Eric & Wendy Schmidt **Data Science For Social Good** Summer Fellowship

Targeting Education Interventions For Young Students



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Introduction

Third grade is often thought to be a critical time where students transition from learning to read to reading to learn. In Oklahoma, the Reading Sufficiency Act (RSA) of 2013 requires less proficient students to repeat third grade. This creates a high-stakes testing environment.

Methods

We applied machine learning models to deliver data-driven predictions of third grade reading proficiency that are accurate and interpretable.

Model





Outcome:

Pass

reading

exam

Results

Tulsa Public Schools has the capacity to provide extra reading help to approximately half of students in any particular year. At this level, results from our best performing model indicate an ability to correctly **recall 95%** of students who are not on track. This is an improvement on the baseline method (using past test score results alone) by around 5 percentage points.



Data

A broad range of data were used to help predict third grade reading outcomes. Through our partnership with Tulsa Public Schools (TPS), data were obtained on student demographics, attendance, behavior and test outcomes. Additionally, data on reading software use was provided by Houghton Mifflin Harcourt. We utilized these data to capture the wide variation in socio-economic conditions across Tulsa.

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Based on a longitudinal student dataset, we created an **end-of-second-grade model** to determine whether a student will pass a third-grade-level reading exam in the next year.

Model Validation

Since the passage of RSA in 2013, there have been two complete cohorts which have taken reading tests. We **split** the data into training and tests sets between these two cohorts to cross-validate.





Our increase in recall implies **250 more struggling** students every year will be given extra attention. This intelligence will be provided to administrators and schools through a risk dashboard for teachers. We hope this will prevent many young students from needing to repeat third grade—and help improve their life trends overall.

Tulsa Public Schools Percent of Population living in Poverty



60

40

20

Classifier Performance

After testing a wide range of classification methods, we found that Random Forest and penalized Logistic Regression give the best

	Student Risk Dashboard		
	Student	Risk	Recommendation
	Kevin W.	80%	Summer School
0	Ali V.	15%	iRead, 30 mins/day
	20 7.5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6		
	Privacy Security Legal Start	Over	Prev Next



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