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Exploring the School Climate and Safety Indicator

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Table of Contents

Introduction	1
Methods	2
Results	6
Excluding a Climate and Safety Indicator	7
Including an Alternate Climate and Safety Indicator	8
Modifying Indicator Weights	9
Summary of Overall Rating Score Distributions	12
Discussion	13
References	15
Appendix A: Histograms Depicting Indicator Score Distributions	16
Appendix B: District-Level Results	30

List of Tables

Table 1. Weighting of Accountability Indicators by Grade Span	2
Table 2. Distribution of School Level Accountability Indicator Scores	3
Table 3. Distribution of District Level Accountability Indicator Scores	3
Table 4. Correlations Among School Level Accountability Indicators: Elementary School	4
Table 5. Correlations Among School Level Accountability Indicators: Middle School	4
Table 6. Correlations Among School Level Accountability Indicators: High School	4
Table 7. Correlations Among District Level Accountability Indicators: Elementary School	5
Table 8. Correlations Among District Level Accountability Indicators: Middle School	5
Table 9. Correlations Among District Level Accountability Indicators: High School	5
Table 10. Comparison of School Overall Score Distributions With and Without Climate and Safety Indicator	7
Table 11. Changes in School Overall Accountability Ratings after Removal of School Climate & Safety Indicator	7
Table 12. Comparison of School Overall Score Distributions Using QSCS Survey vs. Behavior Event Rate	8
Table 13. Changes in School Overall Accountability Ratings Using Behavior Event Rate	8

Table of Contents (Continued)

Table 14. Comparison of School Overall Score Distributions Swapping Weights on English Preparedness and School Climate and Safety Indicators	9
Table 15. Changes in School Overall Accountability Ratings After Swapping Weights on English Preparedness and School Climate and Safety Indicators	9
Table 16. Comparison of School Overall Score Distributions Doubling Weight of Climate and Safety and Reducing Weight of Science, Social Studies & Writing Indicator	10
Table 17. Changes in School Overall Accountability Ratings After Doubling Weight of Climate and Safety and Reducing Weight of Science, Social Studies & Writing Indicator	10
Table 18. Comparison of School Overall Score Distributions Quintupling Weight of Climate and Safety and Redistributing Remaining Weight Proportionally.....	11
Table 19. Changes in School Overall Accountability Ratings After Quintupling Weight of Climate and Safety and Distributing Remaining Weight Proportionally	11
Table 20. Distribution of School Overall Rating Scores Using Different Calculations.....	12
Table 21. Distribution of District Overall Rating Scores Using Different Calculations.....	13
Table B-1. Comparison of District Overall Score Distributions With and Without Climate and Safety Indicator.....	30
Table B-2. Changes in District Overall Accountability Ratings after Removal of School Climate & Safety Indicator	30
Table B-3. Comparison of District Overall Score Distributions Using QSCS Survey vs. Behavior Event Rate.....	30
Table B-4. Changes in District Overall Accountability Ratings Using Behavior Event Rate	31
Table B-5. Comparison of District Overall Score Distributions Swapping Weights on English Preparedness and School Climate and Safety Indicators	31
Table B-6. Changes in District Overall Accountability Ratings After Swapping Weights on English Preparedness and School Climate and Safety Indicators	31
Table B-7. Comparison of District Overall Score Distributions Doubling Weight of Climate and Safety and Reducing Weight of Science, Social Studies & Writing Indicator	31
Table B-9. Changes in District Overall Accountability Ratings After Doubling Weight of Climate and Safety and Reducing Weight of Science, Social Studies & Writing Indicator	32
Table B-10. Comparison of District Overall Score Distributions Quintupling Weight of Climate and Safety and Distributing Remaining Weight Proportionally	32
Table B-11. Changes in District Overall Accountability Ratings After Quintupling Weight of Climate and Safety and Distributing Remaining Weight Proportionally	32

Table of Contents (Continued)

List of Figures

Figure A-1. Elementary School: State Assessment Results in Reading and Mathematics.....	16
Figure A-2. Middle School: State Assessment Results in Reading and Mathematics	16
Figure A-3. High School: State Assessment Results in Reading and Mathematics	17
Figure A-4. Elementary School: State Assessment Results in Science, Social Studies, & Writing	17
Figure A-5. Middle School: State Assessment Results in Science, Social Studies, & Writing	18
Figure A-6. High School: State Assessment Results in Science, Social Studies, & Writing	18
Figure A-7. Elementary School: English Learner Progress.....	19
Figure A-8. Middle School: English Learner Progress	19
Figure A-9. High School: English Learner Progress	20
Figure A-10. Elementary School: Climate and Safety.....	20
Figure A-11. Middle School: Climate and Safety	21
Figure A-12. High School: Climate and Safety	21
Figure A-13. High School: Postsecondary Readiness	22
Figure A-14. High School: Graduation Rate	22
Figure A-15. District Elementary: State Assessment Results in Reading and Mathematics	23
Figure A-16. District Middle: State Assessment Results in Reading and Mathematics	23
Figure A-17. District High: State Assessment Results in Reading and Mathematics	24
Figure A-18. District Elementary: State Assessment Results in Science, Social Studies, & Writing.....	24
Figure A-19. District Middle: State Assessment Results in Science, Social Studies, & Writing	25
Figure A-20. District High: State Assessment Results in Science, Social Studies, & Writing	25
Figure A-21. District Elementary: Climate and Safety.....	26
Figure A-22. District Middle: Climate and Safety	26
Figure A-23. District High: Climate and Safety	27
Figure A-24. District Elementary: English Learner Progress.....	27
Figure A-25. District Middle: English Learner Progress	28
Figure A-26. District High: English Learner Progress	28
Figure A-27. District High: Postsecondary Readiness	29
Figure A-28. District High: Graduation Rate	29

Exploring the School Climate and Safety Indicator

Introduction

Kentucky statute 703 KAR 5:270 defines the components of the accountability system for classifying schools and districts, including a quality of school climate and safety indicator, defined as a measure of school environment. 703 KAR 5:270 further states that this measure of school environment will include perception data from surveys. In spring 2022, the Kentucky Department of Education (KDE) administered Kentucky's Quality of School Climate and Safety (QSCS) survey to gather student perceptions of their school environment. The QSCS was administered in conjunction with the spring summative assessments. Data from the spring 2022 QSCS were used to calculate the quality of school climate and safety indicator, which was combined with other accountability indicators to determine an overall accountability score.

The overall accountability score is a weighted composite based on the following four (elementary and middle) to six (high) indicators (KDE, 2021) (see Table 1 for weighting):

- **State Assessment Results in Reading and Mathematics.** Reaching the desired level of knowledge and skills as measured on state required academic assessments in reading and mathematics. Student performance is aggregated to school, district, and state levels.
- **State Assessment Results in Science, Social Studies, and Writing.** Reaching the desired level of knowledge and skills as measured on state required academic assessments in science, social studies, and writing. Student performance is aggregated to school, district, and state levels.
- **English Learner Progress.** Improvement on the English Language Proficiency Exam by English Learners. English learners' progress is included in the calculation using an English learner growth table.
- **Quality of School Climate and Safety.** Measures of the school environment. Perception data from surveys that measure insight to the school environment.
- **Postsecondary Readiness.** Attainment of the necessary knowledge, skills, and dispositions to successfully transition to the next level of his or her education career. To demonstrate postsecondary readiness, high school students must earn a high school diploma or be classified as a Grade 12 nongraduate AND meet one type of readiness (Academic or Career).
- **Graduation Rate.** Percentage of students earning a high school diploma compared to the cohort of students starting in Grade 9. Kentucky uses a 4-year adjusted cohort rate and an extended 5-year adjusted cohort in accountability, which recognizes the persistence of students and educators in completing the requirements for a Kentucky high school diploma. 4-year and 5-year rates averaged for accountability reporting.

Table 1. Weighting of Accountability Indicators by Grade Span

Indicator	Elementary Weight	Middle Weight	High School Weight
State Assessment Results in Reading and Mathematics	51	46	45
State Assessment Results in Science, Social Studies, and Writing	40	45	20
English Learner Progress	5	5	5
Quality of School Climate and Safety	4	4	4
Postsecondary Readiness	NA	NA	20
Graduation Rate	NA	NA	6

Overall accountability scores are used to classify schools and districts into performance levels. These levels are color coded to communicate simply how schools and districts are performing. Color ratings include five performance levels (red, orange, yellow, green, blue), with red being the lowest rating and blue being the highest rating.

Because the quality of school climate and safety is the newest component of Kentucky’s current accountability system, it is important to scrutinize its use. As part of its accountability research agenda for KDE, the Human Resources Research Organization (HumRRO) conducted a study to explore the impact of incorporating the QSCS into Kentucky’s school accountability index as an indicator of the quality of school climate and safety. This report summarizes the methods and results of the study.

Methods

KDE provided HumRRO with overall and indicator scores for each school and district. Our first step was to explore these data by calculating descriptive statistics.

Tables 2 and 3 provide the means, n-count, and standard deviations for schools and districts, respectively. Mean overall scores were highest at the high school level for both schools and districts. This is in part due to the inclusion of the postsecondary readiness and graduation rate indicators. Among the indicators included for all three grade spans, the school climate and safety indicator was the indicator with the largest mean value and tended to be greater in magnitude at the elementary school level than at the middle and high school levels. This is like the patterns noted in a prior report on the QSCS (Dickinson and Thacker, 2022). The English learner progress indicator also tended to be higher on average at the elementary level, likely due to many students being identified as English learners upon entry and obtaining English language proficiency before exiting elementary school (National Center for Education Statistics [NCES], 2022).

Table 2. Distribution of School Level Accountability Indicator Scores

		Overall Score	Reading & Math	Science, Social Studies & Writing	English Learner Progress	School Climate & Safety	PSR	Grad Rate
Elementary	Mean	59.13	59.00	57.37	52.48	76.85	NA	NA
	N	721	721	700	161	721	NA	NA
	SD	14.31	16.08	14.28	10.74	4.24	NA	NA
Middle	Mean	54.83	56.86	51.76	25.97	66.83	NA	NA
	N	318	318	309	41	318	NA	NA
	SD	11.94	12.78	12.25	8.13	4.82	NA	NA
High	Mean	62.68	57.38	48.82	25.41	61.78	80.64	93.55
	N	228	228	228	37	227	228	228
	SD	9.85	12.89	11.20	10.13	4.02	12.68	3.92

Note. PSR= Postsecondary Readiness. Grade Rate= Graduate rate. N=Number of schools. SD= Standard deviation. NA= Not applicable.

Table 3. Distribution of District Level Accountability Indicator Scores

		Overall Score	Reading & Math	Science, Social Studies & Writing	English Learner Progress	School Climate & Safety	PSR	Grad Rate
Elementary	Mean	58.43	58.30	57.19	50.45	76.69	NA	NA
	N	172	172	171	51	172	NA	NA
	SD	11.10	12.48	11.12	7.87	3.15	NA	NA
Middle	Mean	54.59	57.07	51.38	23.71	66.74	NA	NA
	N	172	172	172	20	172	NA	NA
	SD	10.02	10.61	10.74	6.33	3.77	NA	NA
High	Mean	62.96	57.88	49.28	23.69	62.01	80.33	93.02
	N	168	168	168	20	167	168	168
	SD	8.20	11.09	9.52	12.96	3.98	11.93	4.08

Note. PSR= Postsecondary Readiness. Grade Rate= Graduate rate. N=Number of schools. SD= Standard deviation. NA= Not applicable.

Next, we examined the distributions further by plotting histograms for each indicator. The distributions of scores for accountability indicators generally reflect a normal distribution (see Appendix A for histograms). Next, we calculated Pearson correlation coefficients to explore how the various accountability indicators related to one another. Higher positive correlations would suggest that different indicators are contributing similar information to the overall score, whereas weaker positive correlations would suggest that indicators are contributing unique information to the overall score. Positive correlations that were too large in magnitude would suggest that different indicators were contributing redundant information. We would not expect any indicators to be negatively correlated.

Tables 4 through 9 present the indicator correlations for elementary, middle, and high schools, and for schools and districts, respectively. Across the grade spans for schools and districts, no indicator correlations are negative in direction. Correlations between the school climate and

safety indicator and other indicators are positive and small to moderate in magnitude, indicating that the school climate and safety indicator contributes unique information to the overall score. The one exception is with the English learner progress indicator, which was not statistically significantly different from zero at all levels of aggregation except for the elementary school level. It is important to note that the number of schools at the middle and high school levels, and districts at all levels, that report English learner data is quite small, which effects the likelihood of detecting a correlation. The correlation is also impacted by the reliability of the measures. Although reliability data for the English learner progress indicator are not readily available, there is indication that some of the English language domains are not assessed as reliably as expected (Choi & Dickinson, 2023).

Table 4. Correlations Among School Level Accountability Indicators: Elementary School

	Reading & Math Results	Science, Social Studies & Writing Results	English Learner Progress
Science, Social Studies & Writing Results	0.91		
English Learner Progress	0.00*	0.00*	
School Climate & Safety	0.47	0.51	0.16

Note. Values reported as 0.00 were not statistically significantly different from zero.

Table 5. Correlations Among School Level Accountability Indicators: Middle School

	Reading & Math Results	Science, Social Studies & Writing Results	English Learner Progress
Science, Social Studies & Writing Results	0.93		
English Learner Progress	0.00*	0.00*	
School Climate & Safety	0.47	0.43	0.00*

Note. Values reported as 0.00 were not statistically significantly different from zero.

Table 6. Correlations Among School Level Accountability Indicators: High School

	Reading & Math Results	Science, Social Studies & Writing Results	English Learner Progress	School Climate & Safety	PSR
Science, Social Studies & Writing Results	0.82				
English Learner Progress	0.00*	0.00*			
School Climate & Safety	0.42	0.43	0.00*		
Postsecondary Readiness	0.40	0.45	0.00*	0.15	
Graduation Rate	0.47	0.41	0.00*	0.18	0.31

Note. PSR= Postsecondary Readiness. Values reported as 0.00 were not statistically significantly different from zero.

Table 7. Correlations Among District Level Accountability Indicators: Elementary School

	Reading & Math Results	Science, Social Studies & Writing Results	English Learner Progress
Science, Social Studies & Writing Results	0.92		
English Learner Progress	0.28	0.36	
School Climate & Safety	0.44	0.48	0.00*

Note. Values reported as 0.00 were not statistically significantly different from zero.

Table 8. Correlations Among District Level Accountability Indicators: Middle School

	Reading & Math Results	Science, Social Studies & Writing Results	English Learner Progress
Science, Social Studies & Writing Results	0.92		
English Learner Progress	0.00*	0.00*	
School Climate & Safety	0.47	0.42	0.00*

Note. Values reported as 0.00 were not statistically significantly different from zero.

Table 9. Correlations Among District Level Accountability Indicators: High School

	Reading & Math Results	Science, Social Studies & Writing Results	English Learner Progress	School Climate & Safety	PSR
Science, Social Studies & Writing Results	0.71				
English Learner Progress	0.00*	0.00*			
School Climate & Safety	0.39	0.44	0.00*		
Postsecondary Readiness	0.30	0.37	0.00*	0.17	
Graduation Rate	0.27	0.20	0.00*	0.00*	0.00*

Note. PSR= Postsecondary Readiness. Values reported as 0.00 were not statistically significantly different from zero.

For the remainder of the study, we focused on recalculating school and district overall accountability scores, using slightly different combinations of indicators or slightly differing weighting schemas to determine the impact this would have on mean overall scores and overall accountability ratings. Our first step was to verify that we could replicate the overall accountability scores contained in the original data file provided by KDE. After confirming that we had developed the correct equations for calculating overall scores, including appropriate redistribution of weights when schools or districts did not have data for a particular indicator, we were able to recalculate scores with different indicators or weights.

First, we recalculated overall accountability scores with no indicator of school climate and safety. Next, we recalculated overall accountability scores with an alternate measure of school climate and safety. Specifically, we used publicly available data on behavior events downloaded from the School Report Card page of the KDE website. We started with the total number of

behavior events reported in a school or district for this alternate indicator. The total number of behavior events includes all student behavior events that can be mapped to a state resolution. State resolutions include expulsion, out of school suspension, corporal punishment, restraint, seclusion, in-school removal, in-district removal, and unilateral removal (by school personnel or hearing officer). To account for differences in school size, we divided the total number of events by the total school enrollment to create a behavior event rate ranging from 0.0-1.0. In some instances, the number of students with multiple behavior events in the reporting year yielded a total number of behavior events that exceeded the total school enrollment, leading to a behavior rate exceeding 1. These cases were rounded down to 1.0. Finally, this value was subtracted from 1 to create the final behavior event indicator, which was scaled such that lower values were less desirable, similar in direction to the other accountability indicators.

Next, we recalculated overall accountability scores using a series of alternate weighting schemas. These included:

- Swapping the weight of the climate and safety indicator with that of the English language preparedness indicator.
- Doubling the weight of the climate and safety indicator and reducing the weight from the science, social studies, and writing indicator by that amount.
- Quintupling the weight of the climate and safety indicator and proportionally redistributing that amount among the remaining indicators.

After each set of overall accountability scores was recalculated, we computed for comparison the distribution of scores at each grade span level for schools and districts. Our final step was to calculate for comparison the distribution of overall school and district ratings for each alternate accountability calculation.

Results

This section presents results comparing school and district overall scores and ratings for several recalculations. These include scores and ratings based on calculations that (1) do not include a climate and safety indicator, (2) include an alternate indicator of school climate and safety, and (3) modify the indicator weights. Finally, we present a comparison of the distributions of overall accountability ratings based on the various calculations of overall accountability score.

Because of the similar pattern of results for schools and districts, only school-level results are presented in the main body of the report. District-level results are presented in Appendix B.

Excluding a Climate and Safety Indicator

Table 10 compares the means and standard deviations of school overall accountability scores at each grade span based on a calculation that includes the climate and safety indicator and on a calculation that does not include the climate and safety indicator. Across the grade spans, mean scores decreased slightly and standard deviations increased slightly when the climate and safety indicator was excluded from the calculation. This is in part due to the climate and safety indicator having, on average, the largest value relative to other indicators (see Table 2 in the Methods section). When it is excluded from the calculations, overall scores, on average, decrease slightly.

Table 10. Comparison of School Overall Score Distributions With and Without Climate and Safety Indicator

Level	Indicator Status	Mean	Standard Deviation
Elementary	QSCS Included	59.13	14.31
Elementary	QSCS Not Included	58.35	14.83
Middle	QSCS Included	54.83	11.94
Middle	QSCS Not Included	54.30	12.38
High	QSCS Included	62.68	9.85
High	QSCS Not Included	62.41	10.25

Table 11 presents the number and percentage of schools, across grade spans, that change in terms of overall accountability rating as a result of removing the climate and safety indicator from the calculation of the school overall accountability score. For nearly 96% of schools, removing the climate and safety indicator from the calculation does not impact their overall accountability rating. For approximately 4% of schools, removing the climate and safety indicator from the calculation resulted in a decrease in their overall accountability rating by one level. For less than 1% of schools, removing the climate and safety indicator from the calculation resulted in an increase in their overall accountability rating by one level.

Table 11. Changes in School Overall Accountability Ratings after Removal of School Climate & Safety Indicator

Change in Overall Rating	N	Percentage
Decrease One Level	51	4.03
No Change	1,213	95.74
Increase One Level	3	0.24

Including an Alternate Climate and Safety Indicator

Table 12 compares the means and standard deviations of school overall accountability scores at each grade span based on a calculation that includes a climate and safety indicator based on behavior events. Across the grade spans, mean overall accountability scores decreased between approximately 2.5 and 3 points, while standard deviations remained about the same. This decrease in means was in part due to the wider range of behavior event indicator scores, which go as low as 0 (reflecting a number of behavior events greater than or equal to total enrollment size), while the minimum QSCS survey indicator score across the grade spans is 47.

Table 12. Comparison of School Overall Score Distributions Using QSCS Survey vs. Behavior Event Rate

Aggregation	Indicator Used	N	Mean	Standard Deviation
Elementary School	QSCS	721	59.13	14.31
Elementary School	Event Rate	721	56.05	14.27
Middle School	QSCS	318	54.83	11.94
Middle School	Event Rate	318	52.03	11.87
High School	QSCS	228	62.68	9.85
High School	Event Rate	228	60.14	9.81

Table 13 presents the number and percentage of schools, across grade spans, that change in terms of overall accountability rating as a result of using the behavior event-based indicator of climate and safety. Across the grade spans, using this alternate climate and safety indicator resulted in some schools decreasing in overall accountability rating by one level. The percentage of schools decreasing in overall rating ranged from 17.61% at the elementary level to 28.51% at the high school level.

Table 13. Changes in School Overall Accountability Ratings Using Behavior Event Rate

Change in Overall Rating	N Decreasing One Level	Percentage Decreasing One Level	N No Change in Level	Percentage No Change in Level
Elementary	17	17.61	594	82.39
Middle	79	24.84	239	75.16
High	65	28.51	163	71.49

Modifying Indicator Weights

This section presents results from three recalculations of overall accountability scores in which we modified indicator weights. These include: (1) swapping the weight of the climate and safety indicator with that of the English language preparedness indicator, (2) doubling the weight of the climate and safety indicator and reducing the weight from the science, social studies, and writing indicator by that amount, and (3) quintupling the weight of the climate and safety indicator and proportionally redistributing that amount among the remaining indicators.

Swapping Climate and Safety and English Language Preparedness Weights

Table 14 demonstrates that swapping the weight of the climate and safety indicator with that of the English preparedness indicator has little effect on mean school overall accountability scores and standard deviations. Although all mean values increased, none increase more than 1/5 of a point. This is in large part due to the weights being very similar, with an original weighting of 5 for English language preparedness and 4 for climate and safety.

Table 14. Comparison of School Overall Score Distributions Swapping Weights on English Preparedness and School Climate and Safety Indicators

Aggregation	Weighting	N	Mean	Standard Deviation
Elementary School	Old Weight	721	59.13	14.31
Elementary School	New Weight	721	59.32	14.21
Middle School	Old Weight	318	54.83	11.94
Middle School	New Weight	318	55.00	11.85
High School	Old Weight	228	62.68	9.85
High School	New Weight	228	62.73	9.75

Table 15 shows that a very small percentage of schools did experience an increase in overall accountability rating when this alternate weighting scheme was applied. Across the grade spans, approximately 4.5% of schools increased by one rating level.

Table 15. Changes in School Overall Accountability Ratings After Swapping Weights on English Preparedness and School Climate and Safety Indicators

Change in Overall Rating	N Increasing One Level	Percentage Increasing One Level	N No Change in Level	Percentage No Change in Level
Elementary	10	1.39	711	98.61
Middle	7	2.20	311	97.80
High	2	0.88	226	99.12

Doubling Climate and Safety and Reducing Science, Social Studies & Writing Weight

Table 16 demonstrates that this change in weighting has more of an effect on mean school overall scores and standard deviations. When we doubled the weight of the climate and safety indicator and reduced the science, social studies and writing indicator weight by that amount, means increased by a small amount (.54 to .81) and standard deviations decreased by a small amount (.33 to .50).

Table 16. Comparison of School Overall Score Distributions Doubling Weight of Climate and Safety and Reducing Weight of Science, Social Studies & Writing Indicator

Aggregation	Weighting	N	Mean	Standard Deviation
Elementary School	Old Weight	721	59.13	14.31
Elementary School	New Weight	721	59.94	13.81
Middle School	Old Weight	318	54.83	11.94
Middle School	New Weight	318	55.46	11.53
High School	Old Weight	228	62.68	9.85
High School	New Weight	228	63.22	9.52

Table 17 demonstrates that this change in weighting also has more of an impact on the percentage of schools that increased by one rating level. Across the grade spans, 18.07% of schools increased in overall accountability rating by one level when we doubled the weight of the climate and safety indicator and removed that amount from the weight of the science, social studies, and writing indicator.

Table 17. Changes in School Overall Accountability Ratings After Doubling Weight of Climate and Safety and Reducing Weight of Science, Social Studies & Writing Indicator

Change in Overall Rating	N Increasing One Level	Percentage Increasing One Level	N No Change in Level	Percentage No Change in Level
Elementary	47	6.52	674	93.48
Middle	13	4.09	305	95.91
High	17	7.46	211	95.54

Quintupling Climate and Safety and Distributing Remaining Weight Proportionally

Table 18 compares means and standard deviations of schools' overall accountability scores based on the original weighting with those based on multiplying the climate and safety indicator by five and distributing the remaining weight proportionally among the other indicators. At the elementary level, the mean overall accountability score increased by 3.09 points and the standard deviation decreased by 2.09 points with this alternate weighting. At the middle school level, the mean increased by 2.11 points and the standard deviation decreased by 1.64 points.

At the high school level, the mean was essentially the same (decreased by 0.15 points) and the standard deviation decreased by 1.37 points

Table 18. Comparison of School Overall Score Distributions Quintupling Weight of Climate and Safety and Redistributing Remaining Weight Proportionally

Aggregation	Weighting	N	Mean	Standard Deviation
Elementary School	Old Weight	721	59.13	14.31
Elementary School	New Weight	721	62.22	12.22
Middle School	Old Weight	318	54.83	11.94
Middle School	New Weight	318	56.94	10.30
High School	Old Weight	228	62.68	9.85
High School	New Weight	228	62.53	8.48

Table 19 shows that while most schools' overall accountability ratings were unchanged by this alternate weighting, a small number of schools (0.28% to 7.02%) experienced a decrease of one rating level, and a larger number of schools (3.51% to 20.11%) experienced an increase of one rating level.

Table 19. Changes in School Overall Accountability Ratings After Quintupling Weight of Climate and Safety and Distributing Remaining Weight Proportionally

	Change in Overall Rating	N	Percentage
Elementary	Decrease One Level	2	0.28
Elementary	No Change	574	79.61
Elementary	Increase One Level	145	20.11
Middle	Decrease One Level	3	0.94
Middle	No Change	261	82.08
Middle	Increase One Level	54	16.98
High	Decrease One Level	16	7.02
High	No Change	204	89.47
High	Increase One Level	8	3.51

Summary of Overall Rating Score Distributions

Table 20 presents a comparison of the distributions of school overall rating scores for each of the calculations applied as part of this study. Both removing the QSCS-based climate and safety indicator and replacing it with a behavior event-based climate and safety indicator yielded more schools at Level 1 and Level 2 compared to the established accountability calculation. Both approaches yielded the same percentage of schools at Level 3, which was lower compared to the established accountability calculation. Both approaches yielded a decrease in the percentage of schools at Level 4, though this was more substantial for the calculation using the behavior event-based indicator. Removing a climate and safety indicator from the model yielded roughly the same percentage of schools at Level 5. Using the behavior event-related indicator decreased the percentage of schools at Level 5.

Applying alternate weights to the established overall accountability score calculation yielded a lower percentage of schools at Level 1 for all the alternate weightings explored in this study. None of the alternate weightings had a substantial impact on the percentage of schools at Level 5. All three alternate weighting approaches yielded smaller percentages of schools at Level 2 and larger percentages of schools at Level 3 and Level 4. Generally, all distributions were similar. The largest difference from the percentages based on the established calculation is in the percentage of schools at Level 2 based on quintupling the climate and safety indicator and distributing the remaining weight proportionally (decreased by 6 percentage points).

Table 20. Distribution of School Overall Rating Scores Using Different Calculations

Calculation	Overall Rating 1	Overall Rating 2	Overall Rating 3	Overall Rating 4	Overall Rating 5
Original (n= 1,267)	5.05	29.28	40.17	17.76	7.73
No QSCS (n= 1,267)	6.24	30.54	38.12	17.13	7.97
Sub Behavior Events (n= 1,267)	8.05	35.20	38.12	13.50	5.13
Swap EL and QSCS Weights (n= 1,267)	4.66	28.97	40.57	18.00	7.81
Double QSCS/Reduced SSW Weight (n= 1,267)	3.79	27.07	42.38	18.94	7.81
Quintuple QSCS/Redistribute Across (n= 1,267)	2.29	23.28	45.22	22.02	7.18

Table 21 presents a comparison of the distributions of district overall rating scores for each of the calculations applied as part of this study. Both removing the QSCS-based climate and safety indicator and replacing it with a behavior event-based climate and safety indicator yielded more districts at Level 1 and Level 2 compared to the established accountability calculation. Both approaches also yielded fewer districts at Level 3 compared to the established accountability calculation. Removing a climate and safety indicator from the model yielded roughly the same percentages of districts at Levels 4 and 5, whereas substituting a behavior event-based indicator decreased the percentage of districts at these levels, particularly Level 4.

Applying alternate weights to the established overall accountability score calculation yielded a lower percentage of schools at Level 1 for all the alternate weightings explored in this study. None of the alternate weightings had a substantial impact on the percentage of schools at Level

5. All three alternate weighting approaches yielded smaller percentages of schools at Level 2 and larger percentages of schools at Level 3 and Level 4. Generally, all distributions were similar, but the distribution based on the behavior event-based climate and safety indicator showed the largest differences from the established calculation.

Table 21. Distribution of District Overall Rating Scores Using Different Calculations

Calculation	Overall Rating 1	Overall Rating 2	Overall Rating 3	Overall Rating 4	Overall Rating 5
Original (n= 512)	1.95	30.27	47.66	15.63	4.49
No QSCS (n= 512)	2.93	32.42	44.34	15.43	4.88
Sub Behavior Events (n= 512)	4.10	41.21	41.80	9.77	3.13
Swap EL and QSCS Weights (n= 512)	1.76	29.49	48.44	15.82	4.49
Double QSCS/Reduced SSW Weight (n= 512)	1.37	27.15	49.80	16.99	4.69
Quintuple QSCS/Redistribute Across (n= 512)	0.59	22.27	54.10	18.75	4.30

Discussion

Kentucky’s accountability system addresses the requirements outlined in the Every Student Succeeds Act (ESSA) by incorporating a series of weighted indicators, including academic performance, progress toward English language proficiency, graduation rates, and an indicator of school quality and student success (Erwin et al., 2021). Kentucky has also joined the growing number of states using a school climate survey for the ESSA school quality and student success requirement (Kostyo et al., 2018). This study explored the inclusion of the QSCS survey as the quality of school climate and safety indicator in Kentucky’s school and district accountability model.

We first explored the impact of removing the quality of school climate and safety indicator from the overall accountability score calculation. We found that this led to a slight decrease in overall scores on average and a small increase in overall score variability. These changes impacted overall accountability ratings minimally, with less than 5% of schools being rated one level lower than they would have been with the inclusion of the quality of school climate and safety indicator. This small impact of the quality of school climate and safety indicator reflects ESSA’s intent to have the indicator of school quality and student success carry much less weight than other indicators (Erwin et al., 2021).

Next, we considered an alternate measure to serve as the quality of school climate and safety indicator. Using the number of behavior events relative to school enrollment size, we recalculated overall accountability scores. This change in the calculation yielded larger decreases in overall scores on average (2.5 to 3 points) and no substantial change in variability. This approach also resulted in approximately one-fifth to one-fourth of schools being classified one level lower than they would have been with the use of the QSCS survey as the quality of school climate and safety indicator.

A major benefit of the QSCS survey is that it is a measurement tool that can be evaluated in terms of reliability and validity. Prior research provides evidence of the psychometric quality of the QSCS survey (Lee et al., 2020; Dickinson et al., 2021; Dickinson & Thacker, 2022). Information on the reliability of accountability indicators is essential for establishing that Kentucky's accountability system classifies schools and districts accurately and consistently. Finally, behavior event data was missing for more schools compared to QSCS data, and QSCS data took on a more normal distribution than behavior event data, particularly at the elementary level. The results from this study thus support the continued use of the QSCS survey as the quality of school climate and safety indicator.

It is important to note that climate surveys such as the QSCS are not without criticism. One concern raised is that when student perception scores are aggregated to the school level, unique patterns of student responses within a school could be obscured (Temkin et al. 2021). We recommend that KDE continue its research agenda relative to the QSCS survey, analyzing variability between and within schools, and possibly conducting observational visits to further validate QSCS scores. It may also be prudent to conduct "outlier analyses," particularly if small groups of students within a school show disparate results (especially if those results are negative). This could indicate that, while a school seems safe and conducive to learning for most students, there could potentially be marginalized groups of students who do not have the same experiences at that same school.

Although ESSA requires that accountability models weight other indicators far more than the indicator of school quality and student success, it does not prescribe specific weights. As part of this study, we considered alternative approaches to weighting Kentucky's accountability indicators. The quality of school climate and safety indicator and the English learner progress indicator are the least weighted across grade spans, with English learner progress weighted just one unit more. We found that swapping the weight of the climate and safety indicator with that of the English preparedness indicator would have little effect on mean school overall accountability scores and standard deviations.

We also considered weighting schemes that would further increase the contribution of the climate and safety indicator to the overall score, albeit in violation of the ESSA requirement to weight this indicator far less than other indicators. Exploring such alternatives provides additional useful information about the contribution of the quality of school climate and safety indicator to the overall accountability score. We found generally that increasing the weight of the climate and safety indicator would have more impact at the lowest accountability rating level (number of schools classified at Level 1 decreases) than at the highest level (number of schools classified at Level 5 stays about the same).

Regardless of the indicators used and the weightings applied, we found that the distributions of overall classifications are generally stable. Individual schools and districts may have shifted in overall rating based on the calculation used but were never shifted beyond an adjacent category. Under the Kentucky system, a school's or district's accountability rating is not used to trigger sanctions or rewards, but rather used to communicate status and progress to education stakeholders. Thus, slight differences in accountability ratings that might come from adjusting the model would have little impact on schools and districts. Results from this study support that Kentucky's accountability model is functioning appropriately and as intended.

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Appendix A: Histograms Depicting Indicator Score Distributions

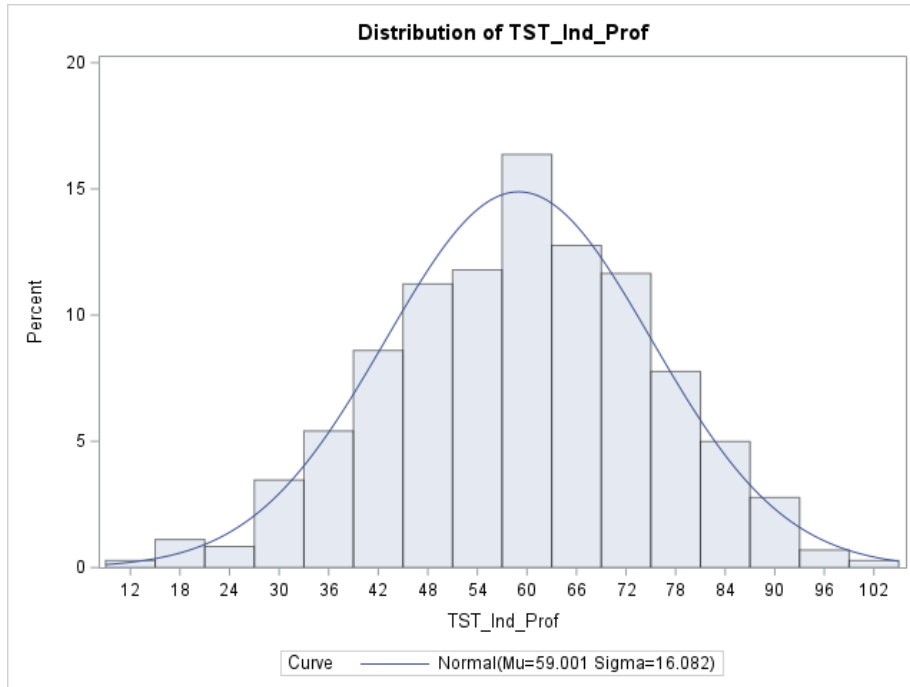


Figure A-1. Elementary School: State Assessment Results in Reading and Mathematics

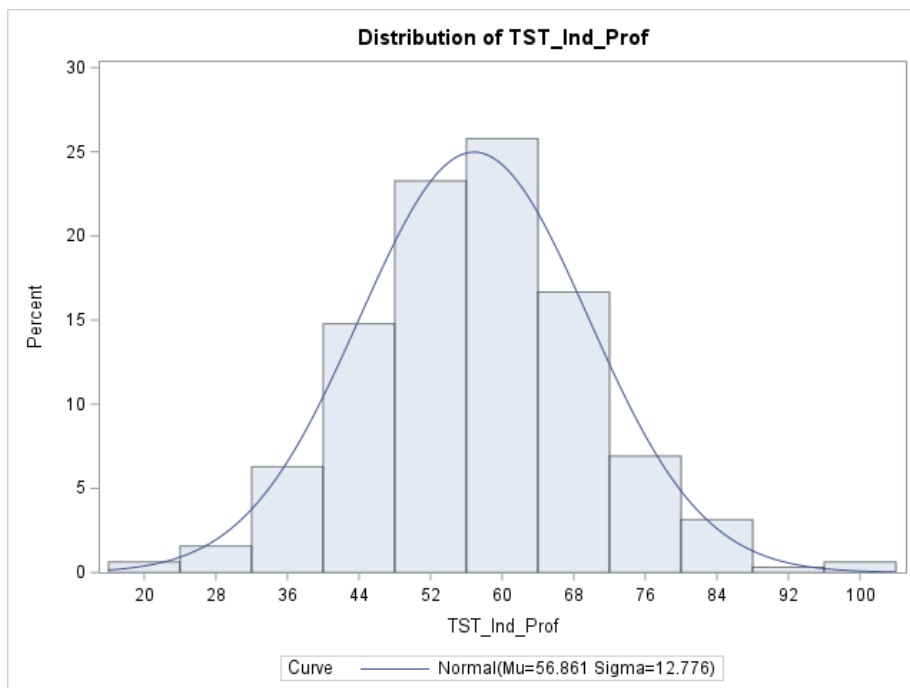


Figure A-2. Middle School: State Assessment Results in Reading and Mathematics

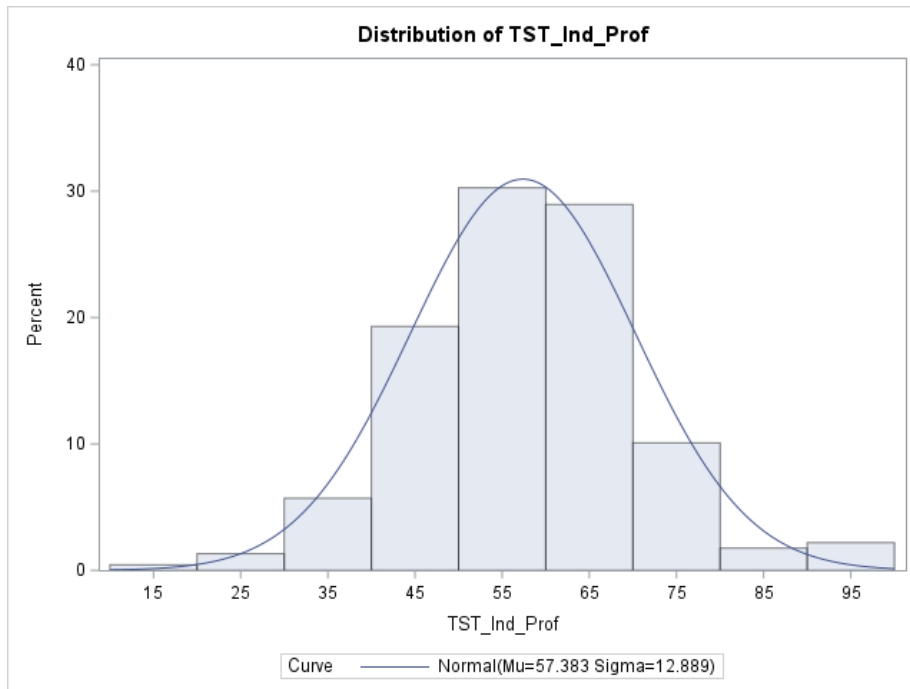


Figure A-3. High School: State Assessment Results in Reading and Mathematics

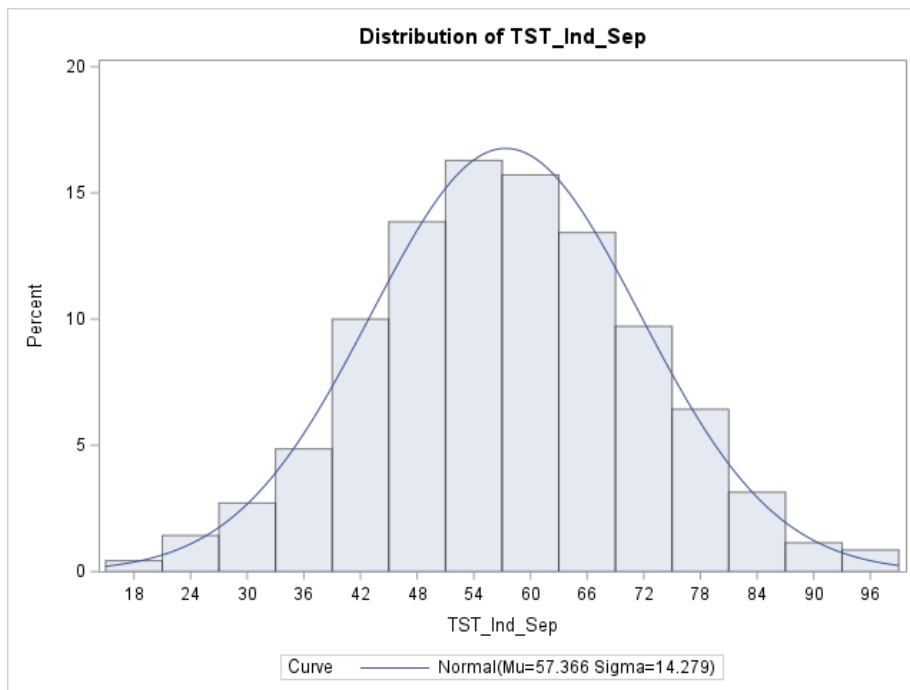


Figure A-4. Elementary School: State Assessment Results in Science, Social Studies, & Writing

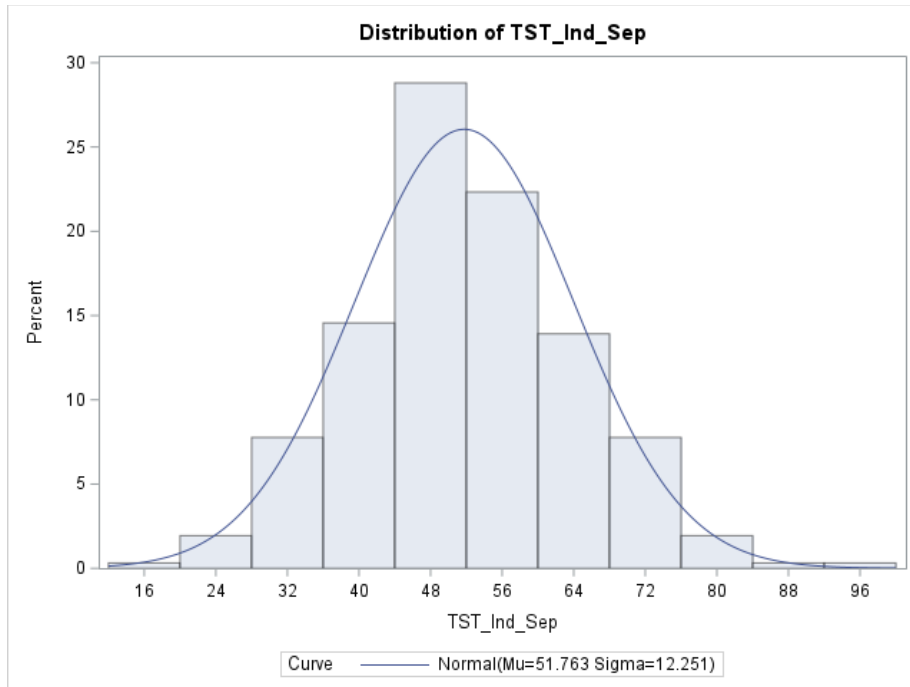


Figure A-5. Middle School: State Assessment Results in Science, Social Studies, & Writing

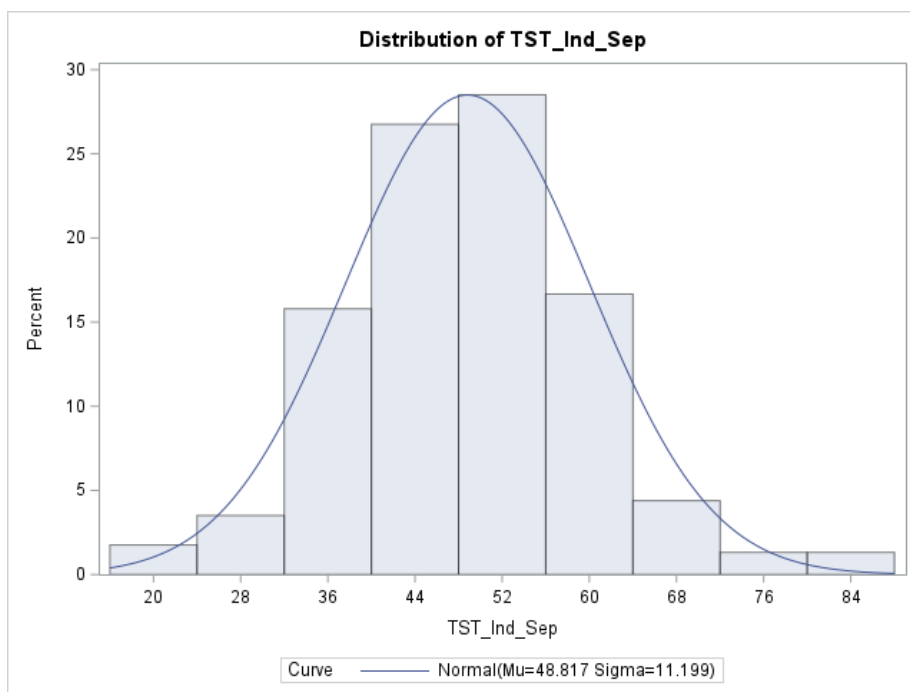


Figure A-6. High School: State Assessment Results in Science, Social Studies, & Writing

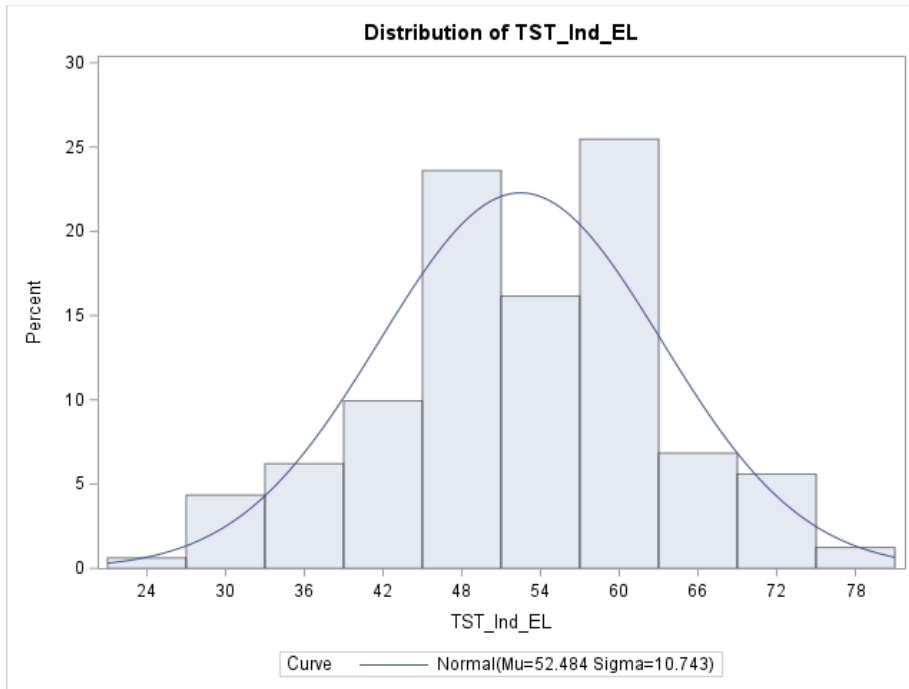


Figure A-7. Elementary School: English Learner Progress

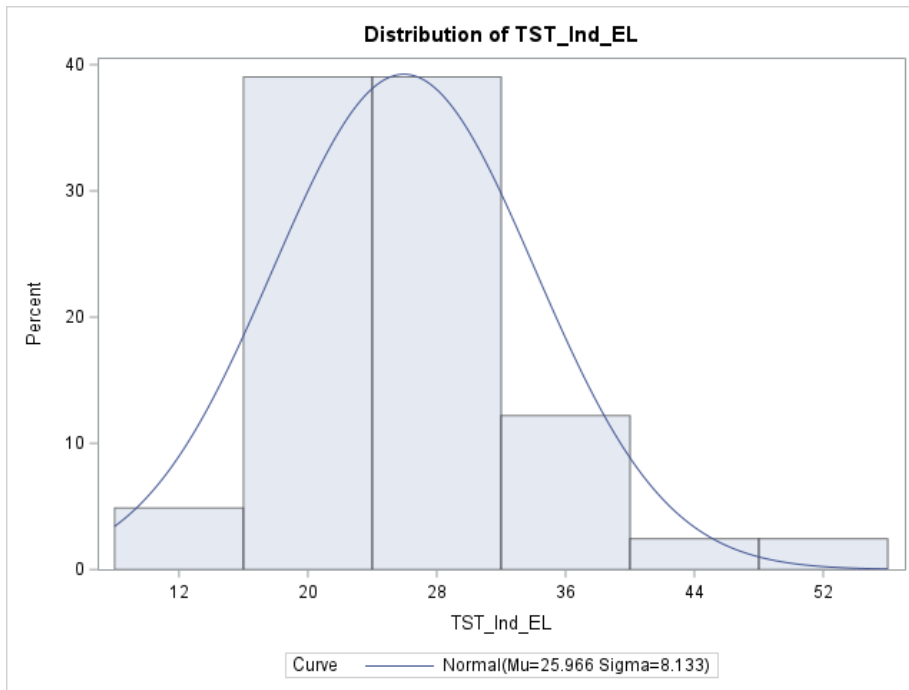


Figure A-8. Middle School: English Learner Progress

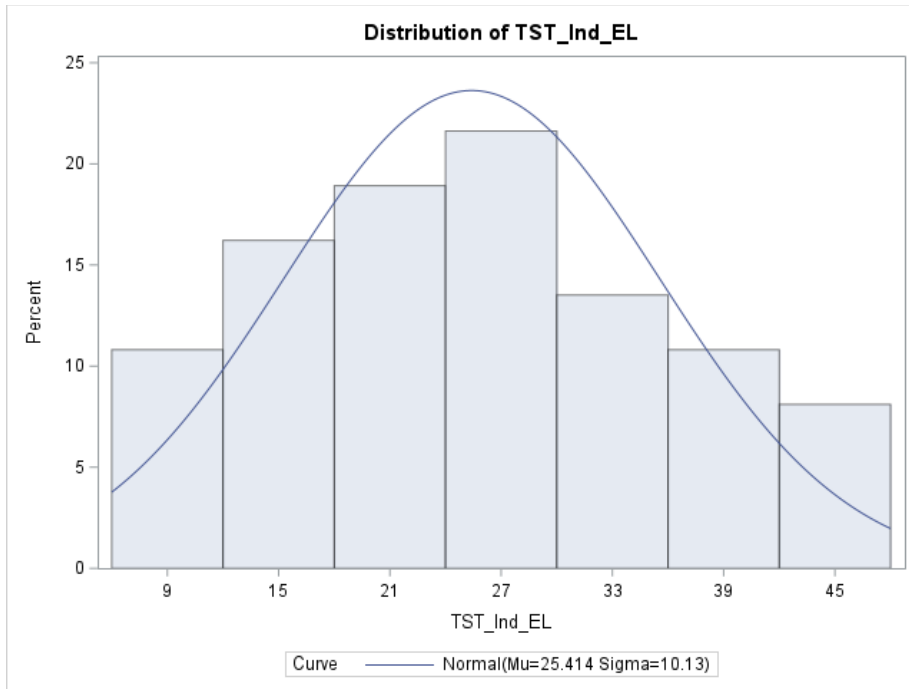


Figure A-9. High School: English Learner Progress

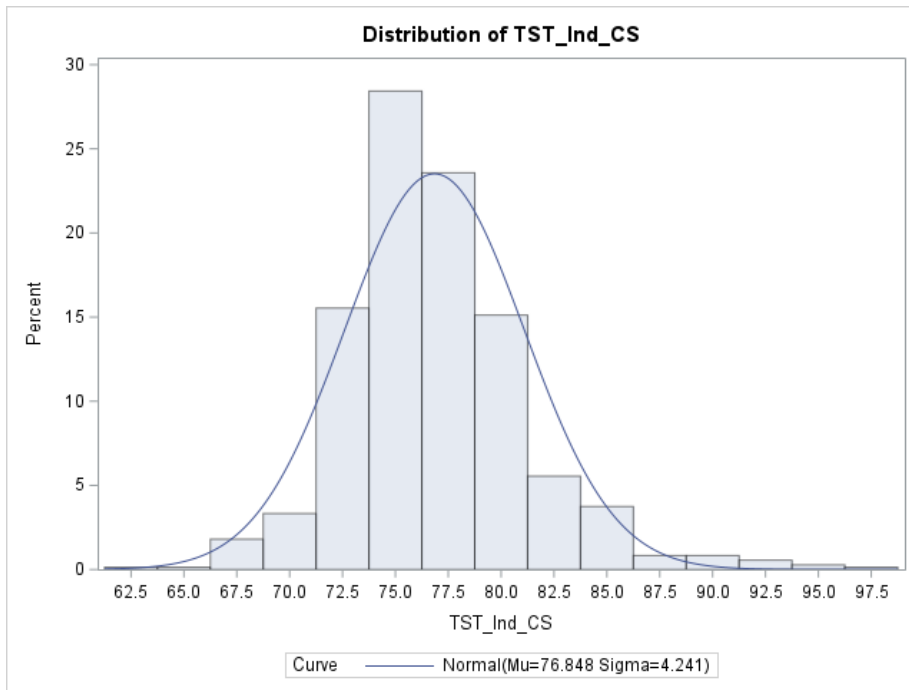


Figure A-10. Elementary School: Climate and Safety

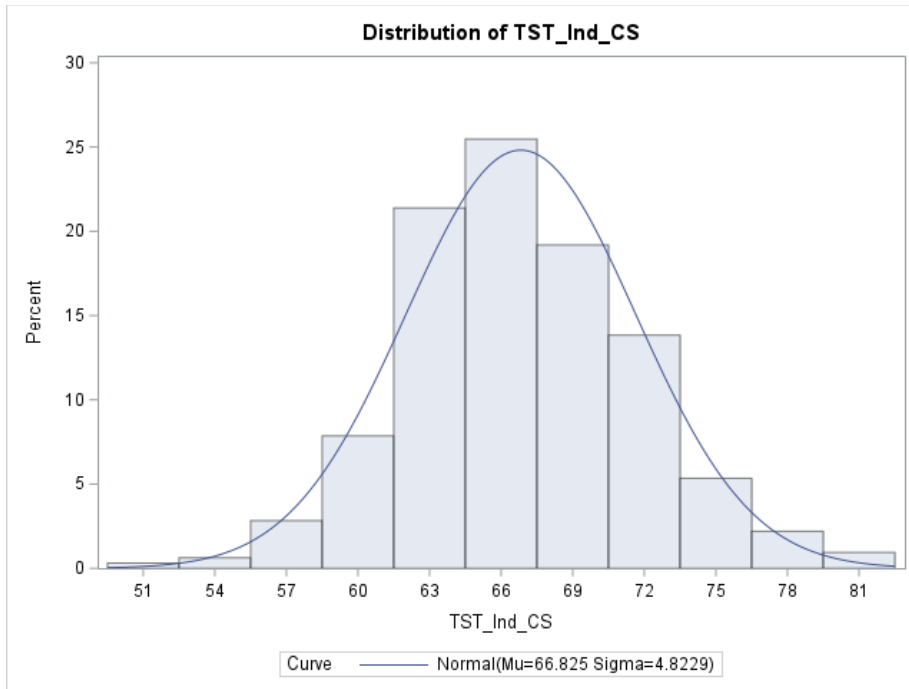


Figure A-11. Middle School: Climate and Safety

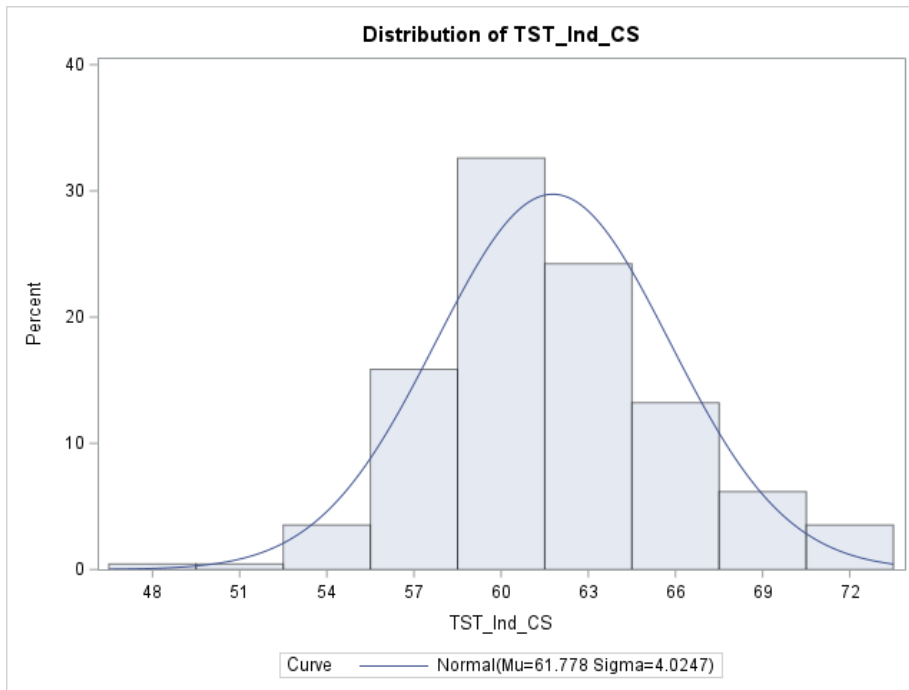


Figure A-12. High School: Climate and Safety

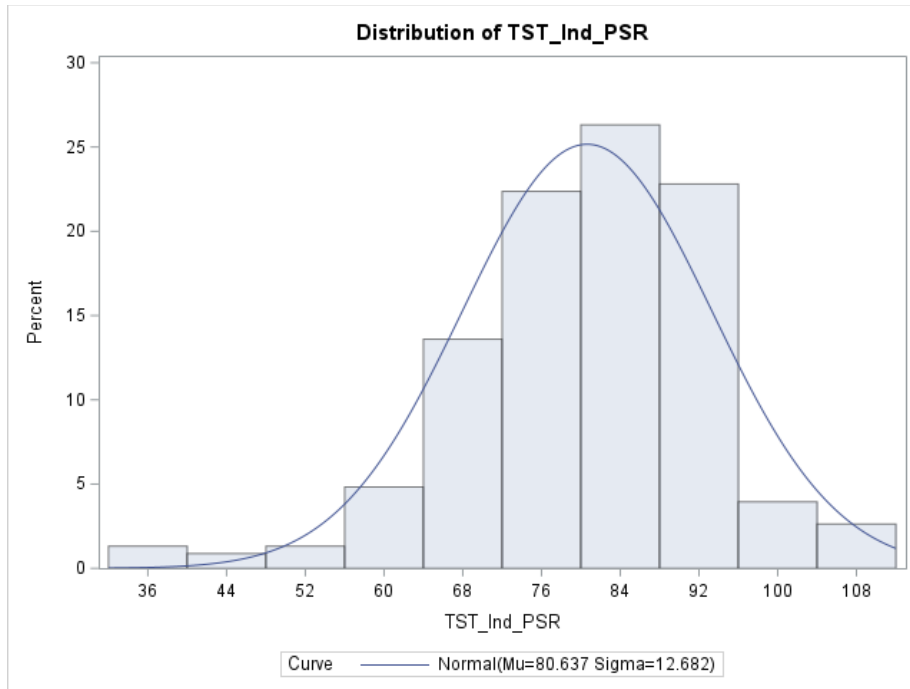


Figure A-13. High School: Postsecondary Readiness

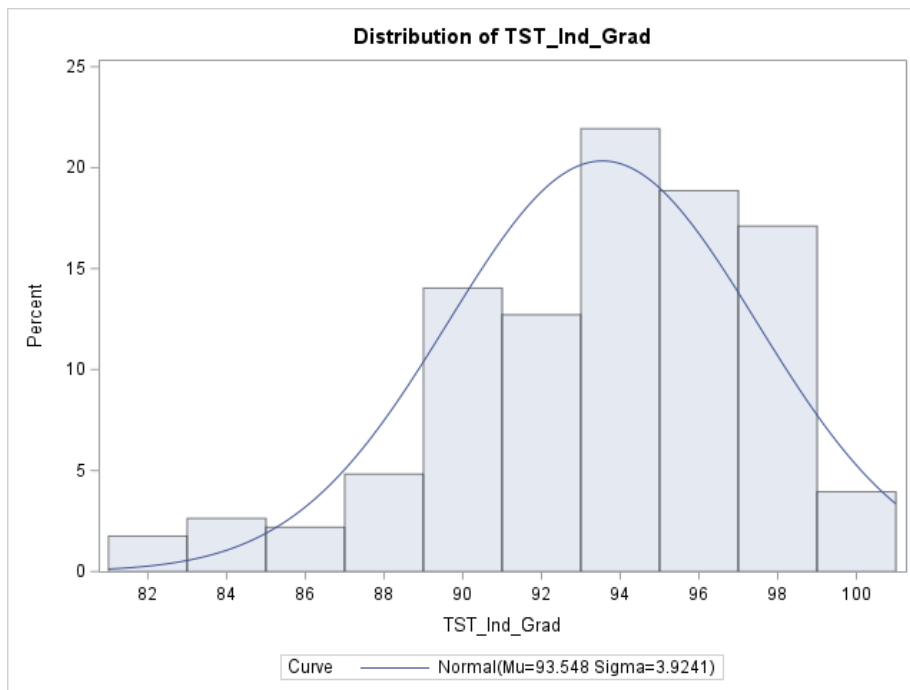


Figure A-14. High School: Graduation Rate

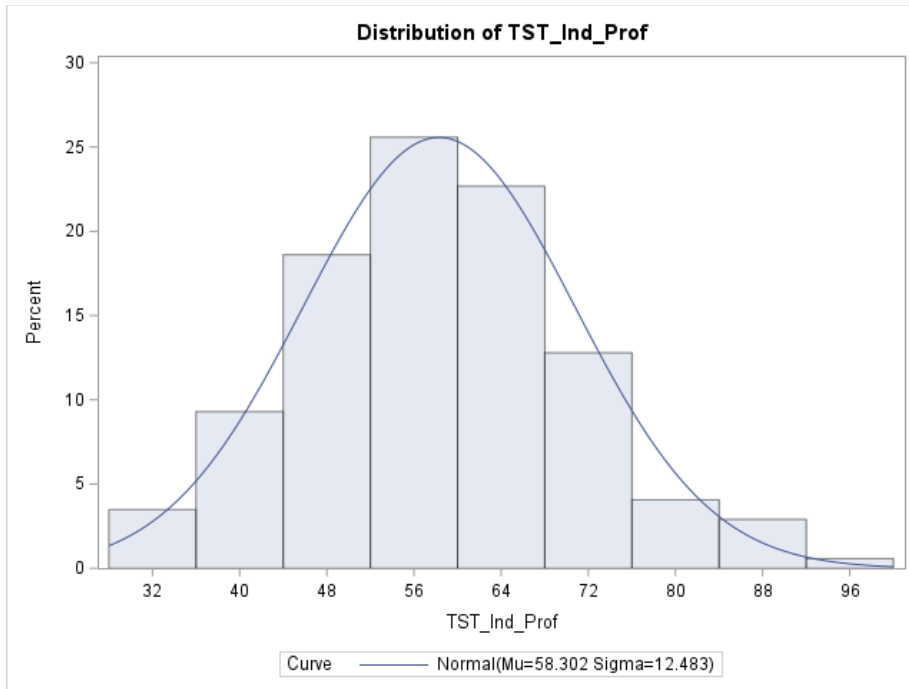


Figure A-15. District Elementary: State Assessment Results in Reading and Mathematics

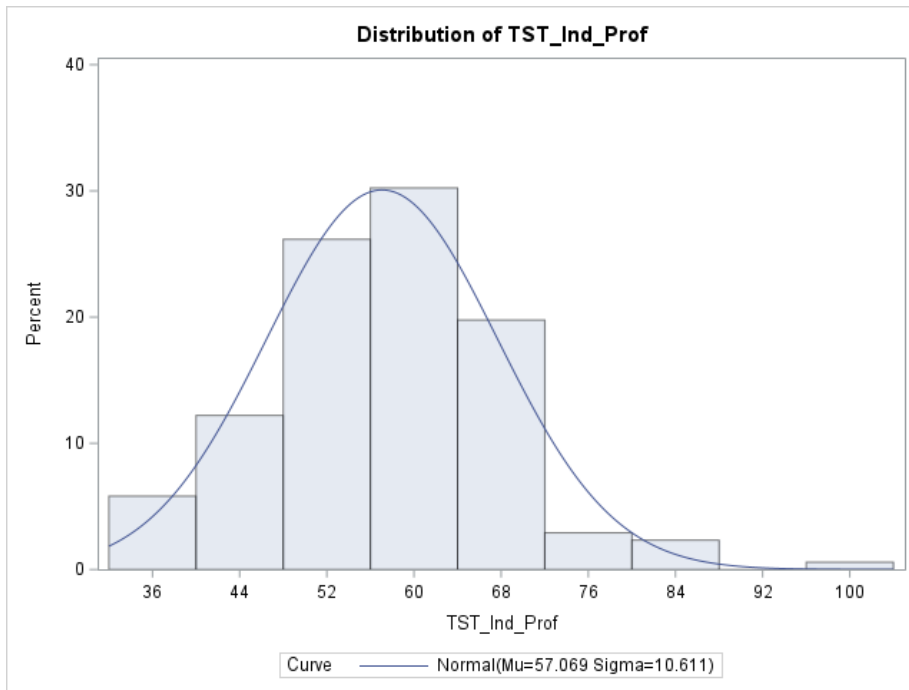


Figure A-16. District Middle: State Assessment Results in Reading and Mathematics

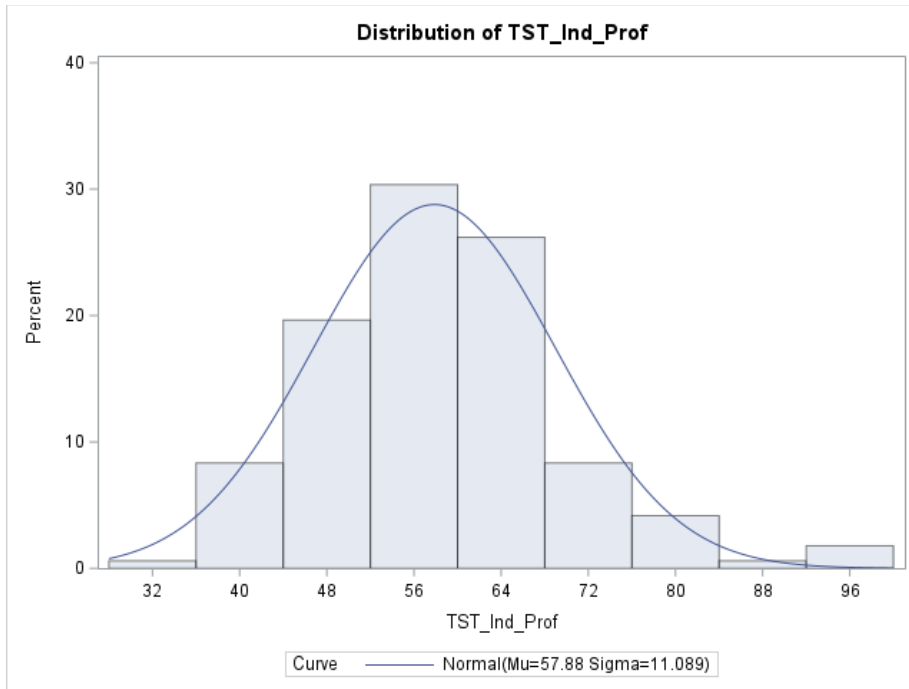


Figure A-17. District High: State Assessment Results in Reading and Mathematics

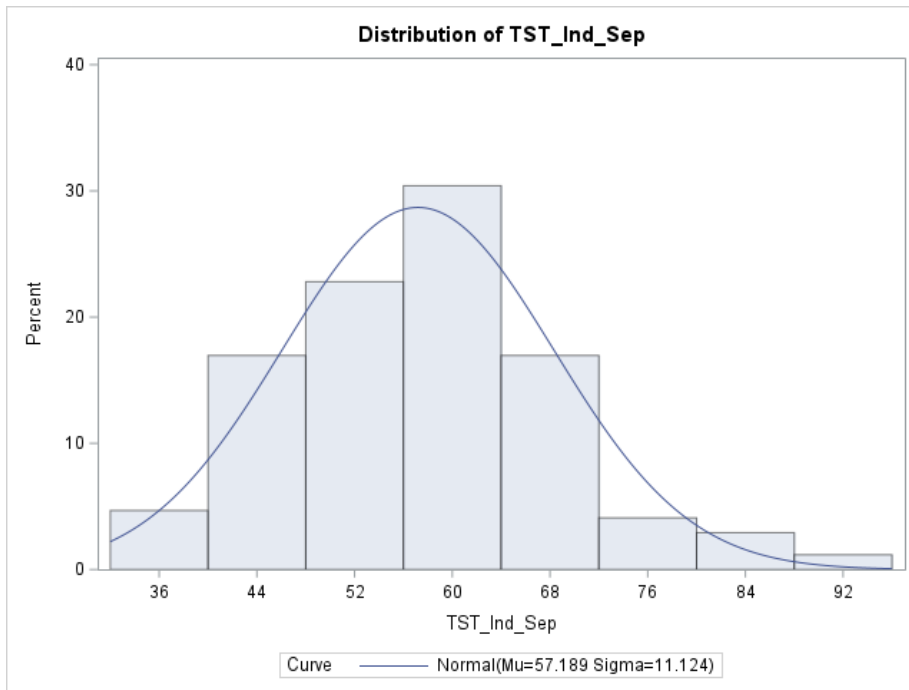


Figure A-18. District Elementary: State Assessment Results in Science, Social Studies, & Writing

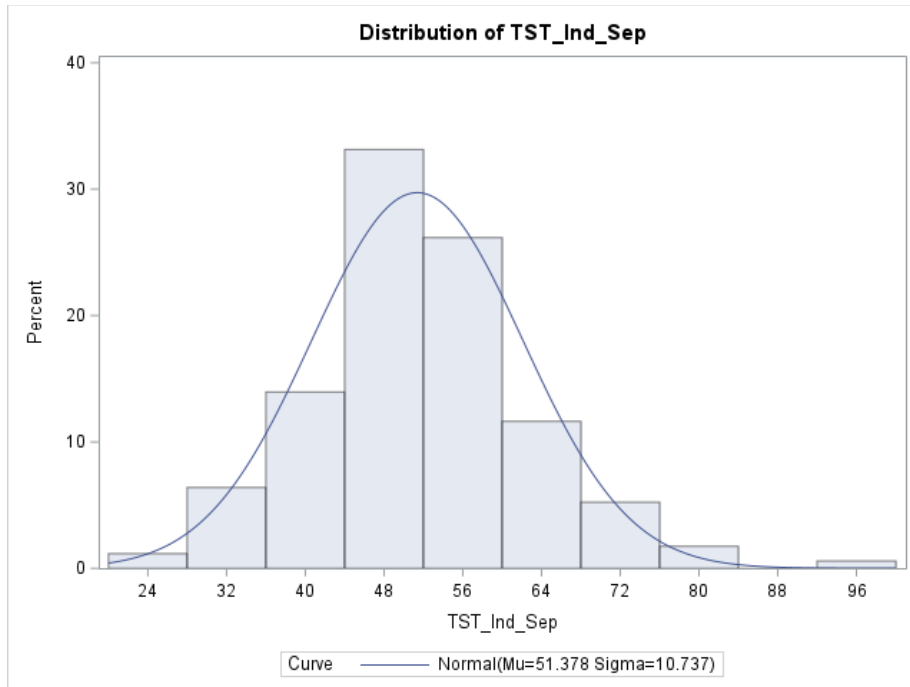


Figure A-19. District Middle: State Assessment Results in Science, Social Studies, & Writing

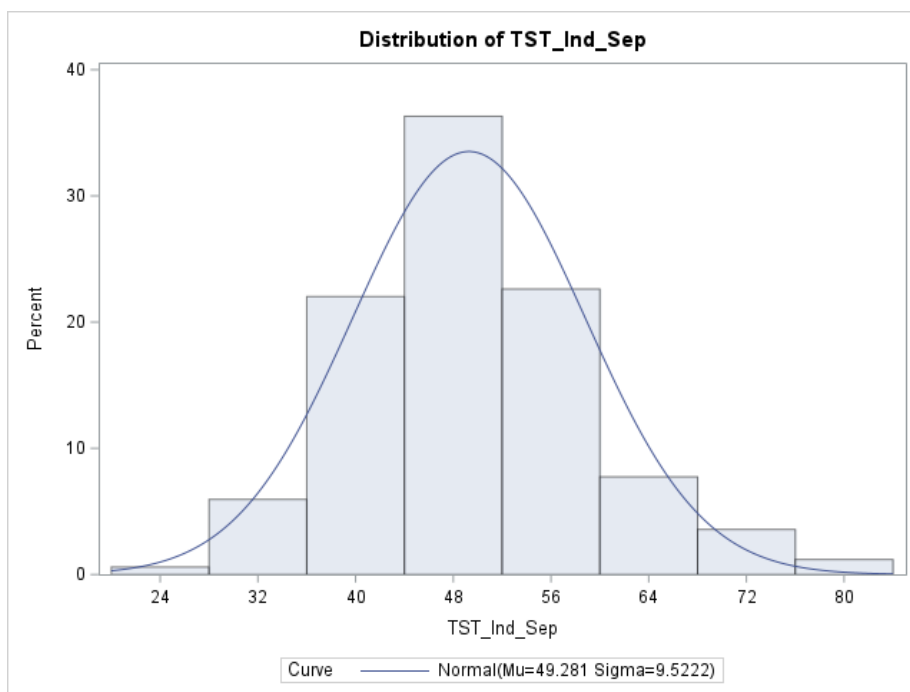


Figure A-20. District High: State Assessment Results in Science, Social Studies, & Writing

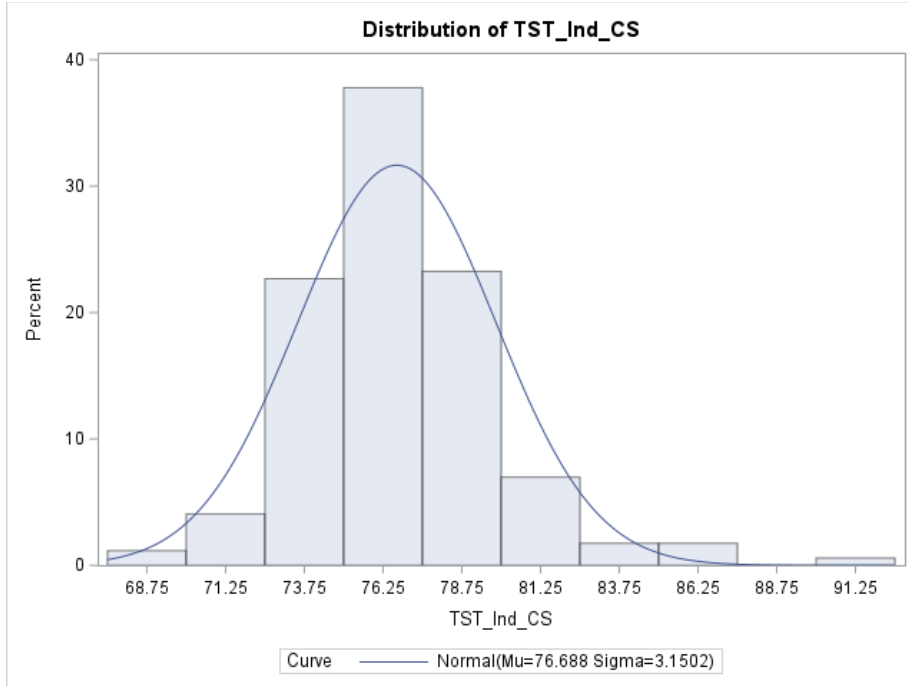


Figure A-21. District Elementary: Climate and Safety

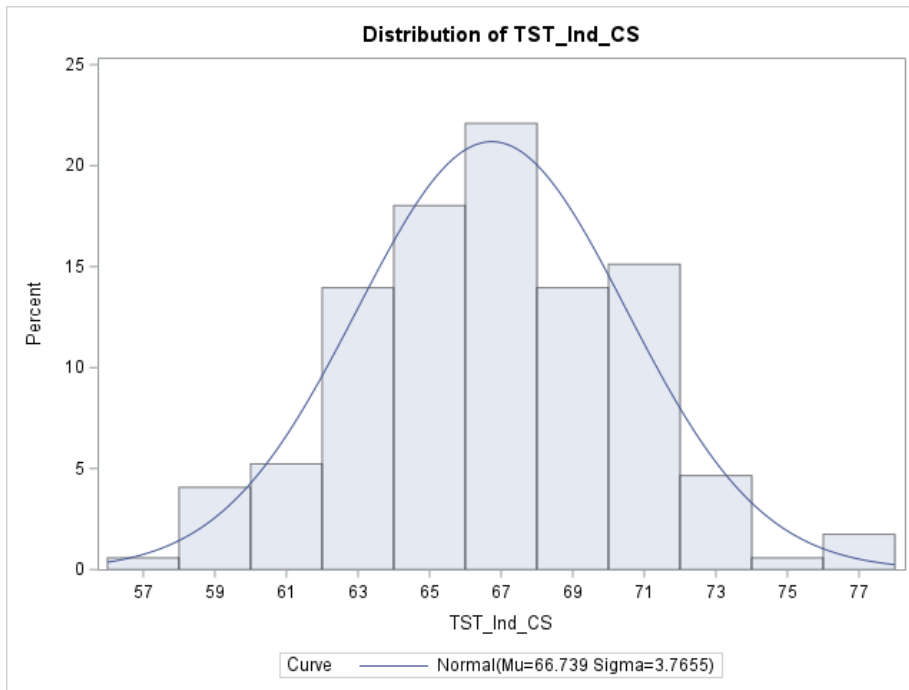


Figure A-22. District Middle: Climate and Safety

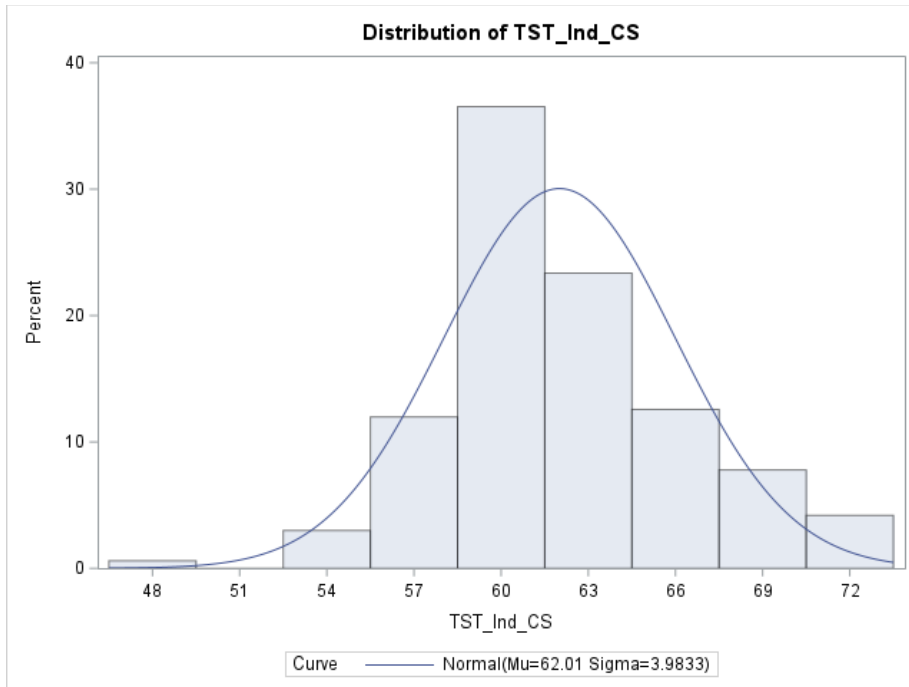


Figure A-23. District High: Climate and Safety

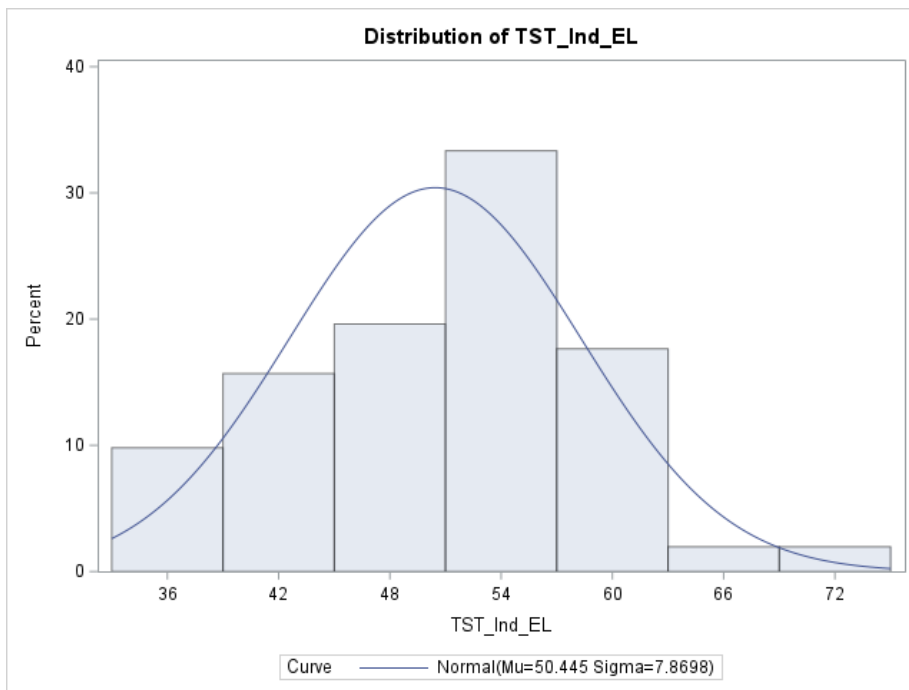


Figure A-24. District Elementary: English Learner Progress

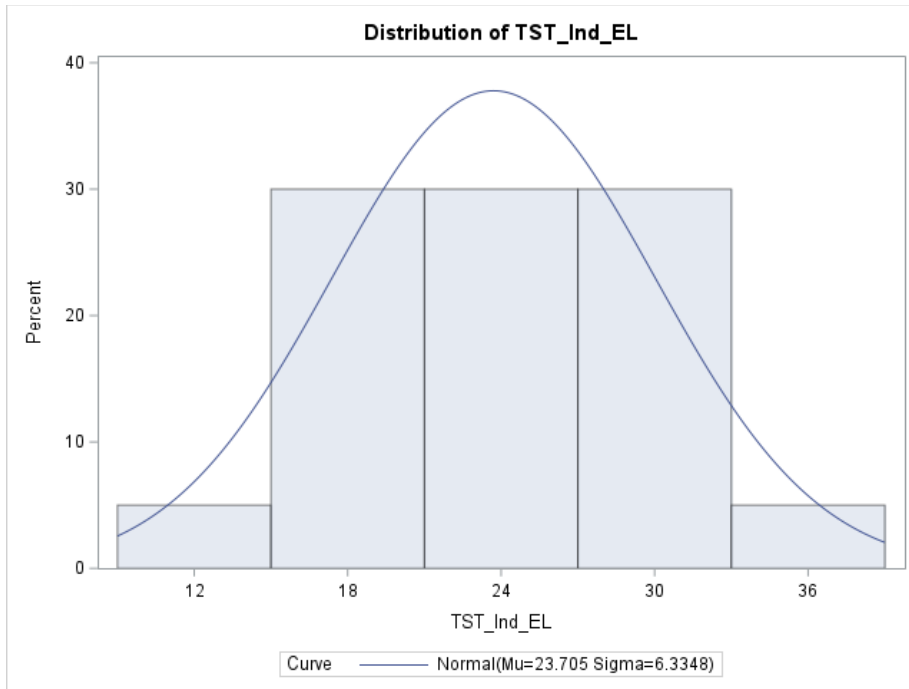


Figure A-25. District Middle: English Learner Progress

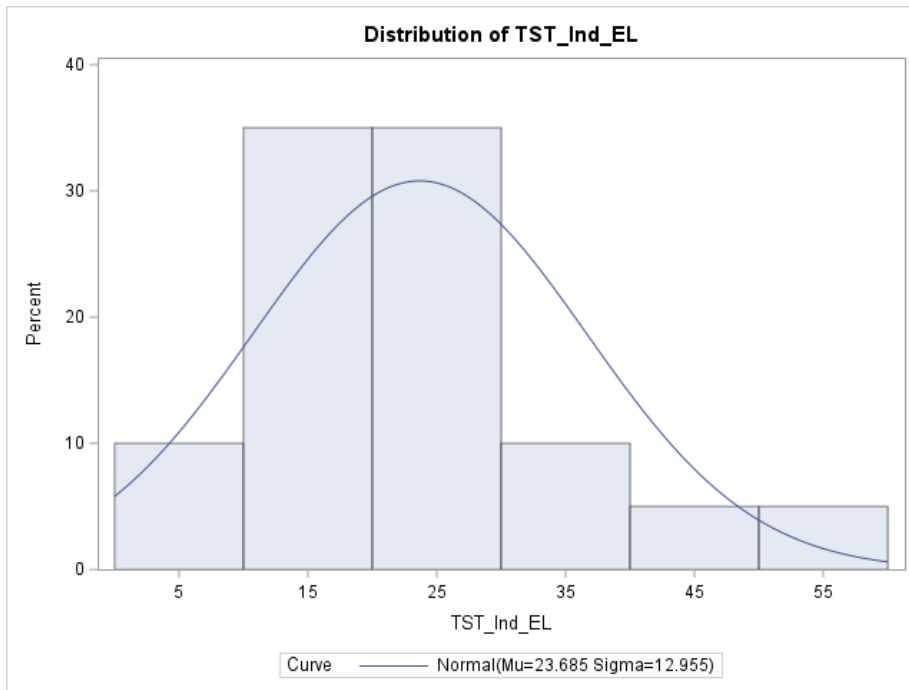


Figure A-26. District High: English Learner Progress

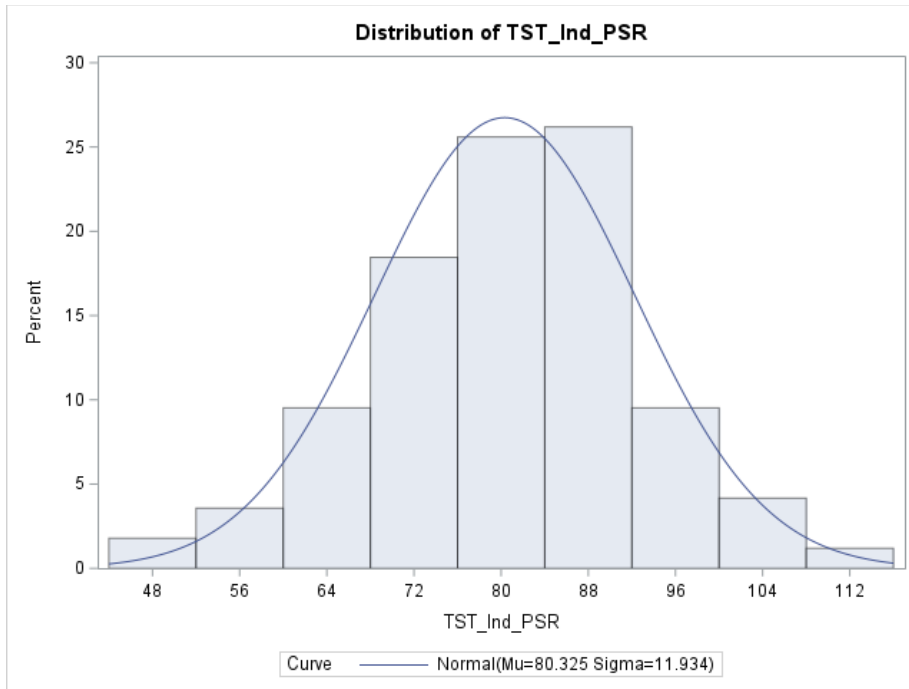


Figure A-27. District High: Postsecondary Readiness

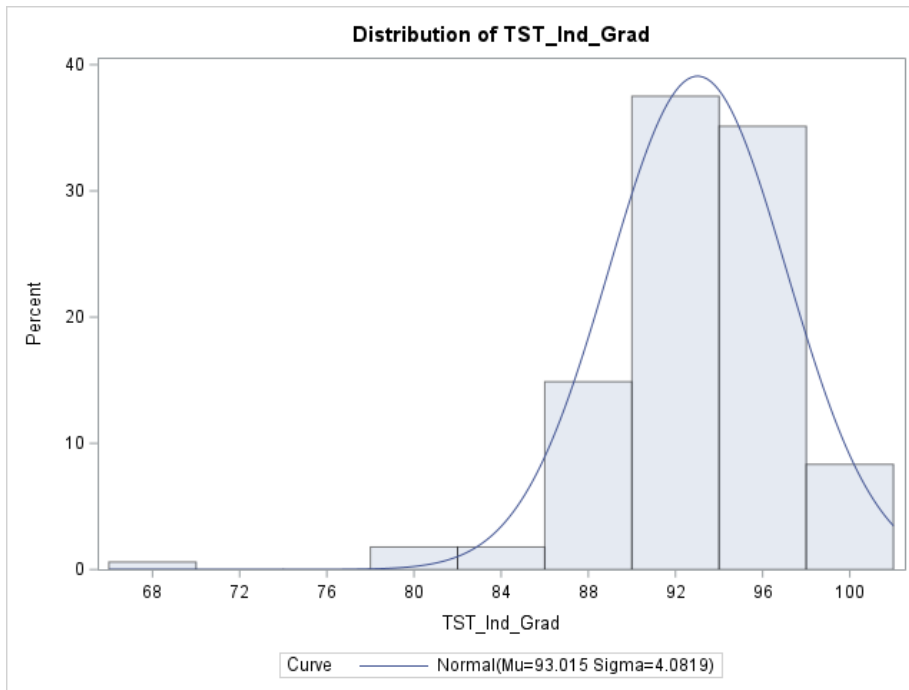


Figure A-28. District High: Graduation Rate

Appendix B: District-Level Results

Table B-1. Comparison of District Overall Score Distributions With and Without Climate and Safety Indicator

Level	Indicator Status	Mean	Standard Deviation
Elementary	QSCS Included	58.43	11.10
Elementary	QSCS Not Included	57.61	11.52
Middle	QSCS Included	54.59	10.02
Middle	QSCS Not Included	54.05	10.38
High	QSCS Included	62.96	8.20
High	QSCS Not Included	62.70	8.53

Table B-2. Changes in District Overall Accountability Ratings after Removal of School Climate & Safety Indicator

Change in Overall Rating	N	Percentage
Decrease One Level	22	4.30
No Change	486	94.92
Increase One Level	4	0.78

Table B-3. Comparison of District Overall Score Distributions Using QSCS Survey vs. Behavior Event Rate

Aggregation	Indicator Used	N	Mean	Standard Deviation
Elementary School	QSCS	172	58.43	11.10
Elementary School	Event Rate	172	55.27	11.07
Middle School	QSCS	172	54.59	10.02
Middle School	Event Rate	172	51.82	9.95
High School	QSCS	168	62.96	8.20
High School	Event Rate	168	60.39	8.13

Table B-4. Changes in District Overall Accountability Ratings Using Behavior Event Rate

Change in Overall Rating	N Decreasing One Level	Percentage Decreasing One Level	N No Change in Level	Percentage No Change in Level
Elementary	29	16.86	143	83.14
Middle	48	27.91	124	72.09
High	45	26.79	123	73.21

Table B-5. Comparison of District Overall Score Distributions Swapping Weights on English Preparedness and School Climate and Safety Indicators

Aggregation	Weighting	N	Mean	Standard Deviation
District Elementary	Old Weight	172	58.43	11.10
District Elementary	New Weight	172	58.65	11.02
District Middle	Old Weight	172	54.59	10.02
District Middle	New Weight	172	54.76	9.94
District High	Old Weight	168	62.96	8.20
District High	New Weight	168	63.00	8.13

Table B-6. Changes in District Overall Accountability Ratings After Swapping Weights on English Preparedness and School Climate and Safety Indicators

Change in Overall Rating	N Increasing One Level	Percentage Increasing One Level	N No Change in Level	Percentage No Change in Level
Elementary	5	2.91	167	97.09
Middle	2	1.16	170	98.84
High	0	0.00	168	100.00

Table B-7. Comparison of District Overall Score Distributions Doubling Weight of Climate and Safety and Reducing Weight of Science, Social Studies & Writing Indicator

Aggregation	Weighting	N	Mean	Standard Deviation
Elementary School	Old Weight	172	58.43	11.10
Elementary School	New Weight	172	59.24	10.71
Middle School	Old Weight	172	54.59	10.02
Middle School	New Weight	172	55.23	9.66
High School	Old Weight	168	62.96	8.20
High School	New Weight	168	63.49	7.96

Table B-9. Changes in District Overall Accountability Ratings After Doubling Weight of Climate and Safety and Reducing Weight of Science, Social Studies & Writing Indicator

Change in Overall Rating	N Increasing One Level	Percentage Increasing One Level	N No Change in Level	Percentage No Change in Level
Elementary	14	8.14	158	91.86
Middle	6	3.49	166	96.51
High	11	6.55	157	93.45

Table B-10. Comparison of District Overall Score Distributions Quintupling Weight of Climate and Safety and Distributing Remaining Weight Proportionally

Aggregation	Weighting	N	Mean	Standard Deviation
Elementary School	Old Weight	172	58.43	11.10
Elementary School	New Weight	172	61.59	9.44
Middle School	Old Weight	172	54.59	10.02
Middle School	New Weight	172	56.69	8.61
High School	Old Weight	168	62.96	8.20
High School	New Weight	168	62.81	7.12

Table B-11. Changes in District Overall Accountability Ratings After Quintupling Weight of Climate and Safety and Distributing Remaining Weight Proportionally

	Change in Overall Rating	N	Percentage
Elementary	Decrease One Level	0	0.00
Elementary	No Change	131	76.16
Elementary	Increase One Level	41	23.84
Middle	Decrease One Level	0	0.00
Middle	No Change	142	82.56
Middle	Increase One Level	30	17.44
High	Decrease One Level	6	3.57
High	No Change	158	94.05
High	Increase One Level	4	2.38