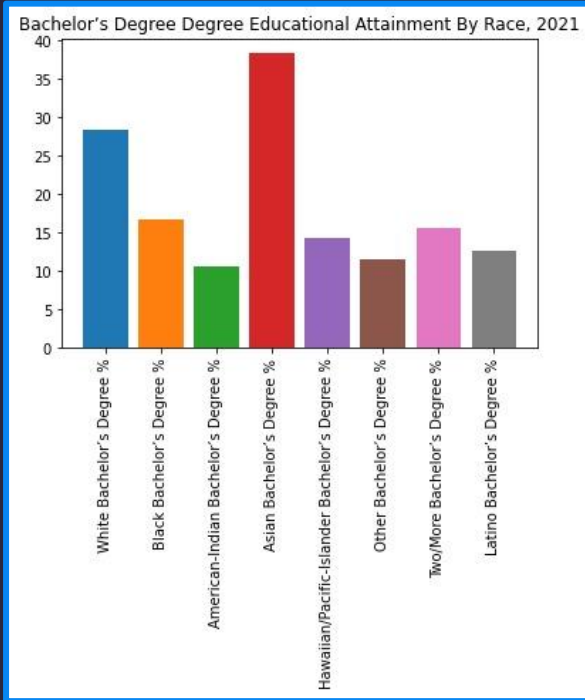
Educational Attainment by Race: High School Degree



Significantly higher attainment in **white**, **Asian** populations compared to **other** races, **Latino** and **black** populations



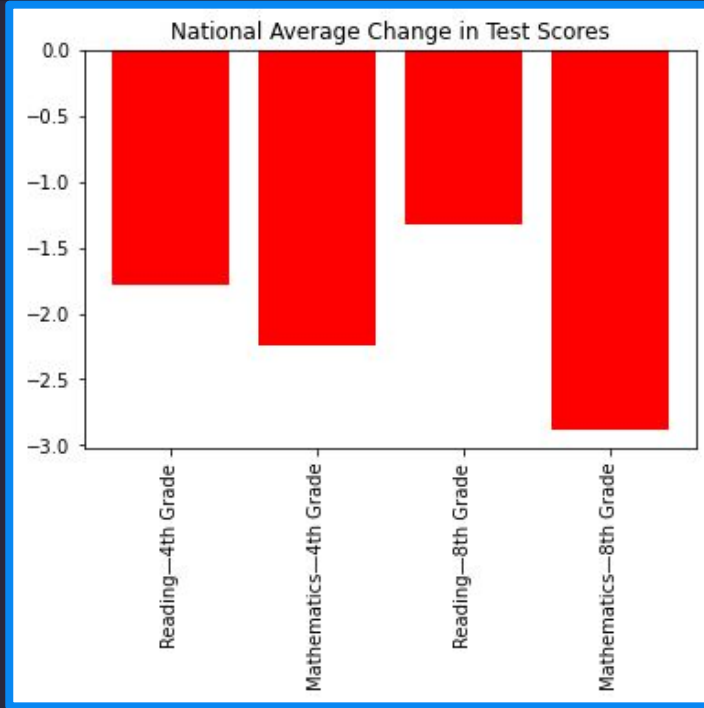
Educational Attainment by Race: Bachelor's Degree



Significantly higher attainment in **Asian** and **white** populations compared to **other** races, **black**, and **Latino** populations



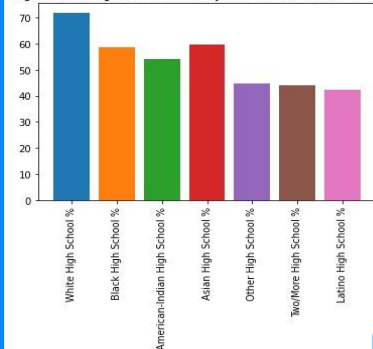
National Change in Test Scores



Drop in test scores across all subjects and grades, exaggerated losses in mathematics compared to reading

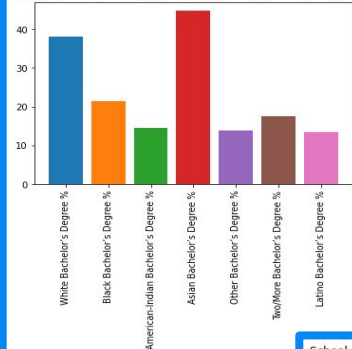
State-Specific Data: Massachusetts

High School Degree Attainment By Race in Massachusetts, 2021

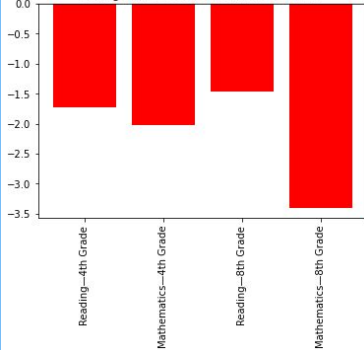


Can produce
state-specific
data with user
input

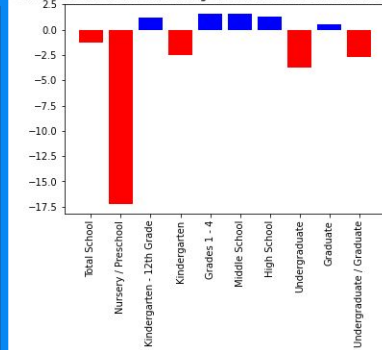
Bachelor's Degree Attainment By Race in Massachusetts, 2021



Change in Test Scores for Massachusetts



School Enrollment Percent Change from 2019 to 2021 for Massachusetts



04

ANALYSIS + CONCLUSIONS



Pre vs Post Pandemic





Enrollment Conclusions



Decline in undergraduate, preschool enrollment

- COVID-19 health concerns for young kids
- Undergraduate gap years

Large growth in graduate enrollment, constant/slow growth in primary, secondary school

- Virtual graduate degree programs
- Mandatory primary, secondary enrollment for kids



Attainment Conclusions



Racial disparities are prevalent

- Black, brown, low-income students severely disadvantaged due to **structural racism and injustice**
 - Discrimination in criminal justice, employment, housing, healthcare, education, and representation
- Lack of resources
- COVID-19 widened and exposed these disparities





Test Scores Conclusions



Consistent decline across the board in all grades and subjects, with exacerbated drops in mathematics

- School closures
- Remote learning
- Changing home situations created learning barriers
- Math more difficult to learn virtually
 - Further research to explain the difference between declining scores for math versus reading





Analysis of Program

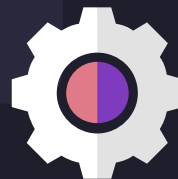


Strengths

- Cross data set functionality—analyzing huge amount of information (ten data sets)
- Multidimensional – incorporates racial, educational, age data
- Both national and specific state analysis

Weaknesses

- No race data for some states
- Census data truncated via handpicked columns
- Attainment change not communicated effectively
- Code can be repetitive especially with bachelor's/high school degree attainment



Future Work

- Further research into external factors affecting the rates for each race groups
 - Data collection methods
- Find more cohesive data to better represent all race categories.
- Look into test scores & enrollment rates by race.

