Ranking Resilience Attributes For Texas Public School Districts

http://DataLab12.github.io/

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Motivation

- COVID-19 school reopening decisions were difficult for policymakers since there was no consensus on the impact of school reopening on the spread of COVID-19.
- Learning loss was documented in many states including Texas.
- **If we can identify the most impactful factors on learning recovery from publicly available data sources during pandemic, we can help policy makers make more informative decisions.**

Research Questions

- Can we identify which counties, districts, demographics, or grades were impacted the most by learning loss, and which were able to recover the most?
- Did the amount of support funding a district received help alleviate learning loss, or support learning recovery?
- Are specific types of factors influencing learning recovery more than others?

Data Acquisition and Integrations

Data are acquired from 7 different sources below and integrated by matching School District ID and County FIPS Code with 79 variables from 1,165 school districts in 253 counties:

- STAAR test results, math and reading, by grade in 2019 through 2022 from the Texas Education Agency
- COVID case data, # of students on campus reported to the Texas Health and Human Services per county
- Student race/ethnicity, Title 1/Free lunch, Teacher-Student ratio per district from Common Core Data from the National Center for Education Statistics(NCES)
- Local Area Unemployment Statistics(LAUS) per county from U.S. Bureau of Labor Statistics
- Average Daily Attendance(ADA) per district from Texas Education Agency
- 2010 Census Block Group data from Texas Education Agency/Census Bureau
- Elementary and Secondary School Emergency Relief(ESSER) Grant from Texas Education Agency

Learning Loss/Recovery Visualizations

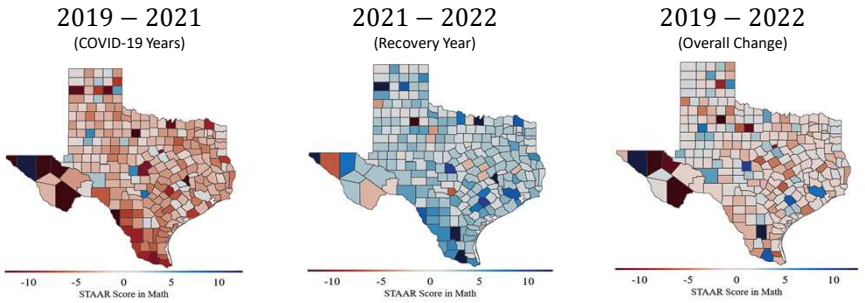


Figure 1: County-level Maps of Texas reflecting the change in Learning Loss in STAAR Math Scores at different year ranges

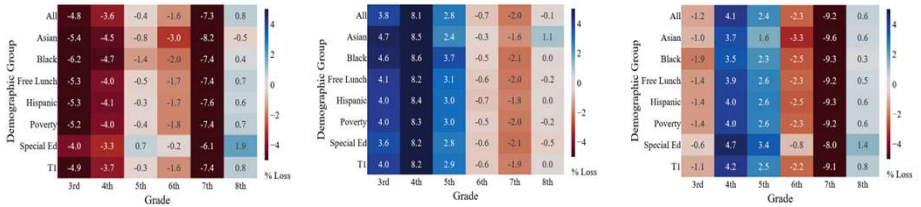


Figure 2: Heatmaps reflecting the change in Learning Loss in STAAR Math Scores at different year ranges by demographic group and grade

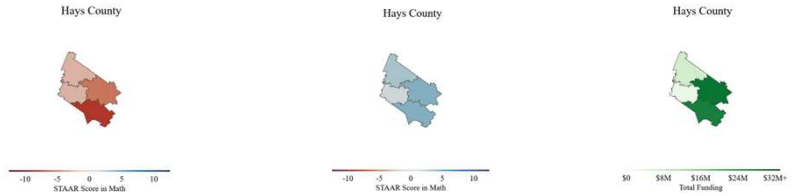


Figure 3: District-level Maps of Hays County reflecting the change in Learning Loss in STAAR Math Scores, and the corresponding total funding a district received.

Important Findings/Notes

- Learning loss is calculated by getting STAAR score differences ((New Score – Old Score)/(Old Score)
- Math suffered much heavier losses than Reading.
- Features were split into different categories to identify which group would be most significant:
  - Attendance, County COVID, Demographics, District Makeup, Locale, Low Income, Mode of Instruction, Prior Score, Race/Ethnicity, Testing Attendance

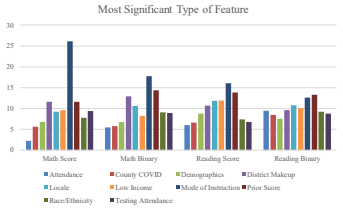
Most Significant Factors

Math

Factor	Feature	Impact Score	Binary Score	ElasticNet Gain	ElasticNet Loss
Demographics	Median Household Income	6.62	5	0	0.2647
District Makeup	Total Students 2018-2019	6.23	7	0	0
District Makeup	Total Students 2020-2021	6.14	6	0	0
District Makeup	Total Students 2021-2022	6.11	7	0	0
Locale	42-Rural: Distant	6.03	3	0.0749	0.0713
Low Income	# of Families 10	5.84	4	0	0
Demographics	Average Annual Pay	5.83	2	0	0.0655
Low Income	ARP ESSER III 21 NORM	5.76	3	0	0
Low Income	CARES ESSER I 20 NORM	5.76	4	0	0

Reading

Factor	Feature	Impact Score	Binary Score	ElasticNet Gain	ElasticNet Loss
Demographics	Average Annual Pay	6.40	3	0.0365	0.1785
Demographics	Per Capita Income	6.27	4	-0.1492	0
District Makeup	Total Students 2021-2022	6.02	6	-0.0325	-0.0142
County COVID	County Population	5.92	5	-0.0136	0
Low Income	# of Families 10	5.91	6	0	0
District Makeup	Total Students 2018-2019	5.89	5	-0.0047	-0.0024
District Makeup	Total Students 2020-2021	5.87	5	0.0000	-0.0136
Low Income	# of Households 10	5.84	5	-0.0147	0
Low Income	% of the Population Under 18 in Poverty	5.80	4	-0.0204	0



- The most significant factors for learning recovery were the median household income and average annual pay of a county.
- The mode of instruction is the most significant type of factor on learning recovery.

Conclusion/Future Work

- Overall, the majority of counties in Texas suffered learning loss from 2019 to 2022.
- The amount of funding, income, and the mode of instruction in an area are all strong factors in learning recovery.

Acknowledgements

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