



Response To Intervention Categorization

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Overview

Cleburne ISD has allowed me to work with their assistant superintendent in charge of research, data, and school improvement on a project to improve 5th grade math outcomes in the district. Normally students are assigned to an RTI (response to intervention) tier, holistically based on the combined recommendation of their math teacher, the campus math specialist, campus administration, and any other relevant parties. An algorithm that could predict a student's math STAAR level of accomplishment has the potential to be a helpful starting point when deciding on which RTI tier a student belongs.

Goals

1. Use exploratory data analysis to identify patterns in the data that may correlate to student math success.
2. Create an algorithm that can accurately predict whether a student will approach, meet, or master the math STAAR for fifth grade.

Specifications

I've been provided with a dataset stripped of identifying information with the following categorical features for all 432 fifth grade student in the 2020-2021 school year:

Student Number Grade Level Campus Number Gender EthnicityRace Economic Disadvantage Economic Disadvantage Category At Risk Special Ed LEP (Limited English Proficiency) ESL (English as a Second Language)	Bilingual Gifted Talented Tested Language Military Connected Student New To Texas >=50.0% Remote SY 2020-21 Discipline Placement Incidents Oral Administration Test Admin Mode STAAR Category STAAR Progress from 2019
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The data can be accessed by clicking this [link](#) if this document is viewed digitally.

Data Wrangling / Cleaning

Before exploring the data I'll look for null values, mistakes and misspellings, and examine the proportions of the values to make sure they make sense based on my own domain knowledge as a former educator. I will also reformat the target variable (STAAR Category) so that it is a single feature from 0 (did not approach) to 4 (Masters). Every other ordinal feature will also be converted into numeric values with a dictionary saved for later interpretation.

Exploratory Data Analysis

I'll begin by searching for patterns between each of the categories, taking special note of how they relate to the target variable. Since this is a smaller dataset, I will also use statistical sampling and hypothesis testing to determine whether any patterns present are statistically significant.

Data Training / Prediction

I will train multiple categorical models on the data and compare the resulting confusion matrices to gauge success. If necessary I may use bootstrapping to increase the size of the dataset. The predictions made will be compared to actual RTI tiers assigned to students for the 2021-2022 school year. From there I will request to use the algorithm to supplement teacher recommendations on one campus for the 2022-2023 school year and survey educators on whether they believe such a resource was valuable to them.

Deliverables

I. All jupyter notebooks

These notebooks will be formatted and notated to maximize interpretation

II. Executive Report and Slidedeck

These will formally explain my process and results to the Assistant Superintendent and any other relevant parties.

III. Tableau Dashboard

This will be a supplementary dashboard for further exploration of my analysis by interested parties