JPM Data For Good
Team 2

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Contents

Introduction

Problem and Approach

Problem: How can we effectively invest in the school system to improve student learning in a way that is maximally efficient?

Our Approach:

- **Predict** student performance based on given data
- **Find** factor(s) with the greatest impact on proficiency
- **Invest** in those solutions related to these factors

Success Metric

Metric: ELA & Math Proficiency

Why this metric?

- Directly correlated to: well-being at home[1], environment at school, teachers/administrators relationships[2], etc.
- Schools with higher scores receive more state $
- Reduce data into a quantitative encompassing metric

[1] Topor, David R et al. "Parent involvement and student academic performance: a multiple mediational analysis." *Journal of prevention & intervention in the community* vol. 38,3 (2010): 183-97. doi:10.1080/10852352.2010.486297

[2] Daily SM, Smith ML, Lilly CL, Davidov DM, Mann MJ, Kristjansson AL. Using School Climate to Improve Attendance and Grades: Understanding the Importance of School Satisfaction Among Middle and High School Students. J Sch Health. 2020 Sep;90(9):683-693. doi: 10.1111/josh.12929. Epub 2020 Jul 21. PMID: 32696507; PMCID: PMC8385678.

Data Analysis

Machine Learning Approach

-   Given this lake of data, machine learning strategies can help us intuit the core factors influencing our success metric
-   Regression models can predict the proficiency rating of the school given the large input set of factors
-   Through these models, we can test the sensitivity of different factors and their respective impact on performance

Support Vector Regression & Recursive Feature Elimination

- Started with 17 quantitative measures

- RFE narrowed down the top 8 most important features in the regression

- Qualitatively narrowed down to 4

- **Targeted Issues: Student Absence & Teacher-Student Collaboration**

Quantitative Reduction:

(1) Economic Need Index (2) School Income Estimate (3) Student Attendance Rate (4) Percent of Students Chronically Absent (5) Rigorous Instruction Rating (6) Collaborative Teachers % (7) Effective School Leadership % (8) Student Achievement Rating
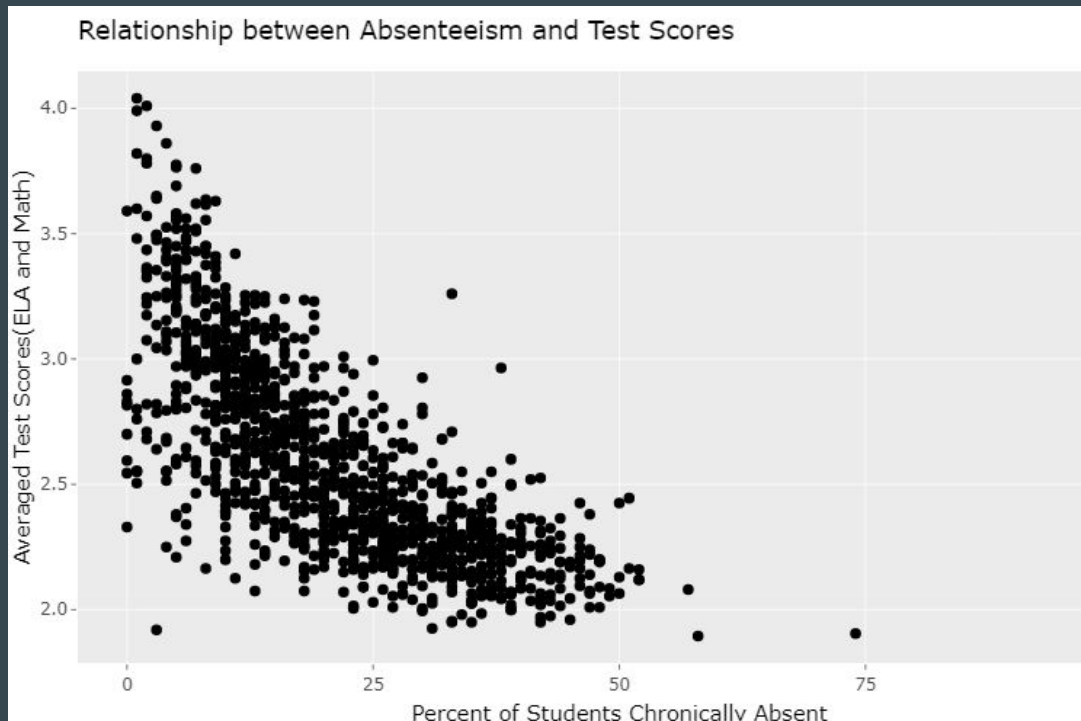
Qualitative Reduction:

(1) Percent of Students Chronically Absent (2) Rigorous Instruction Rating (3) Collaborative Teachers % (4) Effective School Leadership %
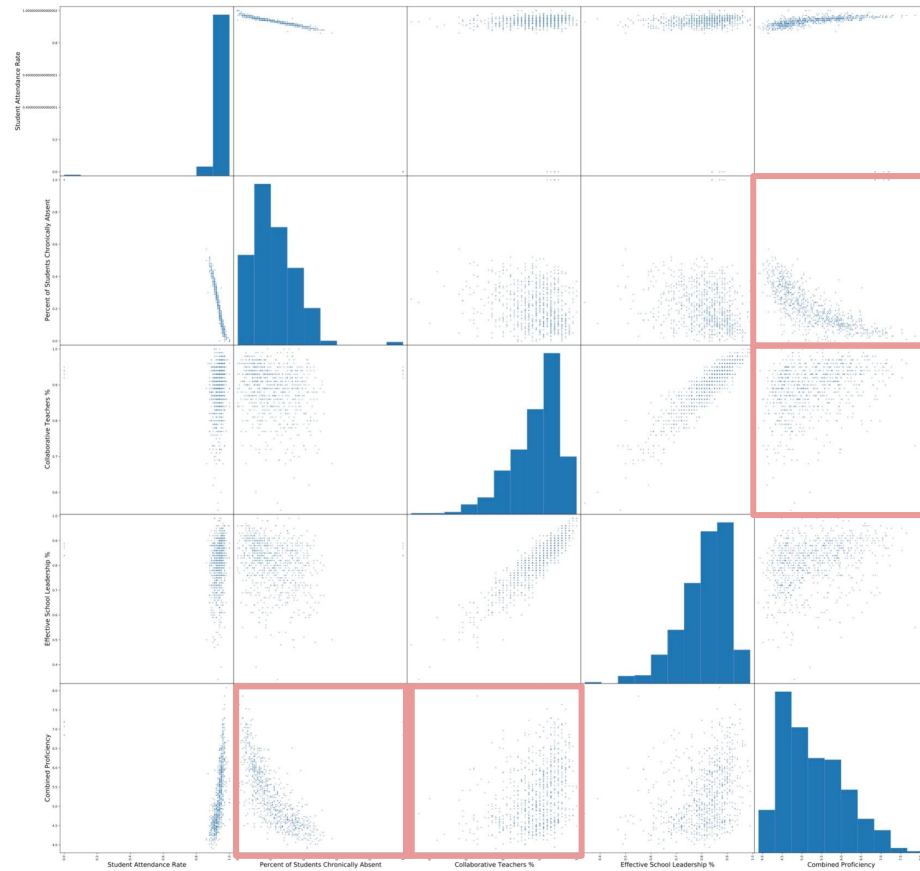
Visualizing the Impact of Absenteeism on Test Scores

- Meaning/Importance of Chronic Absenteeism
- How we got this data
- Implications of the graph

Relationship between Absenteeism and Test Scores

Areas of Investment

Solutions

## Chronic Student Absence

1) Accessibility
   a) Rides to school
   b) Meal plans
2) Increased Study Hall (allow for study time outside of them home environment)
3) Diversity, Equity, and Inclusion education and resources
4) Academic & behavioral counseling

Teacher Collaboration

1) Funding for afterschool programs
2) Student passion projects
   a) Curious Cardinals model
   b) Guidance on self directed projects
3) Field trips
4) Clubs

Student Survey Perceptions - Social Factors

Score Avg. Averages - Social Factors
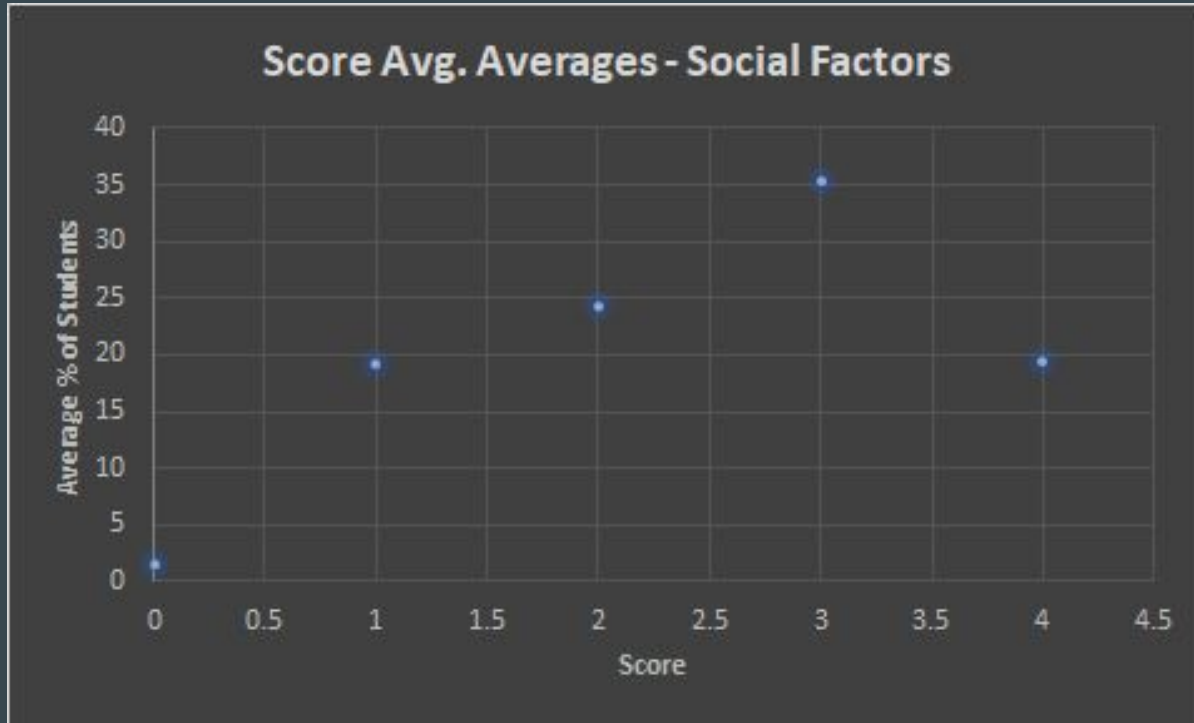
- Dissatisfaction with social factors impacting student experience at school

- Areas of Concern

  - Respect from schoolmates

  - Active engagement in courses

  - Behavior of peers

Student Survey Perceptions - Teaching & Academic Factors

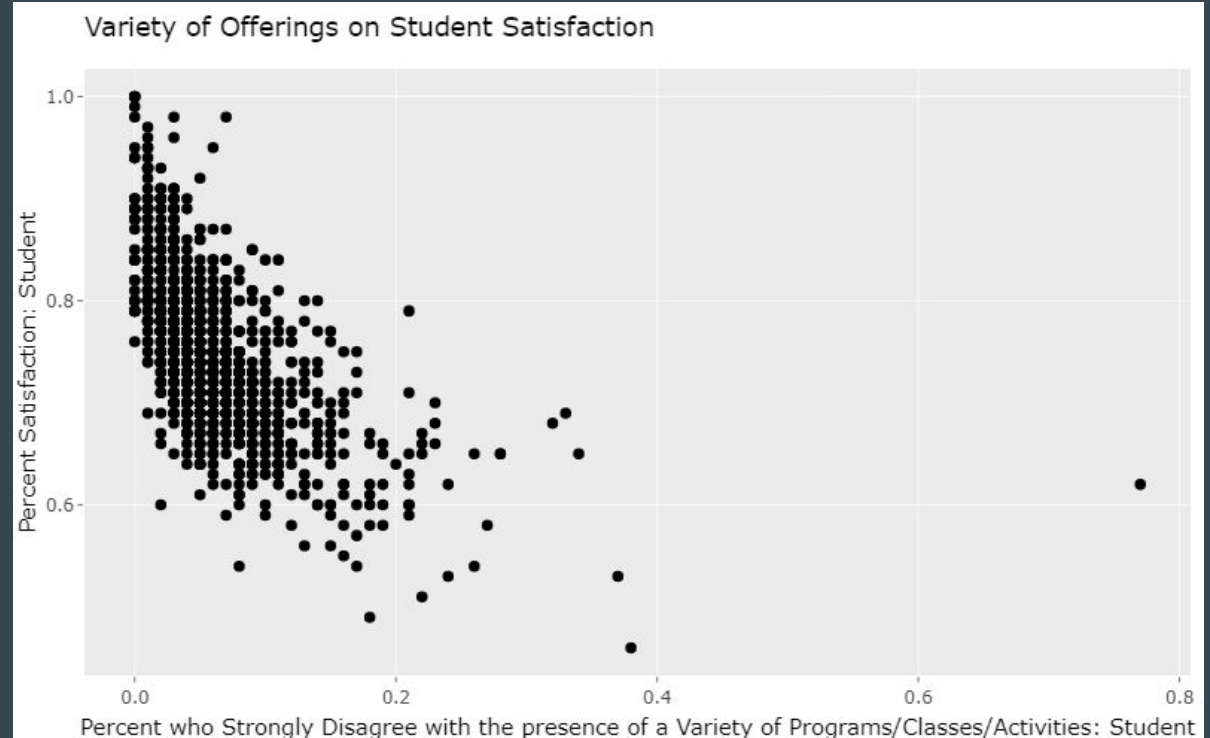Score Avg. Average - Teacher Factors

Score Avg. Averages - Academic Factors
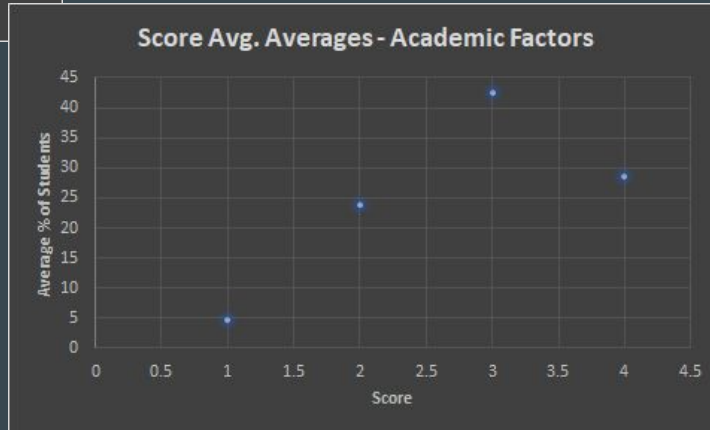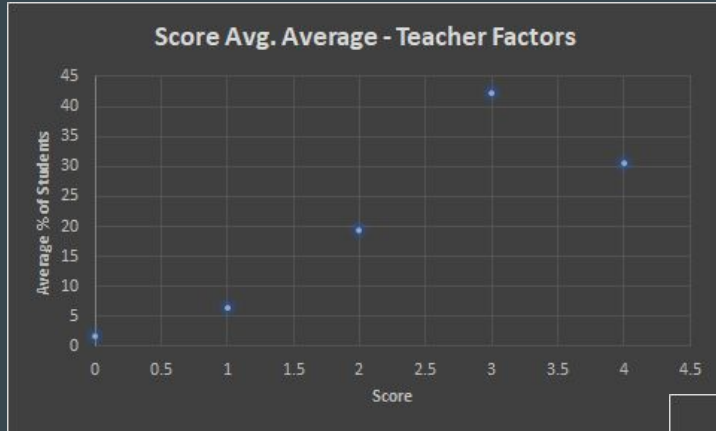
- Dissatisfied with:

    - Variance of

      pedagogy

    - Support of student

      well-being

    - Meaningful

      relationships with

      students

    - Importance of

      schoolwork

Benefits of Offering New Programs

- Our data
- Wider variety of Program offerings leads to higher student satisfaction
- [Pubmed: Using School Climate to Improve Attendance and Grades: Understanding the Importance of School Satisfaction Among Middle and High School Students](#)

Variety of Offerings on Student Satisfaction

[3]Daily SM, Smith ML, Lilly CL, Davidov DM, Mann MJ, Kristjansson AL. Using School Climate to Improve Attendance and Grades: Understanding the Importance of School Satisfaction Among Middle and High School Students. J Sch Health. 2020 Sep;90(9):683-693. doi: 10.1111/josh.12929. Epub 2020 Jul 21. PMID: 32696507; PMCID: PMC8385678.

Implementation

Program Implementation Checklist:

1. Test Student Perception

2. Pilot Period

3. Deployment