Implementing MTSS in ELA

A Data-Driven Approach to PM Tracking, Predictive Modeling, and Targeted Interventions

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What is MTSS?

Multi-Tiered System of Supports (MTSS) is a proactive, data-driven framework used to provide targeted support to students based on their specific needs.

- Tier 1 (Universal): Core instruction for all students.

- Tier 2 (Targeted): Small-group interventions for students falling behind benchmark expectations.

- Tier 3 (Intensive): Individualized, intensive support for students with significant learning gaps or persistent negative growth.

The ELA Data Pipeline

We tailored the data pipeline specifically for ELA FAST Progress Monitoring (PM) assessments:

- Missing Data (Median Imputation): Missing PM scores are filled using class medians to maintain trajectory accuracy.

- Sequential Growth: Tracks the exact scale score point improvement between PM1, PM2, and PM3.

- Achievement Level Benchmarks: Tiers are assigned using the state's Achievement Level cutoffs (Levels 1-5).

- K-Prototypes Clustering: Groups students inside each Tier based on test scores, standards mastery, and demographic profiles for optimal intervention seating.

Demystifying the Data Columns

- Key columns in your generated Excel reports:
  - Average_PM_Score: Overall average scale score across available PM assessments.
  - Growth: The point difference between tests (positive number = improving).
  - Above_Benchmark: 1 = Yes (Level 3 or higher), 0 = No (Level 1 or 2).
  - Tier: Official MTSS placement (Tier 1, Tier 1 - Monitoring, Tier 2, or Tier 3).
  - Cluster: The specific sub-group inside the Tier containing students with highly similar gaps.

Predicting PM3 Outcomes

- Understanding the 'ELA_PM3_Predictions_and_Gains' File:
  - Machine Learning Ensemble: The pipeline uses advanced ML (like XGBoost and Random Forest) to predict the official PM3 Scale Score.
  - Predicted_PM3_Level: The predicted scale score is mapped to a predicted FAST Achievement Level (1-5).
  - Prior_Year_Level: Simulated prior year data used as a baseline.
  - Predicted_Gain: Answers 'Yes' or 'No' based on Florida's official Learning Gains criteria (e.g., maintaining a Level 3, increasing a level, or showing significant scale score growth within Level 1/2).

Evaluating Model Accuracy

- Understanding the 'Predictive_Model_Metrics_Explanation.pdf':
  - RMSE (Root Mean Squared Error): The primary metric used. It represents the average error in FAST scale score units. Lower is better.
  - MAE (Mean Absolute Error): The straightforward average of how many scale score points the prediction is off by.
  - R-Squared (R2): The percentage of variance in PM3 scores explained by our data. Closer to 1.0 indicates higher reliability.
  - The pipeline automatically tests multiple models via 'Walk-Forward Nested Cross-Validation' and selects the one with the lowest RMSE to generate your final predictions.

How to Use the Excel Reports

- Your specific Teacher Rosters are heavily formatted for ease of use:
  - Sheet Navigation: Start at the 'OVERALL' tab to review school-wide Tier Distributions, then locate your specific tab.
  - Auto-Filters: Every column has a drop-down arrow. Instantly filter your students by Tier, Cluster, Period, or Growth Level.
  - Actionable Steps: Filter down to a specific Tier and Cluster, then look at the 'Standards_Needing_Intervention' column to plan targeted lessons.

Turning Data into Action

Immediate Next Steps:

- Review your Class Tier Distribution tab.

- Identify the priority standards dragging down your Tier 2 and Tier 3 students.

- Use the Cluster column to seat students with similar gaps together during intervention days.

Questions? Email me at capiroxanalytics@gmail.com