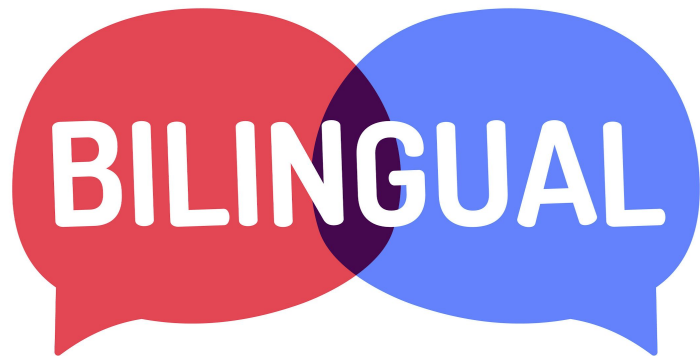


# The Demographics of Mandarin-English Dual-Immersion Bilingual Public Education in the United States

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# Introduction

- Bilingual education programs are ones in which students learn two languages simultaneously.
- In the United States, the Bilingual Education Act of 1968 was signed to encourage language programs for non-native English speakers to help them learn English through mixed-language education.
- Dual Language Immersion programs are a form of bilingual education where two languages are used in regular instruction. Half the day is taught in English, the other in the second language.
- The most common secondary languages are Spanish and Mandarin.
- In this study, I look at demographics differences at public dual immersion program schools in Mandarin between the school and the surrounding district.



# Datasets

- The primary source of data for this project is the Civil Rights Data Collection agency in the U.S. Department of Education. This body collects demographics data for all public schools in the nation.
- The list of dual immersion Mandarin programs was provided by the UW-Madison Geospatial Data Science Lab run by Prof. Song Gao.
- Location data for school districts can be found at the National Center for Education Statistics.

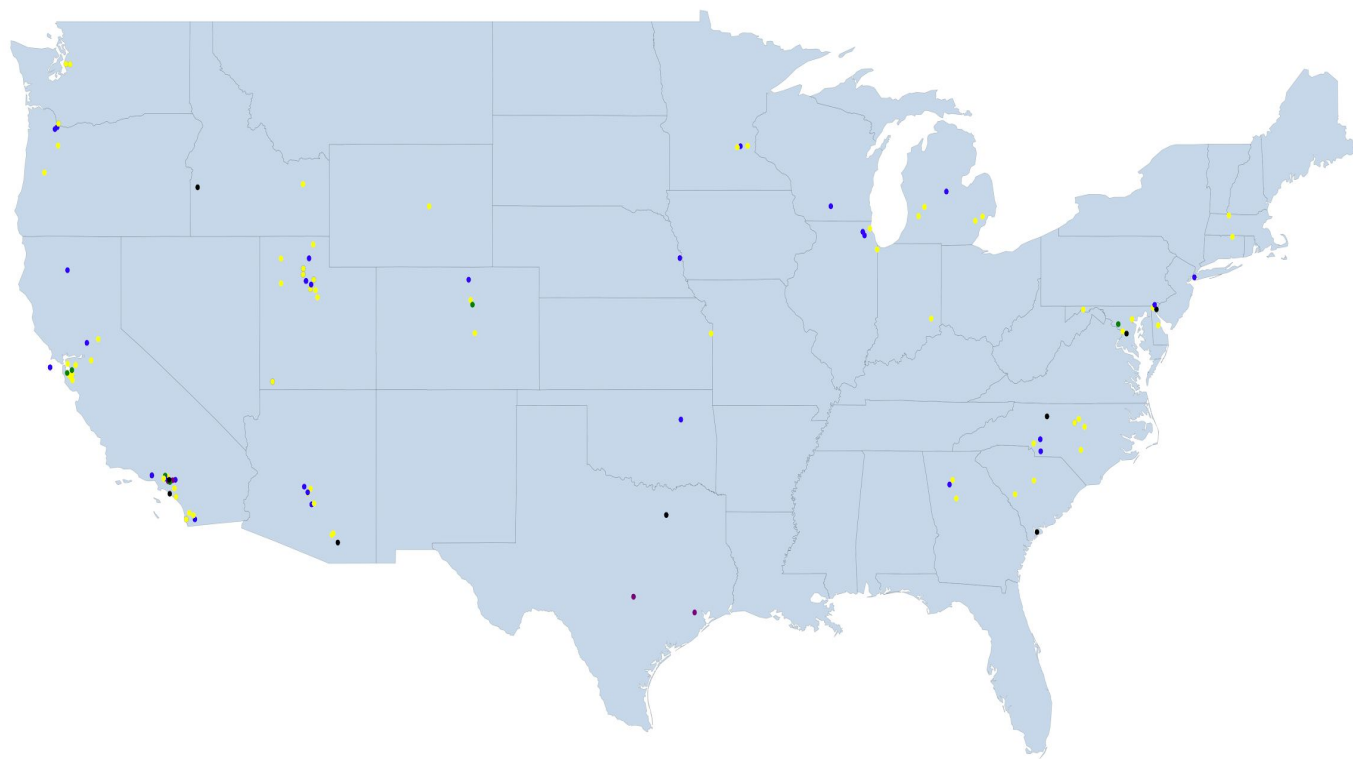


**CRDC**  
Civil Rights Data Collection

# Methods

1. Wrote function to compare the Mandarin dual-immersion database with the Civil Rights Data Collection (CRDC) Schools database, and match schools with same or similar names.
  - a. Matched schools were keys in a dictionary with their corresponding demographics data
  - b. School population totals and demographics percentage was found for each demographic
2. Wrote function to read CRDC school districts database with the matched schools database
  - a. First, calculated demographics percentages for each district
  - b. Then, matched each school in matched database with correct district in districts database
  - c. Subtracted School Percentage from district percentage, giving demographics difference
  - d. Write demographics difference to database for each dual-immersion school
3. Ran a K-Means cluster on each demographics difference group for each school
  - a. Each school was plotted as a point in the continental US, colored according to their cluster
  - b. Each cluster represents the degree of difference between percentage of the given demographics group enrolled in the school vs the percentage in the school district

# Results -- Hispanic



Cluster Centers of  
Differences in %:

Purple : -47.29%

Green: -28.93%

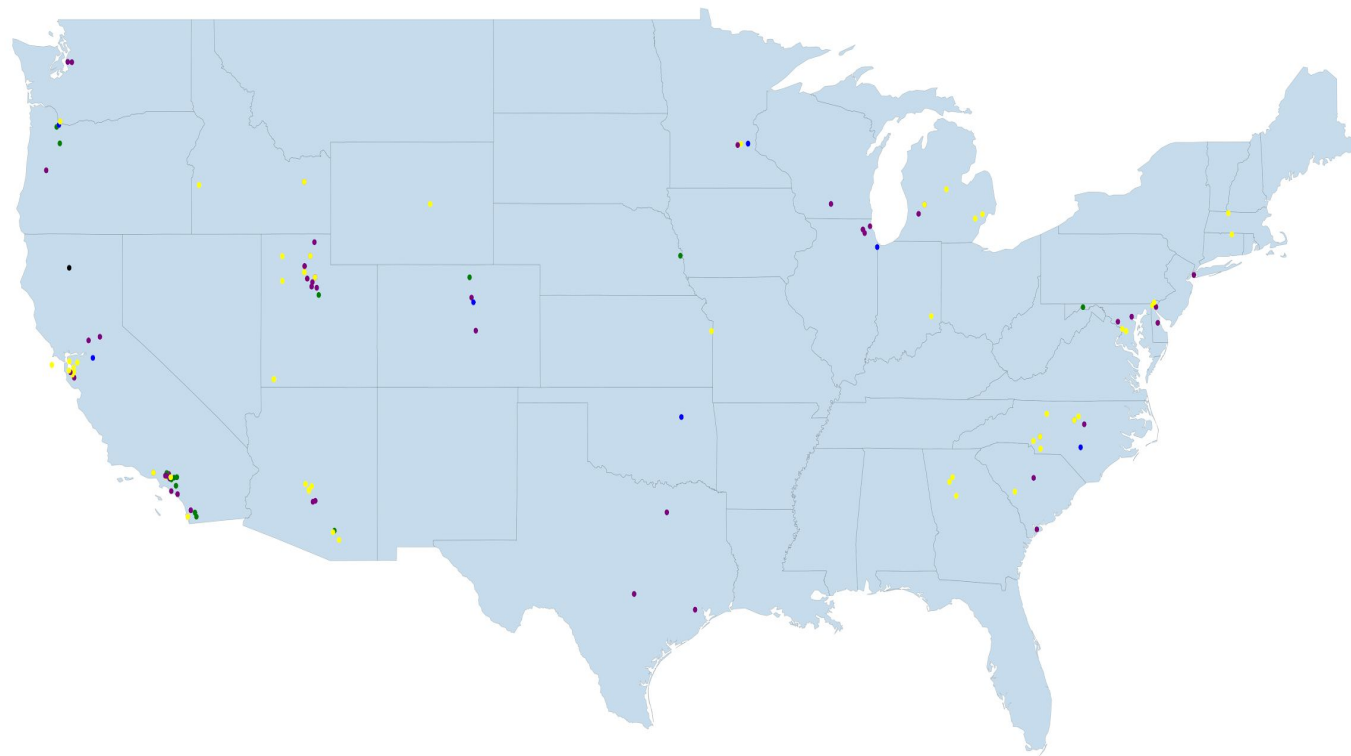
Blue: -9.01%

Yellow: 0.5%

Black: 18.63%

Positive means higher % at  
school than district  
Negative means lower % at  
school than district

# Results -- Indigenous Alaskan and Native American



Cluster Centers of Differences in %:

Black: -4.49%

Blue: -1.05%

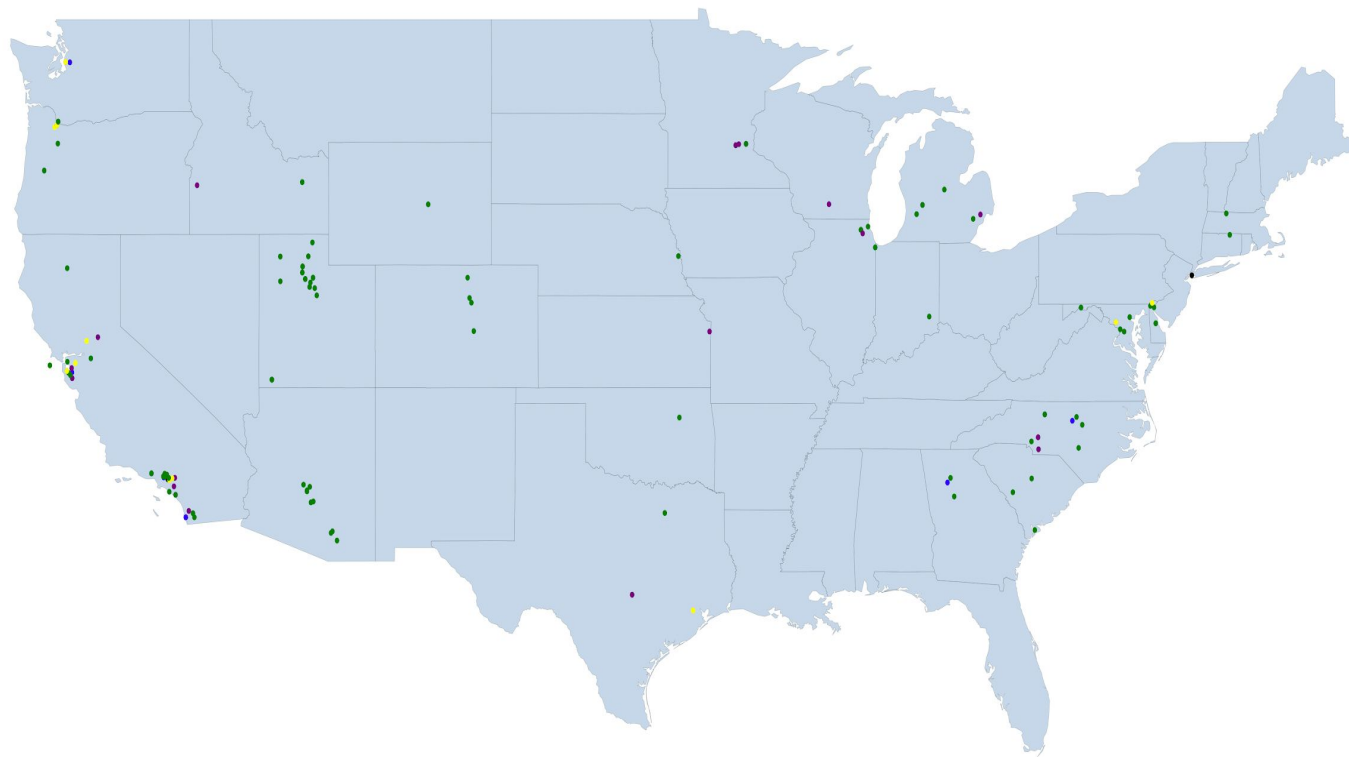
Purple: -0.24%

Yellow: 0.13%

Green: 0.84%

Positive means higher % at school than district  
Negative means lower % at school than district

# Results -- Asian



Cluster Centers of Differences in %:

Blue: -12.08%

Green: 0.00042%

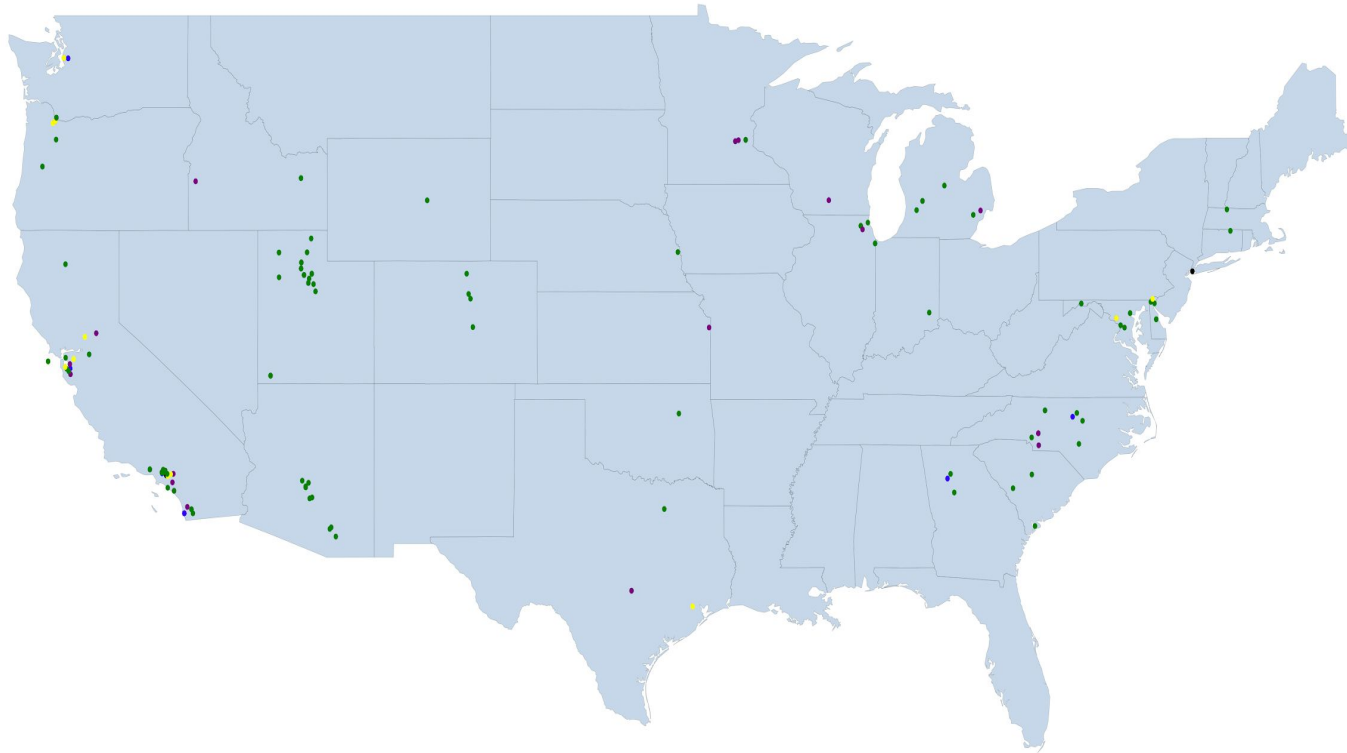
Purple: 8.91%

Yellow: 25.77%

Black: 54.76%

Positive means higher % at school than district  
Negative means lower % at school than district

# Results -- Hawaiian and Pacific Islander



Cluster Centers of Differences in %:

Purple: -2.01%

Blue: -0.86%

Green: -0.069%

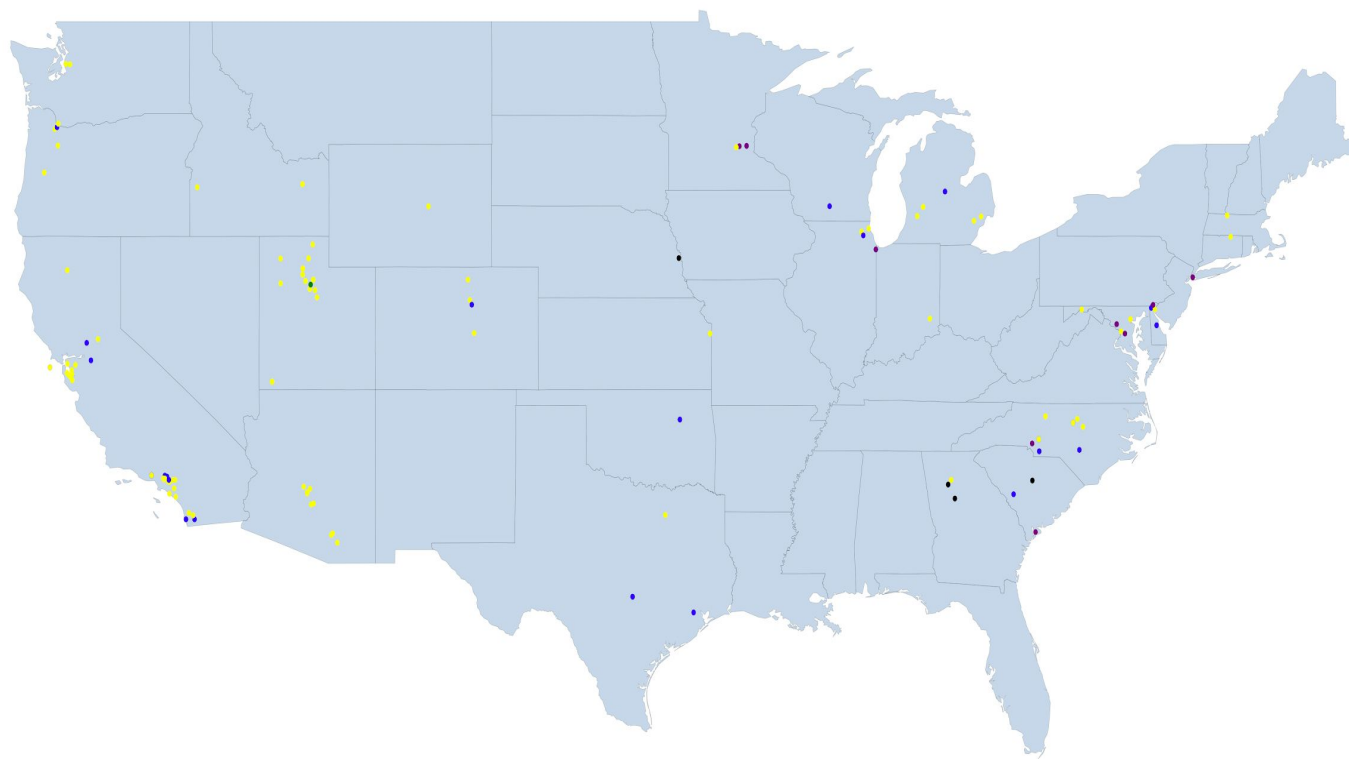
Yellow: 0.72%

Black: 7.58%

Positive means higher % at school than district  
Negative means lower % at school than district



# Results -- White



Cluster Centers of Differences in %:

Purple: -17.78%

Blue: -5.56%

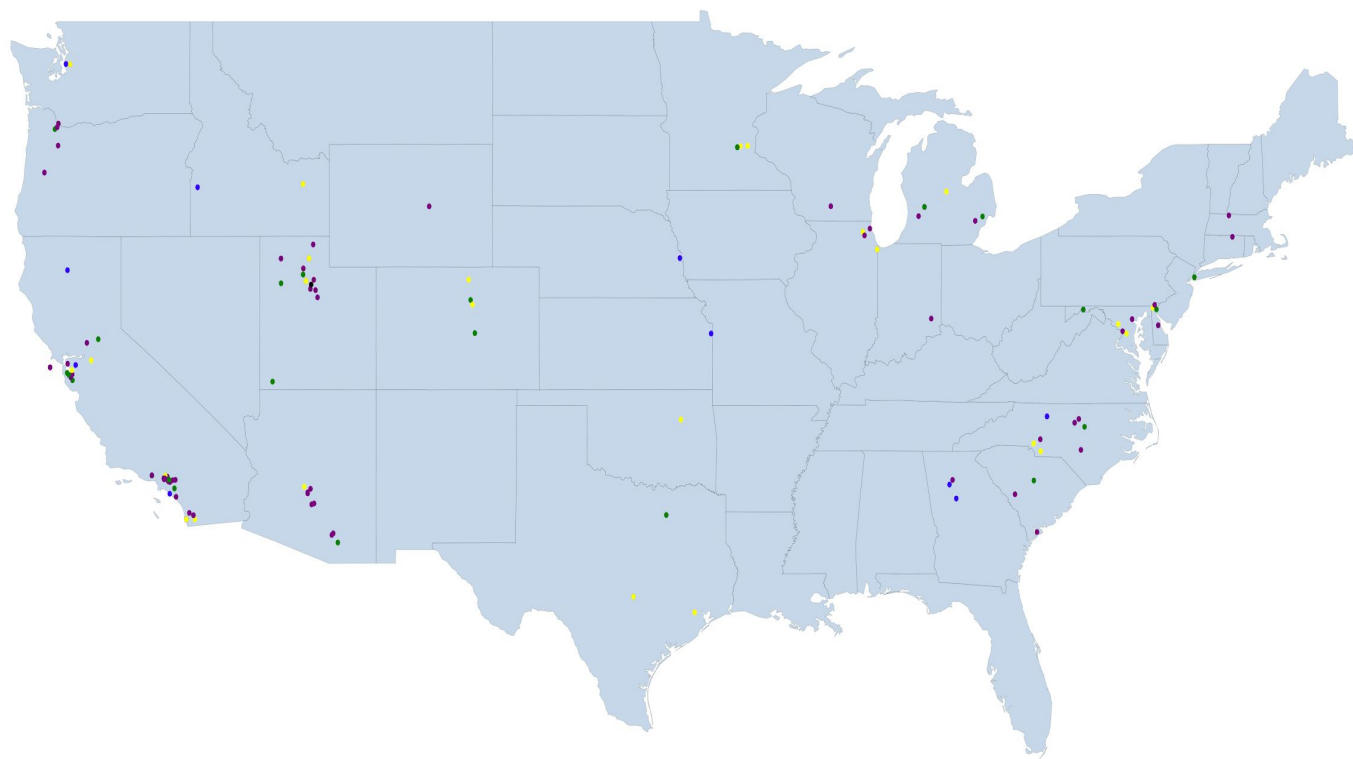
Yellow: 0.74%

Black: 31.93%

Green: 97.10%

Positive means higher % at school than district  
Negative means lower % at school than district

# Results -- Black



Cluster Centers of Differences in %:

Black: -79.63%

Blue: -26.05%

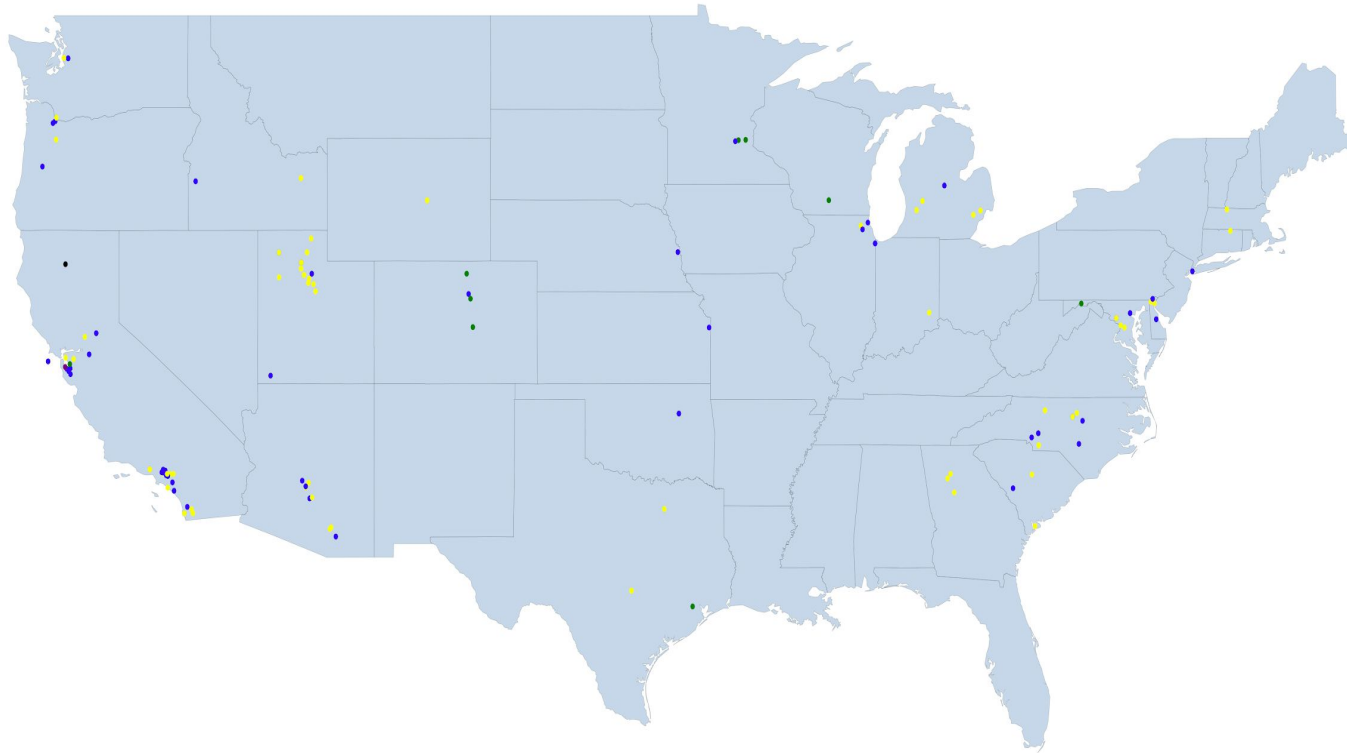
Green: -10.53%

Purple: 0.76%

Yellow: 12.61%

Positive means higher % at school than district  
Negative means lower % at school than district

# Results -- Two or More Races



Cluster Centers of Differences in %:

Yellow: -0.67%

Blue: 2.30%

Green: 8.56%

Purple: 17.88%

Black: 42.48%

Positive means higher % at school than district

Negative means lower % at school than district

# Results and Trends

- Mandarin dual-immersion programs overall tend to have low differences in the percentage of each demographic group compared to their school district.
- The Asian demographic group tends to be represented more in such programs, across space, but especially on the West Coast.
- The Black demographic group has the largest tail into the negative, with no especially visible geographic trend. Somewhat more negative in the South, but more rigorous statistical analysis would be needed.
- The Hispanic demographic group also tends to tail negative, possibly more so outside of the Southwest. More rigorous statistical analysis would be needed to determine that.

# Conclusion

- Generally, these public school dual-immersion programs are relatively similar in demographics to their surrounding district, differing often only by fractions of a percentage
- More rigorous statistical tools should be used to determine how the differences in demographics in these schools differ from differences in demographics in all schools in a difference, to get a better baseline to determine which schools significantly differ from normal
- More attention could be focused on why there are larger tails for Black, White, and Hispanic demographics groups, the local geographies that may play into those disparities, such as racial inequality in some southeastern states.

# References

- “Bilingual Education Act.” *Bilingual Education Act | K12 Academics*, 19 Oct. 2016, [www.k12academics.com/Federal Education Legislation/bilingual-education-act](http://www.k12academics.com/Federal Education Legislation/bilingual-education-act).
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- “Civil Rights Data Collection.” *Home*, 10 Jan. 2020, [www2.ed.gov/about/offices/list/ocr/data.html?src=rt](http://www2.ed.gov/about/offices/list/ocr/data.html?src=rt).