KENTUCKY READING RESEARCH CENTER

LETRS Implementation in Kentucky:

An Analysis of Teacher Training and Student Reading Outcomes

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The Kentucky Reading Research Center is a partnership between the University of Louisville College of Education and Human Development and the Kentucky Department of Education. Established through Kentucky Revised Statute 164.0207, the center supports educators in implementing evidence-based reading programs and promotes literacy development across the Commonwealth.

UNIVERSITY OF LOUISVILLE
COLLEGE OF EDUCATION & HUMAN DEVELOPMENT

Kentucky Department of EDUCATION

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Executive Summary

Key Findings and Policy Implications

Lexia® LETRS® (Language Essentials for Teachers of Reading and Spelling) is a professional learning course for instructors of reading, spelling, and related language skills. It provides educators with in-depth knowledge and tools that they can use with any reading program. LETRS has been made available through the Kentucky Department of Education's Kentucky Reading Academies as a comprehensive, no-cost, professional learning opportunity to all K-5 public school educators and administrators. To date, more than 7,000 Kentucky educators and administrators have participated in the LETRS professional learning opportunity.

This analysis explores the potential effects of LETRS training for both teachers and school administrators on student reading achievement, as measured by the Kentucky Summative Assessment (KSA). The analysis integrates data from 574 A1-type (general education) elementary schools across 135 districts from 2021/2022 to 2024/2025 academic years. Across multiple analytical methods including regression models with baseline outcome measures, group comparisons, and Difference-in-Differences (DID) analyses, the findings consistently indicate that LETRS training helps drive students toward the "Proficient" reading level, while inconclusive results for other reading levels (e.g., "Novice", "Apprentice", and "Distinguished")

Key Outcome: Significant Growth in "Proficient" Students

- **Robust Positive Associations:** Regression models demonstrate that a higher percentage of LETRS-trained teachers in a school is positively associated with a higher percentage of "Proficient" level students. This relationship remained robust even when baseline outcome measures were adjusted and additional school-level covariates were introduced.
- **Administrator Interaction:** No significant interaction effects were found between the percentage of LETRS-trained teachers and the presence of a LETRS-trained school administrator. Consequently, the data does not conclusively show that teacher LETRS training is more effective when supported by a LETRS-trained administrator. While trained administrators may offer broader support, the direct application of LETRS methodologies occurs primarily within the classroom, functioning independently of the administrator's training completion.

- **Group Comparison Growth:** To facilitate group comparisons of similar sizes, schools were categorized into two groups: those below the average percentage of LETRS-trained teachers and those above. Schools with an above-average percentage of LETRS-trained teachers (>10.6%) experienced a notably higher increase in "Proficient" students (4.26%) compared to below-average schools (2.90%) between 2023 and 2025.
- **DID Analysis Confirmation:** DID analysis confirms this positive trend, revealing a statistically significant positive effect on the percentage of "Proficient" students (p = .002 to .005) across both simple and full models, utilizing both 2022 and 2023 baselines.
- **District-Level Impact:** At the district level, the DID coefficient was marginally statistically significant (p < .10) exclusively for the "Proficient" student category across both the 2022 and 2023 baselines.

Part I. School Level Analysis

Focus: LETRS-trained teachers and school-level reading achievement results (KSA)

1. Data Source and Preparation

The analysis integrates multiple data sources to build a comprehensive school-level dataset.

- **LETRS Training Records:** Contains individual-level training data including names, districts, training modules (Unit 1-8, ECE, Administrator, Principals Primer), and completion dates., and complete date.

- **MUNIS Personal Date (2025):** The 2024-2025 state-wide roster of Kentucky school employees used to identify the total number of teachers and school administrators per school.

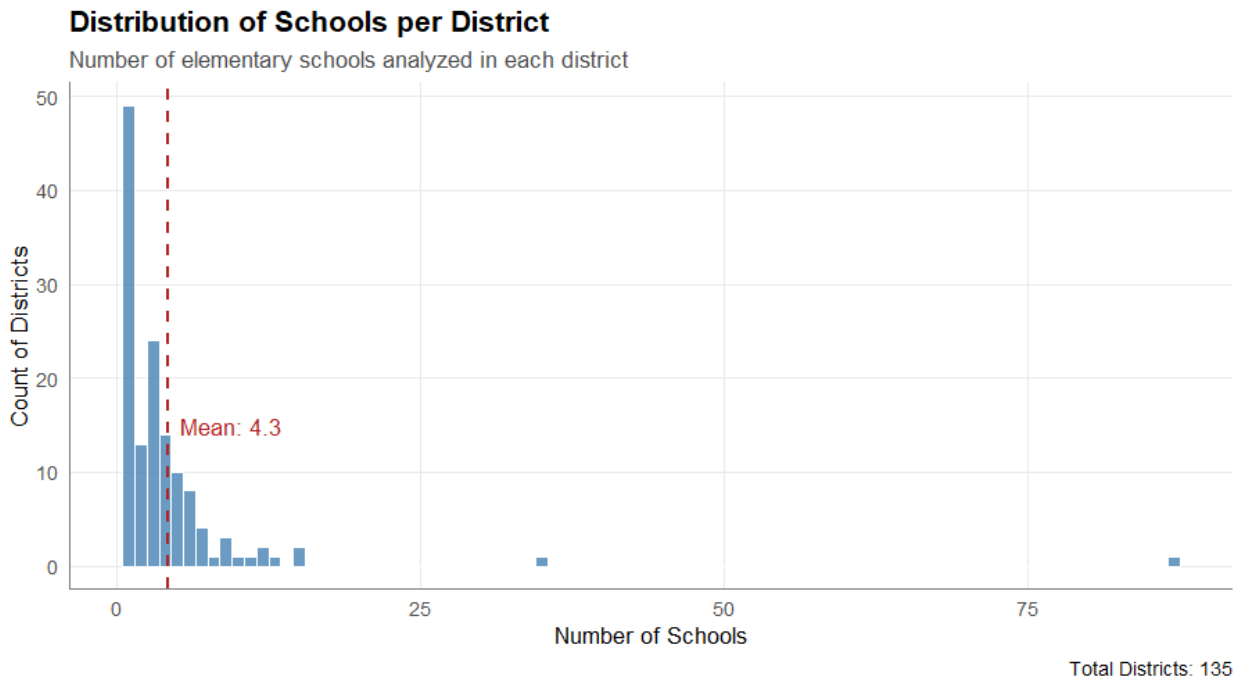
- **KSA Reading Performance (2021/2022 – 2024/2025)**: Yearly school-level student performance data across grade 3 to 5, categorized into Novice (Level1), Apprentice (Level2), Proficient (Level 3), and Distinguished (Level 4) levels.

- **School Characteristics:** Grade Ranges and Open House Supplemental Data and School Directory data retrieved from Kentucky Department of Education (KDE)'s School Report Card Suite.

2. Data Cleaning

Due to incomplete unique teacher IDs (EPSBID) in the LETRS records and discrepancies between LETRS records and MUNIS personnel data, individuals were matched using first and last names along with district membership. LETRS training records without matching MUNIS records were excluded. To ensure a homogeneous sample, the data was restricted to K-5 elementary schools (highest grade of 5th or 6th) and only included A1 (General Education) schools.

Final Sample: The final dataset comprises 574 elementary schools across 135 school districts.



3. LETRS Training Completion Trends

From the final sample, the total number of educators completing the training has substantially increased, heavily concentrated in the last two years (2024 and 2025).

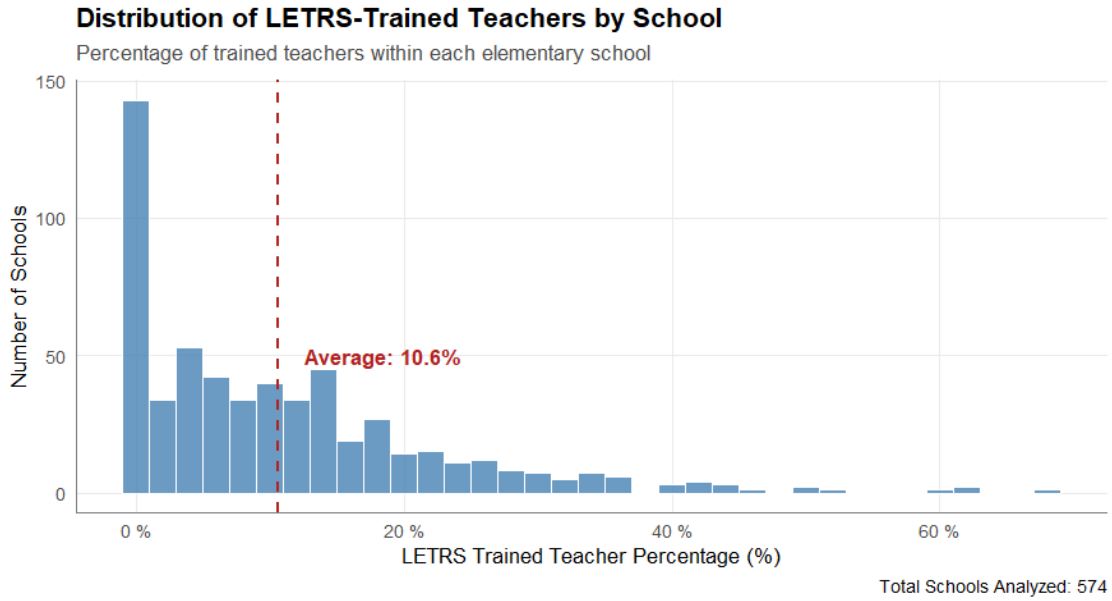
LETRS Completion by Year

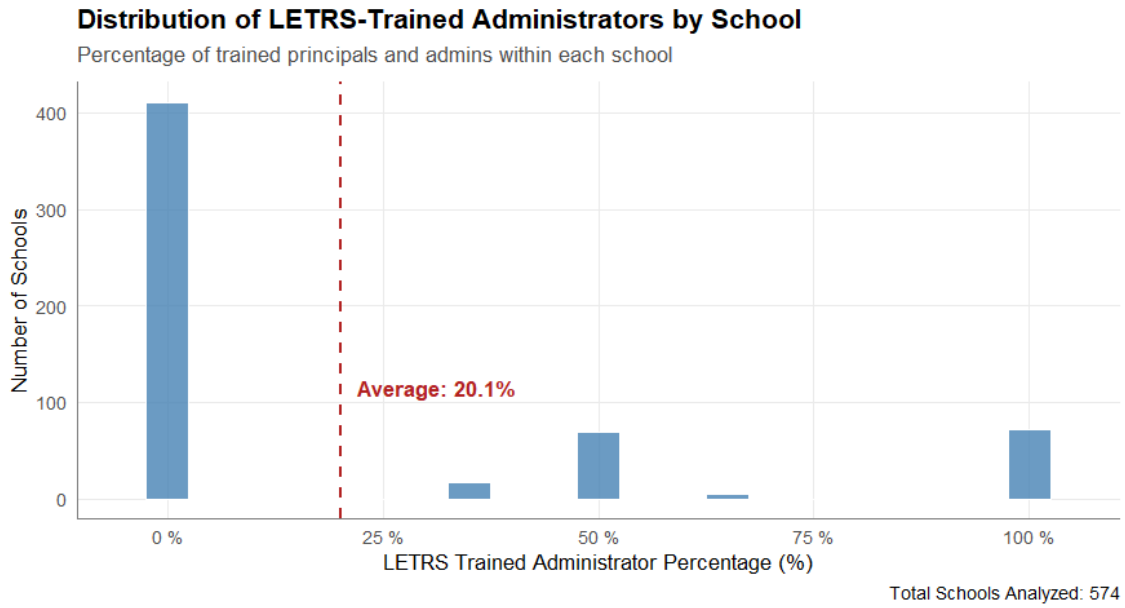
Completion Year	2022	2023	2024	2025	Total
Teacher	1	38	813	1055	1907
School Administrator	4	24	95	82	205
Total (%)	5 (0.24%)	62 (2.94%)	908 (42.99%)	1137 (53.84%)	2112 (100%)

4. School-Level LETRS Training Overview

On average, a school has 3.32 LETRS-trained teachers (10.6%) and 0.357 trained administrators (20.1%) 24.9% of the schools do not have any LETRS-trained teachers. Furthermore, only 11% of schools have at least 1 out of 4 teachers (25%) trained in LETRS.

71.6% (411 schools) do not have any LETRS-trained school administrators. Only 12.5% (72 schools) have all school administrators trained.





5. Analysis of the Relationship between Penetration of LETRS Training and KSA Reading Achievement in School.

The relationship between LETRS training and KSA reading achievement was analyzed using regression models and Difference-in-Differences (DID) analyses.

DID isolates the training's specific impact by comparing the trajectory of reading scores over time between two groups, filtering out general educational trends that would have occurred regardless of the intervention. In this observational setting, comparing unrealistic extremes like 100% and 0% training adoption yields imbalanced and unrepresentative groups. By defining our comparison groups based on above- or below-average LETRS teacher proportions instead, we balance the sample sizes while still providing a robust and practical framework to evaluate the true effect of greater LETRS training density.

Key Variables:

- Independent Variable: Percentage of LETRS-trained teachers
- Outcome Variables: 2024/2025 KSA reading achievement (across four levels)
- Baseline Measures: 2021/2022 KSA reading achievement and 2022/2023 KSA reading achievement

Note*.* In addition to the 2021/2022 KSA reading achievement baseline, we also examined the 2022/2023 academic year. Given that over 95% of educators completed their LETRS training after 2024, the 2022/2023 school year aligns more closely with the presumed intervention period (2024). Furthermore, because the 2021/2022 school year was still significantly impacted by the COVID-19 pandemic, utilizing the 2022/2023 KSA data may provide a more stable baseline.

Full Model Baseline Covariates:

- Pupil-Teacher Ratio (PTR)
- Percentage of students eligible for the Free/Reduced-Price Lunch Program (FRLP)
- School size (total student enrollment)
- Percentage of Black students
- Percentage of Hispanic students
- Percentage of Rank I teachers
- Teacher turnover rate
- School locality (e.g., City, Town, Suburban, and Rural)

5.1. Regression Model Findings

Effect of LETRS-trained teacher: When using the 2021/2022 reading outcomes as a baseline covariate in a full model, there was a statistically significant positive coefficient for the "Proficient" level (p = .012) and a significant negative coefficient for the "Distinguished" level (p = .037). Using the 2022/2023 baseline, the full model again showed a significant positive effect for the "Proficient" level (p =.020).

Effect of LETRS-trained school administrator and interaction effect of LETRS-trained teacher and LETRS-trained school administrator: Regression models assessing the impact of having a LETRS-trained administrator yielded no statistically significant results. Additionally, there were no significant interaction effects between the % of LETRS teachers and the presence of trained administrators.

Regression Model Results - LETRS-trained Teachers

2021/2022 Baseline

Outcome Variable	Simple Model			Full Model		
	Coefficient	*t*	*p*-value	Coefficient	*t*	*p*-value
% Novice	- 0.020	-0.768	.443	-0.013	0.532	.595
% Apprentice	0.013	0.654	.513	0.012	0.631	.528
% Proficient	**0.060**	3.027	.002	0.048	2.511	.012
% Distinguished	**- 0.050**	-2.097	.036	-0.049	-2.095	.037
% Proficient + Distinguished	0.002	0.059	.953	0.002	0.056	.955

Note: Bold numbers indicate statistical significance (p < .05).

2022/2023 Baseline

Outcome Variable	Simple Model			Full Model		
	Coefficient	*t*	*p*-value	Coefficient	*t*	*p*-value
% Novice	- 0.041	-1.754	.080	-0.028	-1.270	.205
% Apprentice	0.010	0.565	.572	0.018	0.976	.329
% Proficient	**0.058**	3.009	.003	0.043	2.341	.020
% Distinguished	- 0.017	-0.831	.406	-0.029	-1.424	.155
% Proficient + Distinguished	0.034	1.199	.231	0.017	.627	.531

Note: Bold numbers indicate statistical significance (p < .05).

Regression Model Results - LETRS-trained School Administrators

Note. Variable Transformation: The percentage of LETRS-trained school administrators was transformed into a dichotomous dummy variable due to its highly limited variation (1 = presence of a LETRS-trained administrator, 0 = absence of a LETRS-trained administrator).

Simple Model Results

Outcome Variable	*2021/2022 Reading Outcome as Baseline Covariate*			*2022/2023 Reading Outcome as Baseline Covariate*		
	Coefficient	*t*	*p*-value	Coefficient	*t*	*p*-value
% Novice	-0.114	-0.173	.863	-0.662	-1.114	.266
% Apprentice	-0.262	-0.533	.594	0.275	0.599	.550
% Proficient	0.339	0.671	.502	0.557	1.237	.256
% Distinguished	0.066	0.110	.912	-0.343	-0.654	.513
% Proficient + Distinguished	0.449	0.547	,575	0.281	0.395	.693

Because none of the coefficients in the simple model were statistically significant, a full model incorporating baseline covariates was not estimated for the LETRS-trained school administrator variable.

Regression Model: Interaction Effects

(Interaction term: % of LETRS-trained teachers * Presence of a LETRS-trained administrator)

Outcome Variable	*2021/2022 Reading Outcome as Baseline Covariate*			*2022/2023 Reading Outcome as Baseline Covariate*		
	Coefficient	*t*	*p*-value	Coefficient	*t*	*p*-value
% Novice	0.018	0.271	.786	0.037	0.622	.534
% Apprentice	0.040	0.811	.418	-0.010	-0.225	.822
% Proficient	-0.001	-0.017	.986	0.025	0.510	.611
% Distinguished	-0.045	-0.752	.452	-0.035	-0.669	.504
% Proficient + Distinguished	-0.072	-0.881	.452	-0.070	-1.303	.193

None of the interaction terms were statistically significant, indicating no interaction effects between the percentage of LETRS-trained teachers and the presence of a LETRS-trained administrator. Consequently, no further analysis was conducted for this model.

5.2. Group Comparison (Above and Below Average % LETRS-trained teacher)

Comparing schools with above-average trained teachers (>10.6%) to those below-average (<10.5%), The largest growth difference is observed at Proficient level.

- 2022 to 2025 KSA level change: The Above Average group experienced much higher increase in Proficient level compared to the Below Average group. (2.87% vs. 1.43%)
- 2023 to 2025 KSA level change: The above Average group experienced much higher increase in Proficient level compared to the Below Average group (4.26% vs. 2.90%)

KSA Level Change Between Above-Average (>10.6%) vs. Below-Average (<10.6%)

(Baseline Year 2022)

Group	Novice % Change	Apprentice % Change	**Proficient % Change**	Distinguished % Change	Proficient + Distinguished % Change
Below Avg (B)	-5.18	1.62	**1.43**	2.10	3.55
Above Avg (A)	-5.47	1.76	**2.87**	0.84	3.70

Note: Bold column indicates the largest percentage change between the two groups.

(Baseline Year 2023)

Group	Novice % Change	Apprentice % Change	**Proficient % Change**	Distinguished % Change	Proficient + Distinguished % Change
Below Avg	-2.40	0.977	**2.90**	-1.52	1.39
Above Avg	-3.30	1.010	**4.26**	-1.92	2.33

Note: Bold column indicates the largest percentage change between the two groups.

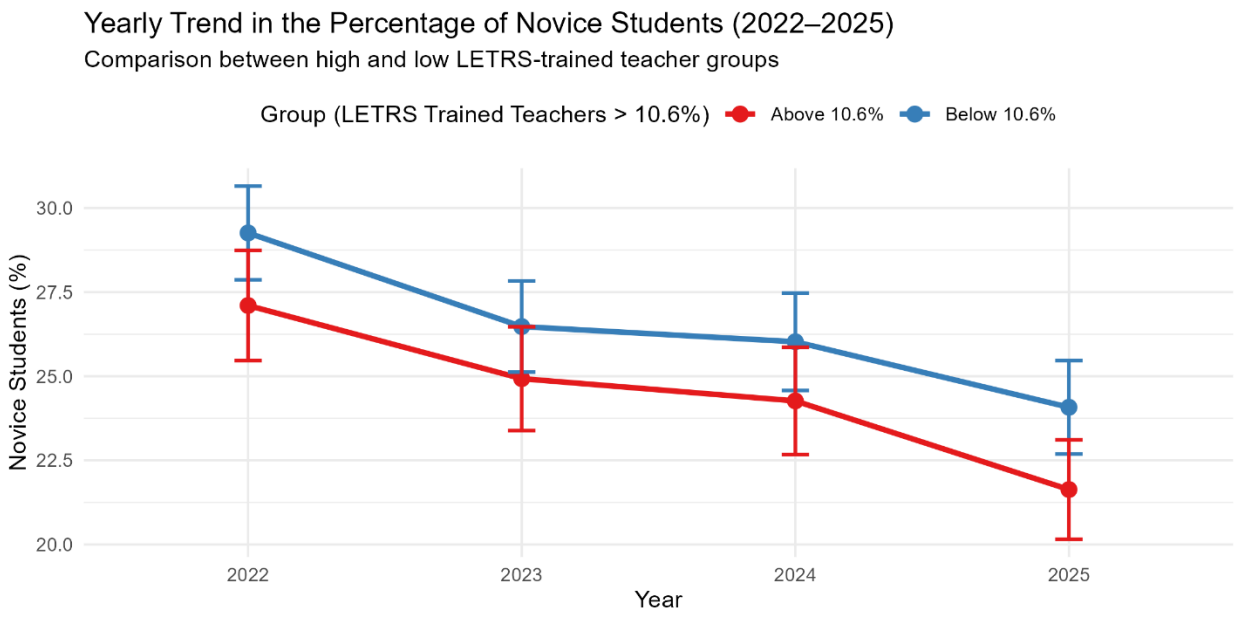
Baseline Covariate (2022) Comparison

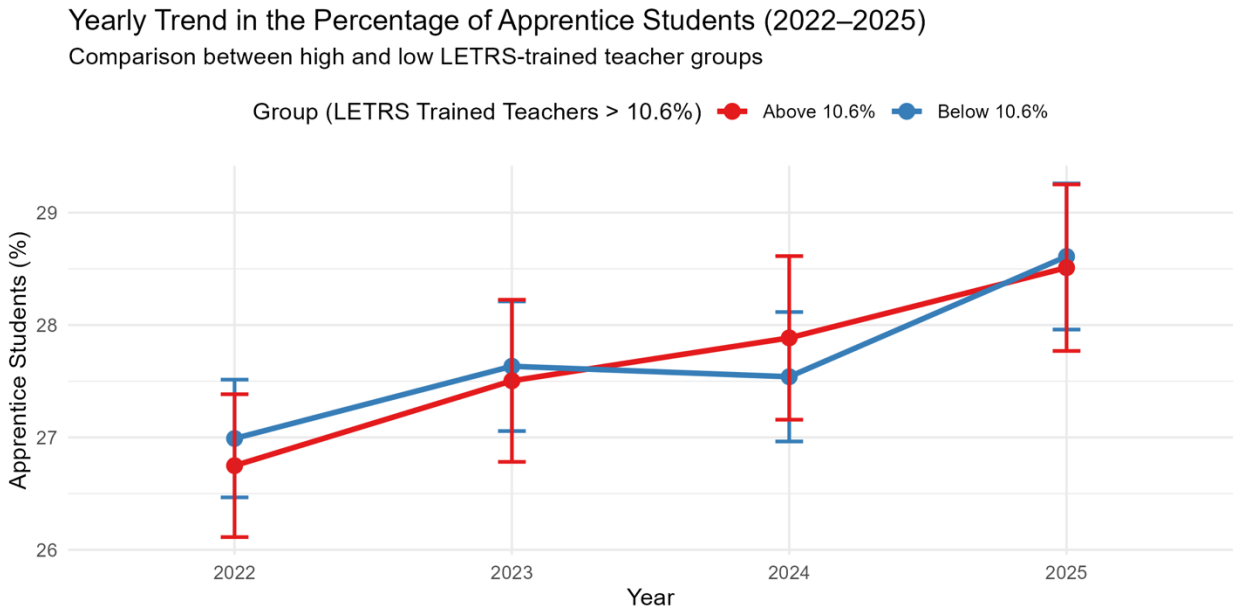
Variable	Schools Below 10.6% LETRS Teachers (n = 340)	Schools Above 10.6% LETRS Teachers (n = 234)
Total Teachers	31.09 (9.48)	31.54 (9.53)
School Administrator	1.77 (0.65)	1.74 (0.63)
LETRS-trained Teachers	1.09 (1.2)	6.57 (3.62)
LETRS-trained Administrators	0.19 (0.48)	0.6 (0.72)
PTR	13.39 (2.19)	13.56 (2.07)
%FRLP eligible	61.48 (18.21)	58.38 (18.00)
School Size	433.06 (140.92)	440.10 (145.51)
% Black	12.50 (18.66)	7.90 (12.3)
% Hispanic	8.79 (8.91)	7.69 (7.83)
% Teacher Turnover	20.58 (12.95)	19.15 (10.94)
% Rank I Teachers	23.94 (11.85)	23.26 (11.61)
% Novice (2022)	29.26 (13.11)	27.10 (12.80)
% Apprentice (2022)	26.99 (4.93)	26.75 (4.96)
% Proficient (2022)	27.74 (6.93)	28.23 (6.95)
% Distinguished (2022)	16.05 (9.01)	17.98 (10.05)
% Proficient + Distinguished (2022)	43.78 (14.38)	46.20 (14.98)

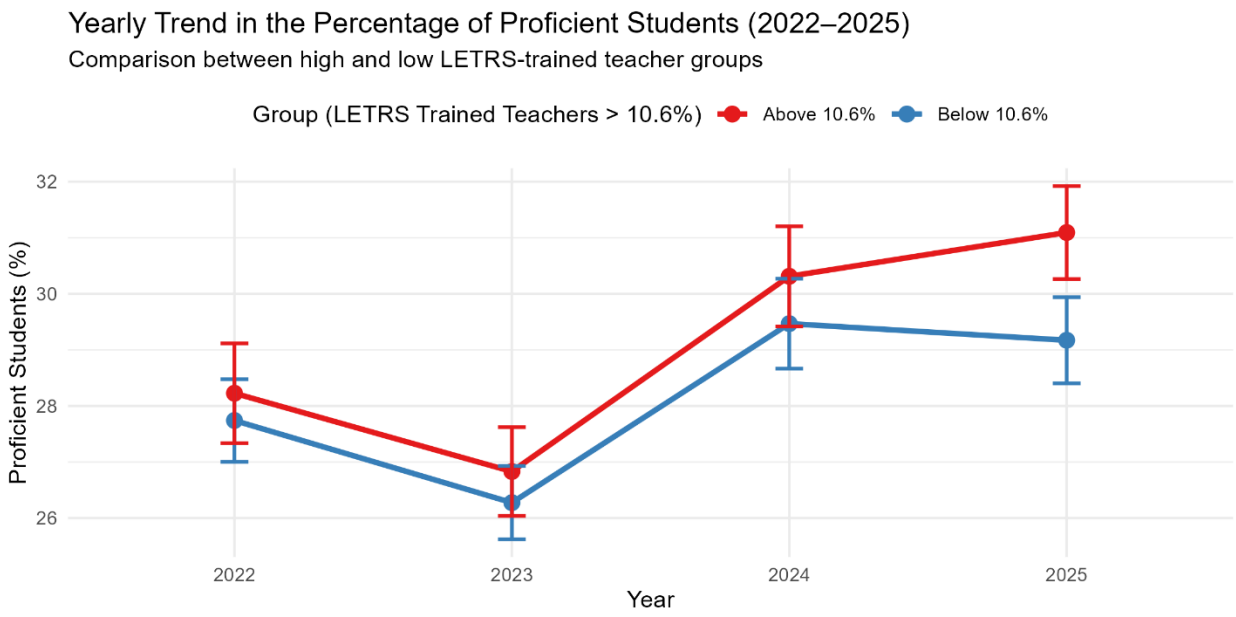
Note: PTR (Pupil-Techer Ratio), FRLP (Free or Reduced Lunch Program)

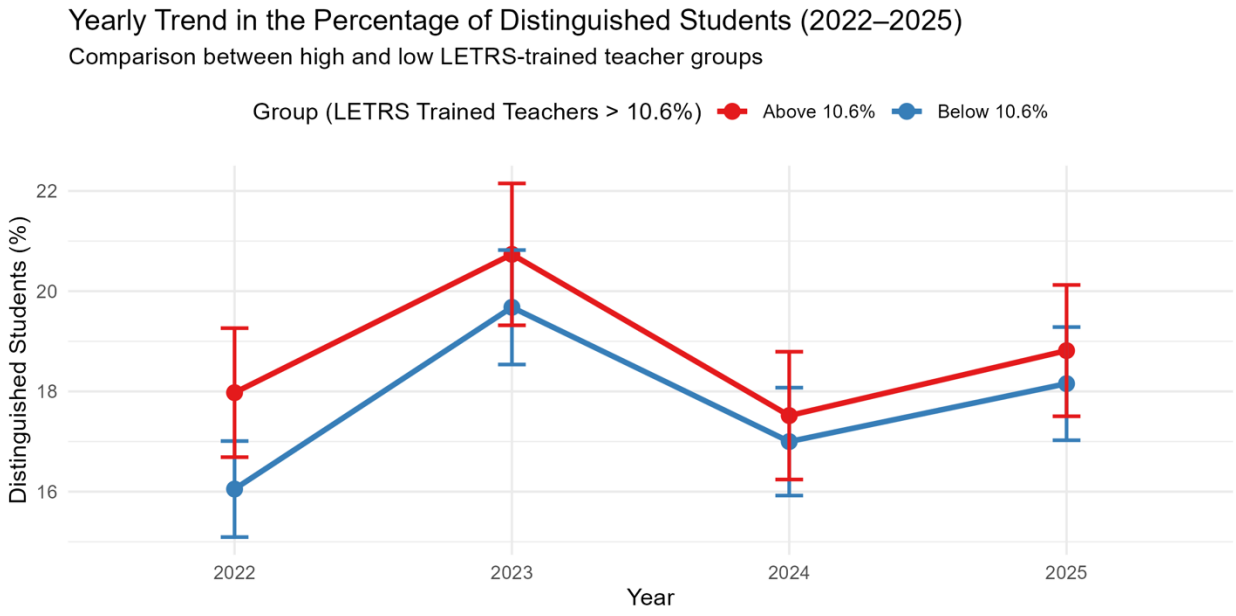
Outcome Variables (2025)

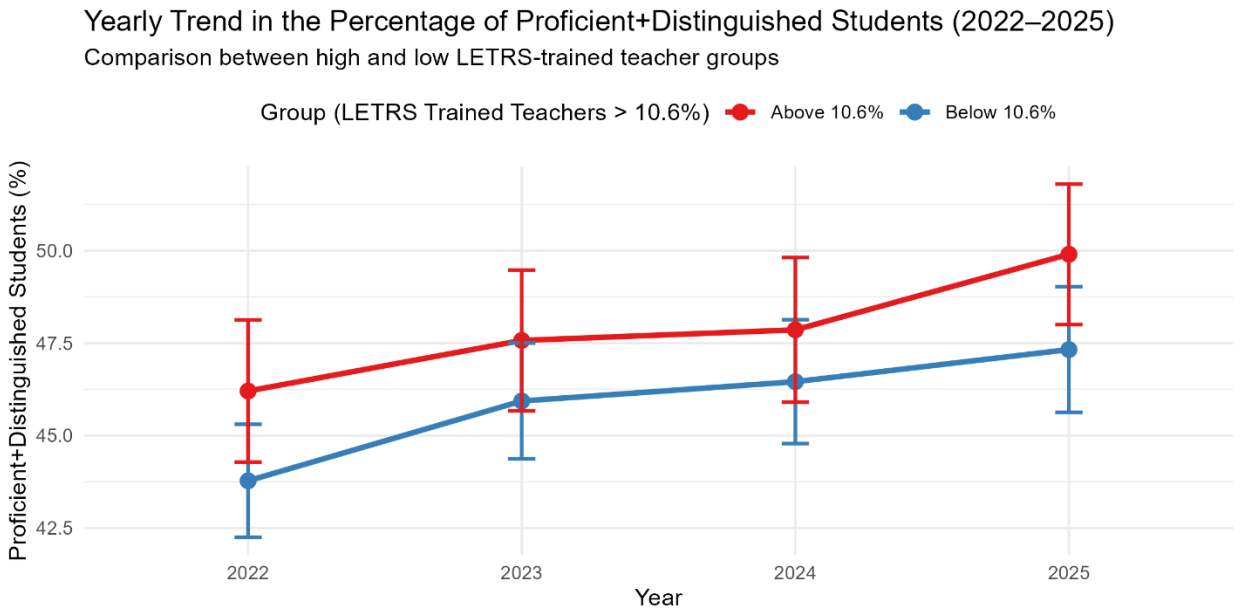
Variable	Schools Above 10.6% LETRS Teachers (n = 340)	Schools Above 10.6% LETRS Teachers (n = 234)
% Novice	24.08 (13.04)	21.63 (11.55)
% Apprentice	28.61 (6.12)	28.51 (5.78)
% Proficient	29.17 (7.23)	31.09 (6.47)
% Distinguished	18.15 (10.62)	18.81 (10.23)
% Proficient + Distinguished	47.33 (15.98)	49.90 (14.82)


Yearly Trend in the Percentage of Novice Students (2022–2025)
Comparison between high and low LETRS-trained teacher groups
Group (LETRS Trained Teachers > 10.6%)
Above 10.6%
Below 10.6%
Novice Students (%)
30.0
27.5
25.0
22.5
20.0
2022
2023
2024
2025
Year


Yearly Trend in the Percentage of Apprentice Students (2022–2025)
Comparison between high and low LETRS-trained teacher groups
Group (LETRS Trained Teachers > 10.6%)
Above 10.6%
Below 10.6%
Apprentice Students (%)
29
28
27
26
2022
2023
2024
2025
Year


Yearly Trend in the Percentage of Proficient Students (2022–2025)
Comparison between high and low LETRS-trained teacher groups
Group (LETRS Trained Teachers > 10.6%)
Above 10.6%
Below 10.6%
Proficient Students (%)
32
30
28
26
2022
2023
2024
2025
Year


Yearly Trend in the Percentage of Distinguished Students (2022–2025)
Comparison between high and low LETRS-trained teacher groups
Group (LETRS Trained Teachers > 10.6%)
Above 10.6%
Below 10.6%
Distinguished Students (%)
22
20
18
16
2022
2023
2024
2025
Year



***Note*:** Mean and bar represents 95% confidence intervals.

5.3. Difference-in-Differences (DID) Analysis

The DID analysis confirmed the positive trends observed in the Proficient category for schools with higher LETRS training rates.

- Baseline 2022, Post-2025: The full model showed a statistically significant positive effect on the % of Proficient level students (DID coefficient = 1.541, p = .004).
- Baseline 2023, Post-2025: Similarly, the full model indicated a significant positive effect on the % of Proficient level students (DID coefficient = 1.475, p = .002).

DID Coefficient for Models (Baseline: 2022)

	Simple Model			Full Model		
Dependent Variable	DID coefficient	t	*p*-value	DID coefficient	t	*p*-value
% Novice	-0.289	-0.456	.648	-0.408	-0.622	.534
% Apprentice	0.142	0.294	.769	-0.058	-0.119	.905
% Proficient	**1.435**	2.798	.005	**1.541**	2.917	.004
% Distinguished	**-1.264**	-2.293	.022	-1.053	-1.868	.062
% Proficient + Distinguished	0.149	0.194	.846	0.458	0.582	.561

Note: Bold numbers indicate statistical significance (p < .05).

DID Coefficient for Models (Baseline: 2023)

	Simple Model			Full Model		
	DID coefficient	t	*p*-value	DID coefficient	t	*p*-value
% Novice	-0.897	-1.624	.105	-1.076	-1.892	.059
% Apprentice	0.029	0.065	.948	0.141	0.305	.760
% Proficient	**1.365**	2.970	.003	**1.475**	3.152	.002
% Distinguished	-0.397	-0.769	.442	-0.442	-0.835	.404
% Proficient + Distinguished	0.939	1.438	.151	1.004	1.512	.131

Note: Bold numbers indicate statistical significance ($p < .05$).

Part II. District Level Analysis

LETRS trained teachers and district level reading achievement results (in KSA)

1. Data Source and Aggregation

To conduct the district-level analysis, school-level data from Part I were aggregated to represent broader district trends. For each school, the number of students at each KSA reading level was calculated using the total number of students in each grade and the corresponding percentage for each reading level. These school-level counts were then aggregated to the district level to calculate comprehensive district-level measures.

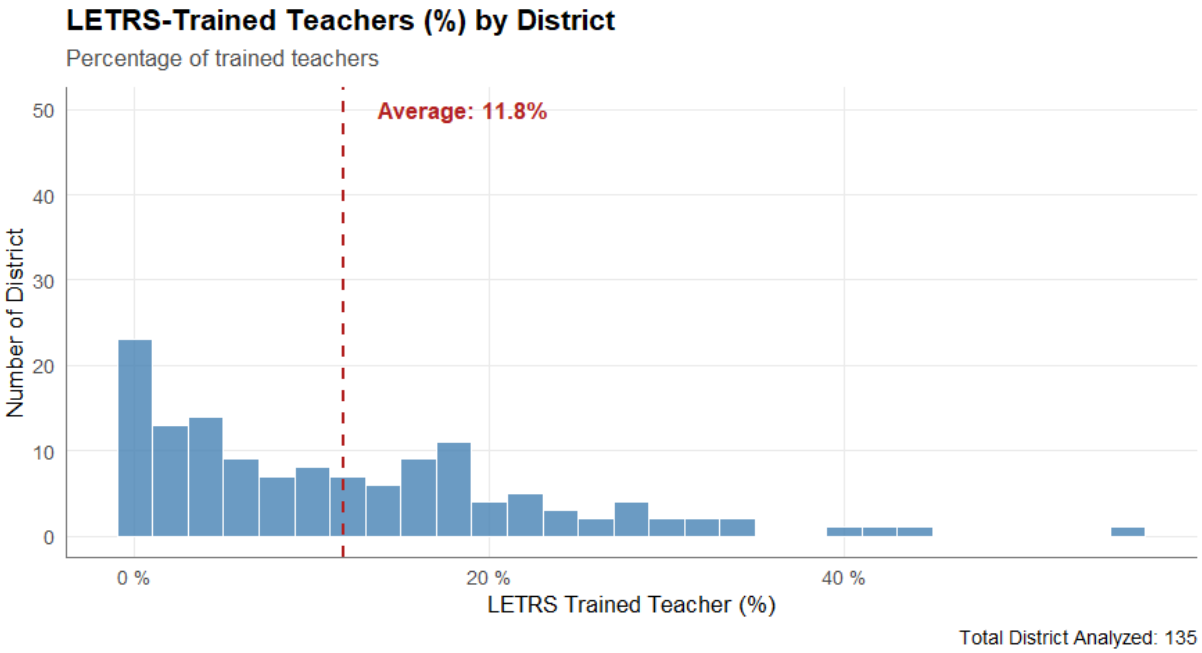
- Total Districts Analyzed: 135 districts
- School Distribution: The mean number of elementary schools per district is 4.25 (standard deviation of 8.22), ranging from a minimum of 1 to a maximum of 87 schools (Jefferson County).

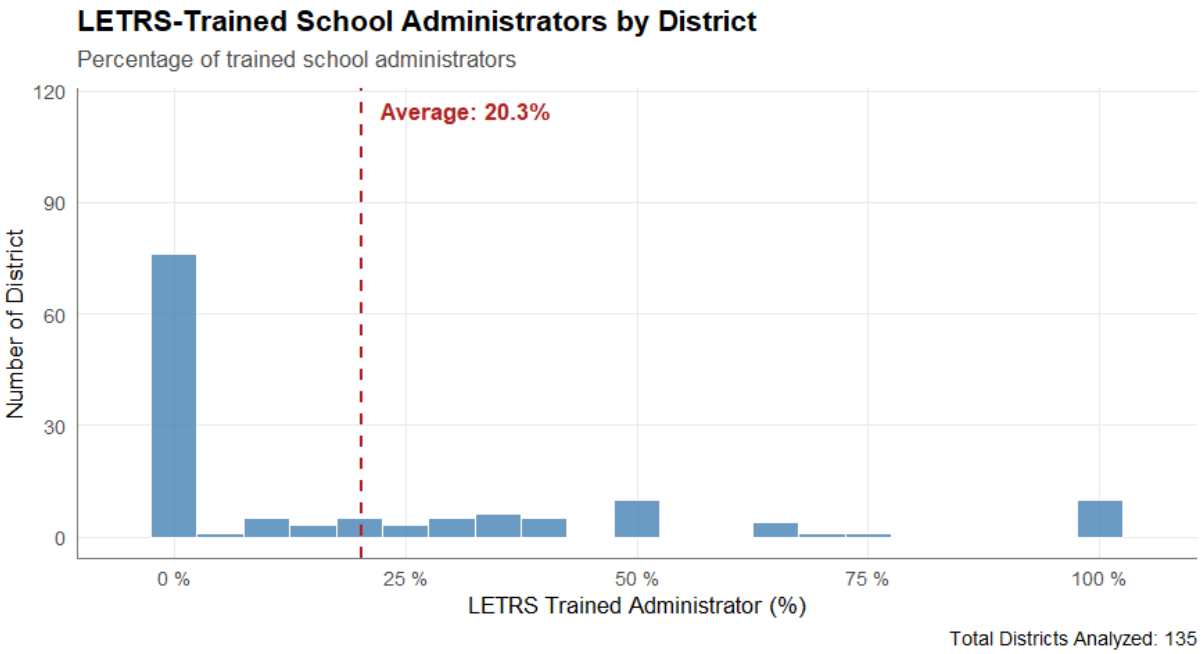
2. District-Level LETRS Training Overview

The penetration of LETRS training varies significantly across different districts.

On average, 11.8% of teachers within a district are LETRS-trained. In 22 districts (16.3%), none of the K-5 schools have any LETRS-trained teachers. Conversely, 113 districts (83.7%) have at least some LETRS-trained teachers in their K-5 schools. Currently, only 16 districts (11.9%) have reached a threshold where more than 25% of their teachers have completed the training.

Similarly, an average of 20.3% of school administrators within a district are LETRS-trained. However, more than half of the districts—76 districts (56.3%)—do not have any LETRS-trained school administrators, while 59 districts (43.7%) have at least one. Furthermore, in 42 districts (31.1%), more than 25% of the school administrators are LETRS-trained.


LETRS-Trained Teachers (%) by District
Percentage of trained teachers
Average: 11.8%
Number of District
50
40
30
20
10
0
0 %
20 %
40 %
LETRS Trained Teacher (%)
Total District Analyzed: 135


LETRS-Trained School Administrators by District
Percentage of trained school administrators
Average: 20.3%
Number of District
120
90
60
30
0
0 %
25 %
50 %
75 %
100 %
LETRS Trained Administrator (%)
Total Districts Analyzed: 135

3. Reading Achievement Analysis

3.1 Regression Model Findings

- Effect of Teacher Training: Using a simple model with 2021/2022 reading outcomes as a baseline, none of the coefficients were statistically significant except for "Distinguished" level (p = .026). None of the coefficients were statistically significant for the 2022/2023 baseline outcome model.
- Effect of Administrator Training: When evaluating the presence of LETRS-trained school administrators (using a dummy variable), simple models revealed a statistically significant positive coefficient for the "Proficient" level. This held true using both the 2021/2022 baseline (p = .003) and the 2022/2023 baseline (p = .004). Full models were not applied here as district level covariates are not available.
- Interaction Effects: Models testing interaction between the % LETRS teachers and the presence of LETRS-trained school administrators yielded no significant interaction effects.

Regression Model Results (% LETRS-trained teachers)

Outcome Variable	*2021/2022 Reading Outcome as Baseline Covariate*			*2022/2023 Reading Outcome as Baseline Covariate*		
	Coefficient	*t*	*p*-value	Coefficient	*t*	*p*-value
% Novice	0.031	0.715	.476	-0.011	-0.284	.777
% Apprentice	0.013	0.387	.700	0.034	1.120	.265
% Proficient	0.039	1.345	.181	0.044	1.693	.093
% Distinguished	**-0.086**	-2.252	.026	-0.062	-1.824	.070
% Proficient + Distinguished	-0.037	-0.673	.502	-0.010	-0.220	.826

Note: Bold numbers indicate statistical significance (p < .05).

Regression Model Results (the presence of LETRS-trained School Administrators)

(1: having LETRS-trained school administrators, 0: not)

Outcome Variable	*2021/2022 Reading Outcome as Baseline Covariate*			*2022/2023 Reading Outcome as Baseline Covariate*		
	Coefficient	*t*	*p*-value	Coefficient	*t*	*p*-value
% Novice	-1.052	-1.093	.276	-0.863	-1.045	.298
% Apprentice	-0.629	-0.868	.387	0.226	0.332	.740
% Proficient	**1.883**	3.038	.003	**1.605**	2.894	.004
% Distinguished	-0.652	-0.762	.448	-1.166	-1.542	.125
% Proficient + Distinguished	1.531	1.260	.210	0.418	0.410	.682

Note: Bold numbers indicate statistical significance (p < .05).

3.2 Group Comparison of KSA Reading Level Change

Districts were categorized into two groups for comparison: those below the average teacher training rate (<11.8%) and those above the average (>11.8%).

- 2022 to 2025 Change: The Above Average group demonstrated a higher percentage increase in “Proficient” students (+2.53%) compared to the Below Average group (+1.31%). However, the Below Average group showed a slightly higher increase in “Distinguished” students (+2.09%) over the Above Average group (+0.72).
- 2023 to 2025 Change: The Above Average group outpaced the Below Average group in “Proficient” student growth (+3.91% vs. + 3.02%) and showed a larger reduction in “Novice” students (-4.57% vs. -3.43%).

Comparison between District Below Average % LETRS teachers and Above Average % LETRS teachers

Variable	District Below 11.8% LETRS Teachers (n = 76)	District Above 11.8% LETRS Teachers (n = 59)
% Novice (2022)	27.72 (8.15)	28.85 (9.69)
% Apprentice (2022)	27.50 (3.38)	27.58 (3.63)
% Proficient (2022)	26.86 (4.37)	27.84 (5.51)
% Distinguished (2022)	16.10 (6.22)	15.73 (7.30)
% Proficient + Distinguished (2022)	44.78 (9.70)	43.57 (11.63)
% Novice (2025)	21.97 (8.24)	23.06 (8.63)
% Apprentice (2025)	29.85 (4.84)	30.11 (4.61)
% Proficient (2025)	29.99 (4.29)	30.37 (5.00)
% Distinguished (2025)	18.19 (7.96)	16.45 (7.37)
% Proficient + Distinguished (2025)	48.18 (11.26)	46.82 (11.65)

KSA Level Change Between Above-Average (>11.8%) vs. Below-Average (<11.8%)

(Baseline 2022)

Group	Novice % Change	Apprentice % Change	Proficient % Change	Distinguished % Change	Proficient + Distinguished % Change
Below Avg	-5.75	2.35	**1.31**	2.09	3.40
Above Avg	-5.78	2.53	**2.53**	0.72	3.25

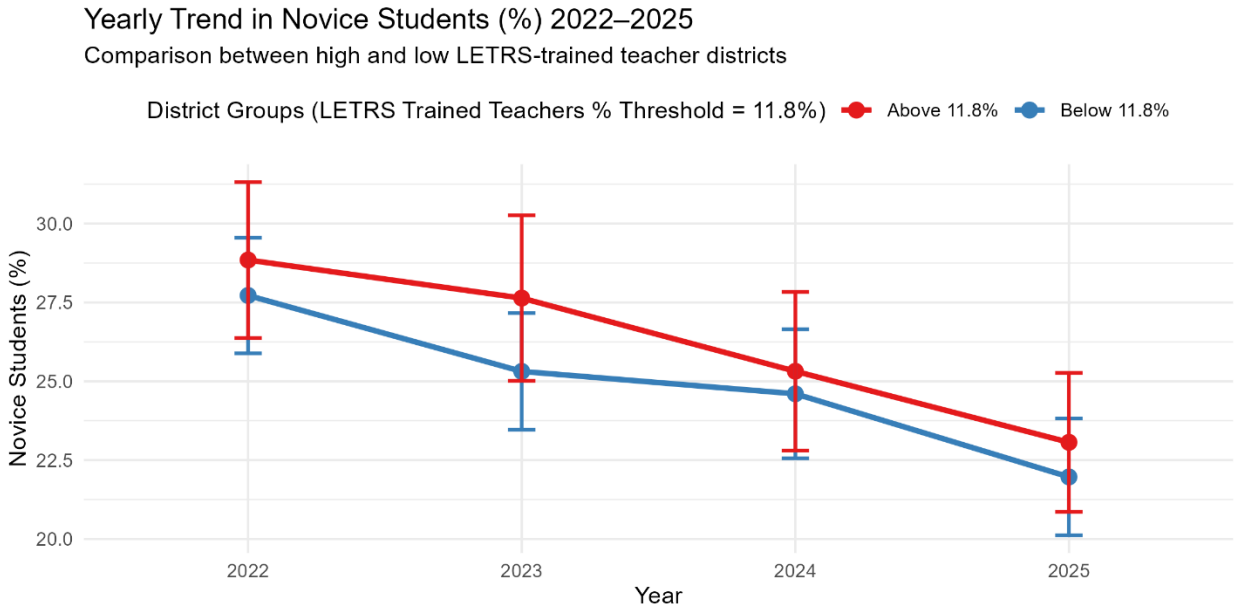
Note: Bold column indicates the largest percentage change between the two groups.

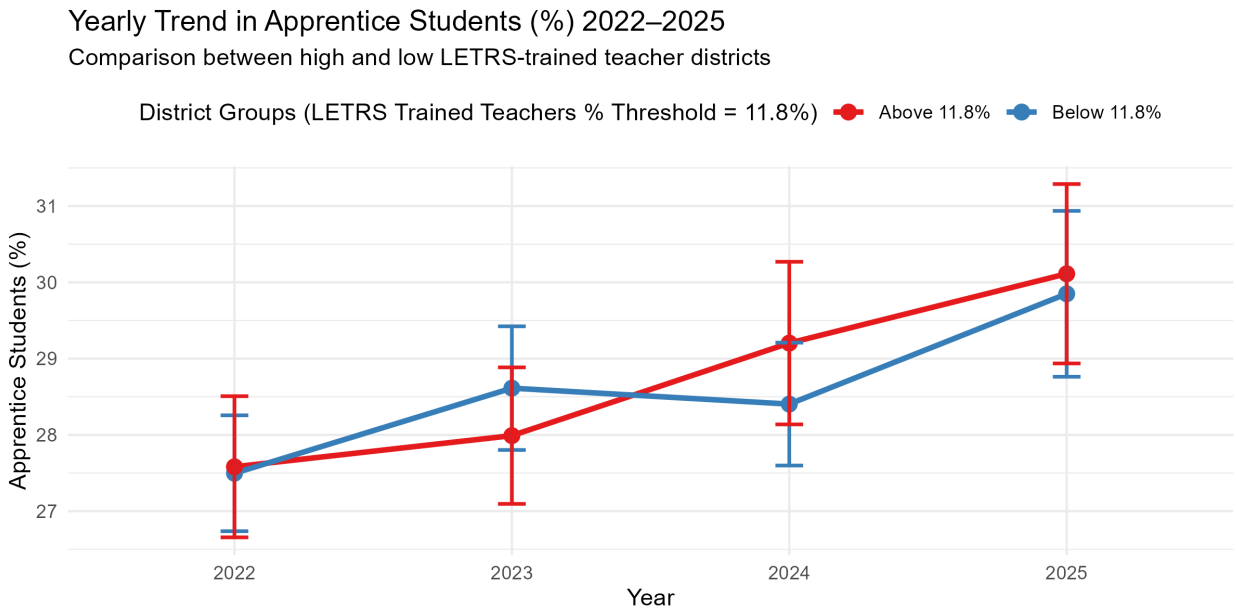
(Baseline 2023)

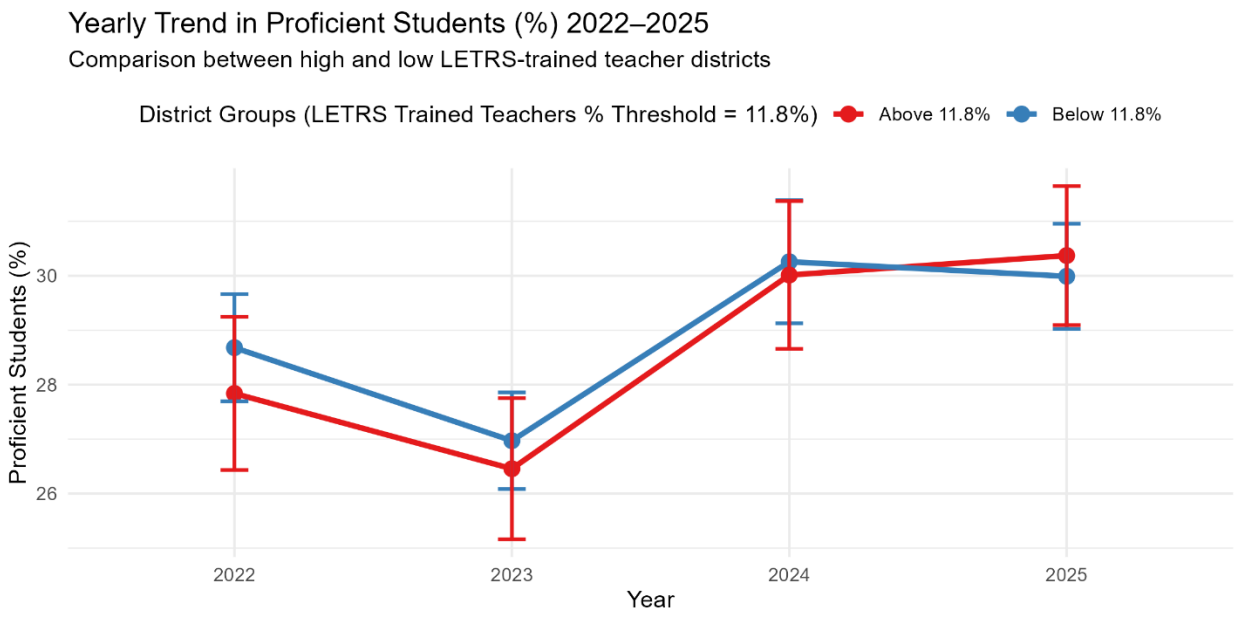
Group	Novice % Change	Apprentice % Change	Proficient % Change	Distinguished % Change	Proficient + Distinguished % Change
Below Avg	-3.35	1.24	**3.02**	-0.91	2.11
Above Avg	-4.57	2.12	**3.91**	-1.46	2.45

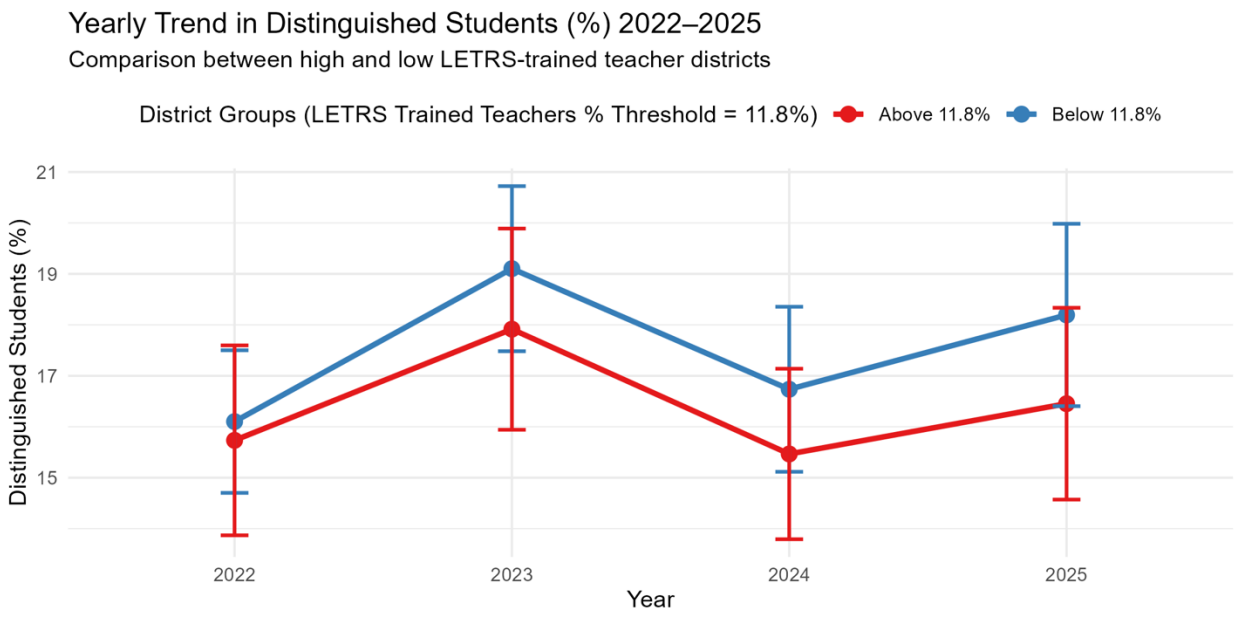
Note: Bold column indicates the largest percentage change between the two groups.

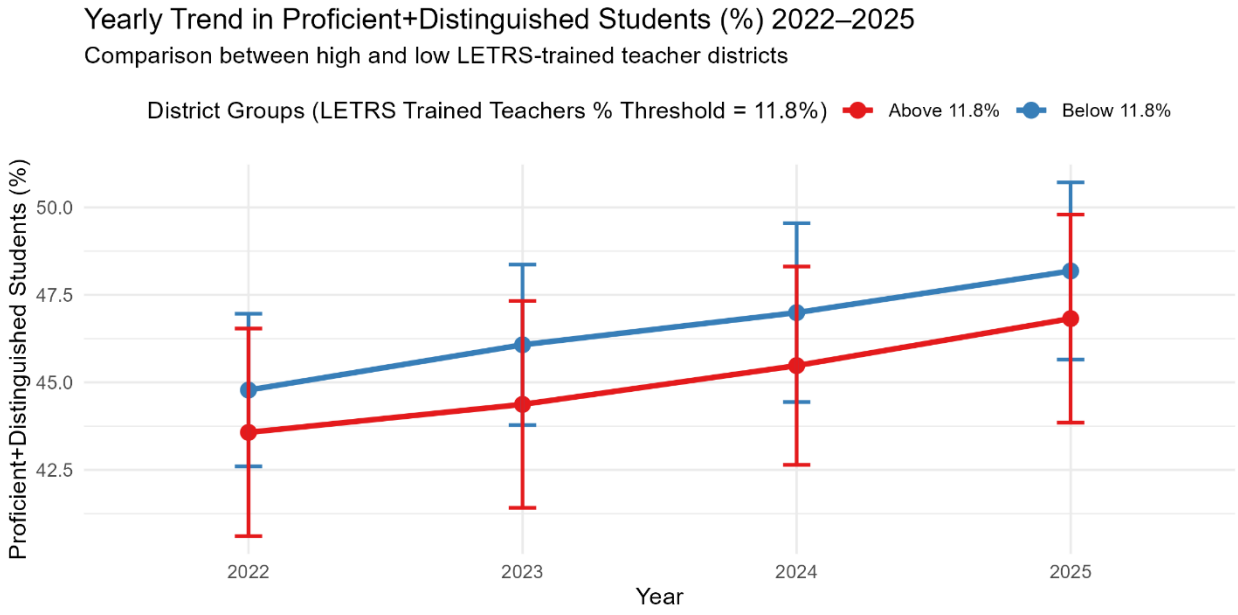
Visualization (Yearly Trend by the group)




Yearly Trend in Apprentice Students (%) 2022–2025
Comparison between high and low LETRS-trained teacher districts
District Groups (LETRS Trained Teachers % Threshold = 11.8%)
Above 11.8%
Below 11.8%
Apprentice Students (%)
31
30
29
28
27
2022
2023
2024
2025
Year


Yearly Trend in Proficient Students (%) 2022–2025
Comparison between high and low LETRS-trained teacher districts
District Groups (LETRS Trained Teachers % Threshold = 11.8%)
Above 11.8%
Below 11.8%
Proficient Students (%)
30
28
26
2022
2023
2024
2025
Year





***Note*:** Mean and bar represents 95% confidence intervals.

4. DID Analysis Results

A DID analysis was conducted to explore the (possible) causal relationship between the higher LETRS training rates (>11.8% in district level) using varying baseline outcome measures. The treatment variable set to be either higher level of LETRS trained percentage and lower level of LETRS trained percentage. Even though it is not sharp definition of treatment, it could shed light on the relationship between LETRS training and student reading performance.

- Baseline 2022 to Post-2025: The results indicated none of the DID coefficients were statistically significant. But it is noteworthy that “Proficient” level showed smallest p value with positive DID coefficient.
- Baseline 2023 to Post-2025: The analysis showed marginal significance for the reduction of the “Novice” level (p = .103) and the growth of the “Proficient” level (p = .056)

DID Coefficients

	Baseline: 2022			Baseline: 2023		
	DID coefficient	*t*	*p*-value	DID coefficient	*t*	*p*-value
% Novice	-0.027	-0.026	.979	-0.816	-1.630	.103
% Apprentice	0.178	0.232	.817	-0.021	-0.036	.971
% Proficient	1.222	1.664	.097	1.060	1.194	.056
% Distinguished	-1.373	-1.652	.100	-0.239	-0.425	.671
% Proficient + Distinguished	-0.151	-0.122	.903	0.797	1.051	.294

Conclusion

This analysis aims to explore the relationship between LETRS training and student reading assessment performance in Kentucky (KSA) using LETRS training records, MUNIS personnel data, and school-level KSA results from 2021/2022 to 2024/2025. Because this was not an experimental design, we relied on observational approaches, primarily regression models and group comparisons between schools above and below the mean percentage of LETRS-trained teachers.

From the various models, we found that schools with a higher percentage of LETRS-trained teachers are associated with higher percentages of students at the "Proficient" level. "Proficient" was the primary level showing a consistently statistically significant positive relationship with teacher training. It is also notable that the percentage of "Novice" level students decreased more substantially in schools with higher LETRS-trained teacher rates compared to those with lower rates. While the presence of LETRS-trained administrators showed a positive association with "Proficient" students, it was not statistically significant at both school and district levels. This implies that while the role of leadership in literacy outcomes is supportive, it requires further investigation. Additionally, there were no significant interaction effects between the teacher LETRS ratio and the administrator LETRS ratio.

The primary limitation of this study lies in the data structure. LETRS records could not be fully utilized because the dataset lacks unique teacher IDs (EPSBID) and unique school IDs, making it difficult to match accurately with the MUNIS data. Furthermore, while the district-level analysis did not yield many statistically significant results, the general trends remained consistent with the school-level findings: the "Proficient" level tends to increase more, and the "Novice" level tends to decrease more rapidly, in districts with higher LETRS-trained percentages. This implies that LETRS training has a positive impact on improving teaching and learning in the classroom. Future studies should focus on the classroom-level effects of LETRS training and how the actual application of what teachers learned from LETRS correlates with students' literacy development.

Moving forward, closing the state-wide literacy gap will require more well-trained teachers and strong administrative support in schools. The results indicate that expanding LETRS training is a viable policy option, especially considering that many schools and districts still have 0% LETRS-trained educators.

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