Predictive Model Metrics Evaluation (ELA 9th Grade)

Portfolio Sample - Anonymized Data

Model Performance (Walk-Forward Cross-Validation)

Model Name	RMSE	MAE	R-Squared
Linear Regression	5.055	4.035	0.961
Gradient Boosting	5.687	4.522	0.950
Random Forest	5.803	4.666	0.948
XGBoost	6.213	4.896	0.940

How to Interpret the Metrics

1. RMSE (Root Mean Squared Error): Represents the average error in the same units as the state scale score. It penalizes larger errors heavily. A lower RMSE means predictions are mathematically closer to actual outcomes.

2. MAE (Mean Absolute Error): The straightforward average of how many points the model is off by. If MAE = 4.0, the prediction is on average 4 points away from reality. Lower is better.

3. R-Squared (R2): Represents the percentage of variance in final scores that the model successfully explains using historical data. Closer to 1.0 (100%) indicates a highly reliable model.

CONCLUSION: The Linear Regression model was automatically selected for final predictions because it achieved the lowest RMSE (5.055).