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Tutoring Program 2023-24

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Key Findings

- There were just under 14,000 unique students enrolled in District tutoring.
- There were statistically significant findings for math tutored students both in TCAP and i-Ready assessments. Students who were tutored at 90% of both semesters outperformed their non-tutored peers on the TCAP, and students who were tutored either 90% of one semester or 90% of both semesters outperformed their non-tutored peers in i-Ready as well.
- While there were not statistically significant findings in other subjects or grades, students who participated in tutoring 90% of both semesters more often outperformed their non-tutored peers.

Program Overview

Memphis-Shelby County Schools (MSCS) provided before school, after school, and Saturday tutoring for students in grades K–12. Tutoring occurred from September 2023 to April 2024 for just under 14,000 students. Schools could choose their schedule but on average, a school provided three hours of tutoring per week for before and after school tutoring. This evaluation will center on before and after school tutoring.

According to the Academic Operations and School Support team, schools could choose either: A) 3 days per week for 1 hour per day or B) 2 days per week for 1.5 hours per day and C) up to 2 Saturdays per month (Saturday tutoring is optional based on available staff for program but strongly encouraged for all sites). Elementary and middle school students received additional instruction in ELA and/or Math. High school students received additional instruction in EOC content (9-10) and ACT prep (11-12). Students could receive either ELA or Math tutoring in one semester and can be enrolled in only one tutoring course code. Students could not receive both ELA and Math tutoring in the same semester. However, schools had the autonomy to enroll students in a different subject area at the change of the semester.

Each school selected a Tutoring Coordinator to ensure tutoring programs are implemented with fidelity (please see the Appendix to see all of the tutoring coordinators' essential roles and responsibilities). One of the struggles that schools faced was attendance defaulted to present, and tutoring did not take attendance with fidelity resulting in inadequate attendance data. Tutoring Coordinators were also responsible for setting up classes in PowerSchool, which sometimes resulted in duplicated student enrollments, missing room numbers, student enrolled in the wrong grade band of tutoring, and/or Placeholders not replaced with the correct teachers. When Tutoring Coordinators resigned, some schools did not replace the tutoring coordinator; thus, making it difficult to clean up data and support the school with tutoring.

Program Goals

1. Tutored students in the high dosage group (90%+) will outperform non-tutored students on the TCAP (3–8).

2. Tutored students in the high dosage group (90%+) will outperform non-tutored students on EOC exams (9-10th grade).

3. Tutored students in the high dosage group (90%+) will outperform non-tutored students on ACT (11th & 12th grade).

4. Tutored students in the high dosage group (90%+) will outperform non-tutored students on student growth metrics (i-Ready K–8).

5. Increase the percentage of students in the high dosage group scoring in the 65th percentile or higher on spring i-Ready assessments.

Data and Methodology

All tutoring attendance data were taken from a dashboard that the Decision Analytics and Information Management (DAIM) team created. Attendance was entered into PowerSchool by the school-level tutoring coordinators. Attendance was recorded in hours; the average maximum number of hours students could enroll and attend was 81; however, many students only attended one semester of a subject of tutoring. For one semester, the maximum number of hours possible was 41. Schools could have tutoring two days a week with an hour-and-a-half long sessions or they could have three one-hour sessions a week; regardless schools usually provided three hours of tutoring a week. Because so many schools offered one subject per semester, analyses were broken into two high dosage groups—those who attended 90% of one semester (34 to 41 hours) and those who attended 90% of both semesters (70 to 81 hours). Table 1 below shows the number of hours associated with each dosage group.

Table 1.

Tutoring Dosage Groups	
Dosage Group	Hours Present at Tutoring
No Tutoring	0 hours/ Not enrolled
90% of 1 Semester*	34 to 41 hours
90% of Both Semesters	70 or more hours
*90% of one semester is only for K-8th ELA and Math	

The analyses were broken down by different grade bands, as different tests are given to various grade bands. Each grade band has an assessment for math and ELA, except for 11th and 12th graders who have one combined assessment. i-Ready math and i-Ready ELA data were used for grades Kindergarten through eighth grade. Third through eighth grade also participated in the math and ELA TCAP, and those data were used for analyses for this grade band as well. Ninth and 10th grade students took End of Course (EOC) tests based on subject area, and these were used for their analyses. Lastly, ACT composite scores were used for analysis for 11th and 12th grade students. Table 3 below shows assessments by grade band with the subjects they cover. The following sections will outline the variables used for each assessment's analysis.

Table 2.

Grade Range	Assessments	Subject
K–8	i-Ready	ELA
		Math
3rd-8th	TCAP	ELA
		Math
9th Grade	EOC	ENG I
		ALG I
10th Grade	EOC	ENG II
		ALG II
		Geometry
11th-12th	ACT	All Combined

i-Ready K–8 Data

Kindergarten through eighth grade students take the i-Ready diagnostic assessment three times a year—in the fall, at the middle of the year, and at the end of the year (called fall,

winter, and spring, respectively). For the tutoring evaluation, the fall window was used as the baseline, including the i-Ready provided Annual Typical Growth Measure (ATGM) variable for each student. This measure is defined as, "Typical Growth represents the average yearly growth for a student of that grade and initial placement level" (Curriculum Associates Research, 2023, p. 2). i-Ready provides this measure to help teachers gauge how well their students are doing. The ATGM was used for the analysis for the tutoring program. This target measure was used to determine the amount of growth students achieved. This measure will be called Student Growth Measure (SGM) and is calculated by subtracting a student's fall scale score from their spring scale score and then dividing that by their ATGM and multiplying by 100% to make this a percentage. See Figure 1 for the formula below.

Figure 1. Formula for Student Growth Measure

$$Student\ Growth = \frac{Spring\ iReady\ scale\ score\ -\ Fall\ iReady\ scale\ score}{iReady\ Annual\ Typical\ Growth\ Measure} \times 100\%$$

A student who has a 100% SGM would have hit their ATGM exactly. This would happen if a student had a fall scale score of 400, an ATGM of 30, and they had a spring scale score of 430. A student with a SGM less than 100% means that they did not hit their ATGM. If their SGM is greater than 100% this indicates that they exceeded this measure. A negative percentage indicates that they scored lower than they did in the fall. To ensure that outliers did not sway the analysis, any SGM that was outside of three standard deviations were removed from the dataset when using this as a dependent variable.

Students were included in this analysis if they had a test in the fall and spring testing windows. Tutored students needed to be enrolled in tutoring of the subject area and to have a valid test in each testing window to be included in analysis (e.g., a student is enrolled in ELA tutoring and had an ELA i-Ready assessment in fall and spring). Testing had to be done in the correct window. There were extended windows to ensure that the District was compliant with testing by giving students extra opportunities to take the assessments, however including students who had a fall test in the extended window would not show an accurate picture of where all students were at the beginning of the school year. Tutored students were compared to non-tutored students who also had a test in fall and spring.

3rd through 8th Grade TCAP Data

Third through eighth graders take the state assessment (TCAP) in the spring semester each year in both math and ELA. Each year the state provides both their TCAP scores and projections for the upcoming year based on their prior performance (TVAAS projections). TVAAS projections help teachers know how well their students are expected to perform on the next TCAP. They can also be used as a comparison to how well the student actually performs on the TCAP the next year.

The TVAAS projection that will be used for this analysis is a projected percentile rank. This is then compared to the percentile rank that the student actually achieved in the spring of the 2022–23 school year. The variable used for this analysis is referred to as the "Difference between Projected and Actual Percentile Rank." To create this variable, the student's project percentile rank is subtracted from their actual percentile rank. If a student has a zero or above, this means they met or exceeded their projected percentile rank. If the student has a negative number, this means they did not meet their projected percentile rank. To be included in the analysis for this portion of TCAP, students needed to have both a projected percentile rank on file and a valid test from the 2023–24 spring TCAP.

Table 3 shows the breakdown of how many students were in tutoring and had valid i-Ready and TCAP scores by subject to be included in the analyses. Because i-Ready was given to more grades than the TCAP, there were more students in the i-Ready analysis. More students were tutored in ELA so in both i-Ready and TCAP there were more students in ELA than math.

Table 3.

Tutor Dosage (Before & After School Tutoring)		Assessments			
		i-Ready		TCAP	
Grade Range for Assessment		K-8		3rd-8th	
Subject		ELA	Math	ELA	Math
All Tutored	*N*	7,375	5,167	5,237	3,826
90% of 1 Semester	*N*	1,586	1,221	1,074	902
	%	22%	24%	21%	24%
90% of Both Semesters	*N*	1,084	580	776	538
	%	15%	11%	15%	14%

9th and 10th Grade EOC Data

Ninth and 10th graders took End of Course (EOC) assessments in the spring after taking the following courses: English I, English II, Algebra I, Algebra II, and Geometry. High schoolers were able to enroll in tutoring in these courses. Like the TCAP for third through eighth graders, ninth and 10th graders receive projections of how well they will do on their EOCs, based on their previous year's performance.

To be included in the analysis, students needed to have both an EOC score within the subject level for the 2022–23 school year and a TVAAS, as well as be tutored within that subject. Students were removed if they did not have both measures. Subject levels were chosen for specific grades based on the regular sequence for high school math and English. Only ninth graders were chosen for the analysis of English I and Algebra I tutoring, because they made up the majority of the students who were enrolled in those tutoring sessions.

English II, Algebra II, and Geometry only include 10th grade students for the same reason. Table 4 shows the breakdown of students by each subject.

11th and 12th Grade ACT Data

High schoolers were able to enroll in ACT tutoring, as well as English or math tutoring. For 11th and 12th graders, ACT composite scores were used to analyze ACT tutoring. Each year the state provides projections for students' ACT scores. These projections can be used to compare how well the student performs on the ACT the next year. Students were taken out of the main analysis if they were enrolled in the PeerPower University tutoring, which involves college students tutoring high school students on ACT skills. Students were also removed if they were enrolled in at least five hours of an ACT prep course within their regular school schedule. Table 4 shows tutoring by subject for 9th and 10th graders, as well as ACT for 11th and 12th graders.

Table 4.

Tutor Dosage (Before + After School Tutoring)		Assessments					
		EOC					ACT
		English I	English II	Algebra I	Algebra II	Geometry	
All Tutored	*N*	573	203	393	68	166	475
90% or More	*N*	60	58	37	17	7	169
	%	10%	29%	9%	25%	4%	36%

Methods

Propensity score and balance weighting methodology was used to create the most comparable control group for the evaluation. Students were identified as being in tutoring, participating 90%, and having the correct assessments to be in the tutored group. To be in the non-tutored group, students needed to have the correct assessments and not have received tutoring in the subject matter that was being tested in the assessment. Propensity score and balance weighting allows researchers a way to take observational data and pull a control group that is like a randomized control trial. Randomized control trials are the gold standard in science due to eliminating selection bias and thereby allowing researchers to claim causal effects (Markoulidakis et al, 2022). Propensity score and balance weighting achieves this by assigning a unit interval to each case within a dataset based on how likely each case is to being in the treatment group, in this case the tutoring group.

This is done by including as many variables as possible that could influence a student to enroll in the tutoring program. These variables include race/ethnicity (as four categories:

Black/African American, Hispanic, white, and 'other'), sex, grade level, previous test scores, Economically Disadvantaged (ED), Student with Disability status (SWD), and English Learner status (EL). Students who were in the tutored group automatically get a "1", indicating that it is the most likely they could be in the tutoring group because ultimately, they did enroll and participate. All other students are given a unit interval based on how closely they resemble the tutored group. If a student has very dissimilar characteristics from the tutored group, they will get a very small unit interval, closer to 0. Therefore, students who have similar qualities to the tutored group will have a unit interval closer to 1 and will be weighted more heavily than those who are not similar. This allows the model to include all students, but it creates an Effective Sample Size (ESS) which takes all the non-tutored students and compiles them into what can be thought of as a random sample. On the charts below the non-tutored group is labeled with '*n* out of *n*'; the second *n* is the entire group of non-tutored students, and the first *n* is the Effective Sample Size, which indicates the approximate number of cases the model is using once all students are weighed appropriately.

CoBWeb or "Covariate Balancing & Weighting Web App" was the program used in this process. Their app states, "the goal of this app is to robustly estimate the causal treatment effect in observational studies. It follows all the necessary steps to evaluate overlap of the treatment groups, obtain estimates of PS and balancing weights, check for covariate balance, estimate the causal treatment effect, and assess sensitivity to unobserved confounding" (Markoulidakis et al.). To learn more about the process of using the app and what all is involved, please see the references for a link to the site and their article. The application accurately balances students based on their confounders and runs a regression model on the outcome variable. This was done for all assessments previously discussed in the Data Section. The following section will show the results of these regression models.

Findings and Results

KPI 1:

Tutored students in the high dosage group (90%+) will outperform non-tutored students on the TCAP (3–8).

TCAP ELA

While there were no statistically significant findings, students who attended 90% of the year (or both semesters) of ELA tutoring had a higher positive difference between projected and actual percentile rank than their non-tutored peers, in general and for those who were in the Below category the previous year. Figures 2 and 3 show these results. Both students who

were in the overall tutoring group and those in the Below category in the previous year had over or almost a full percentage point over their non-tutored peers.

Figure 2.

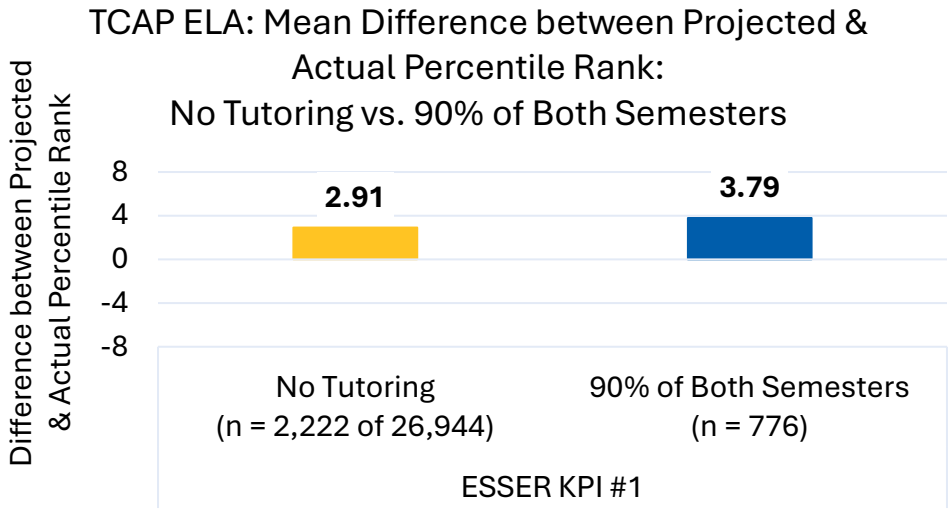
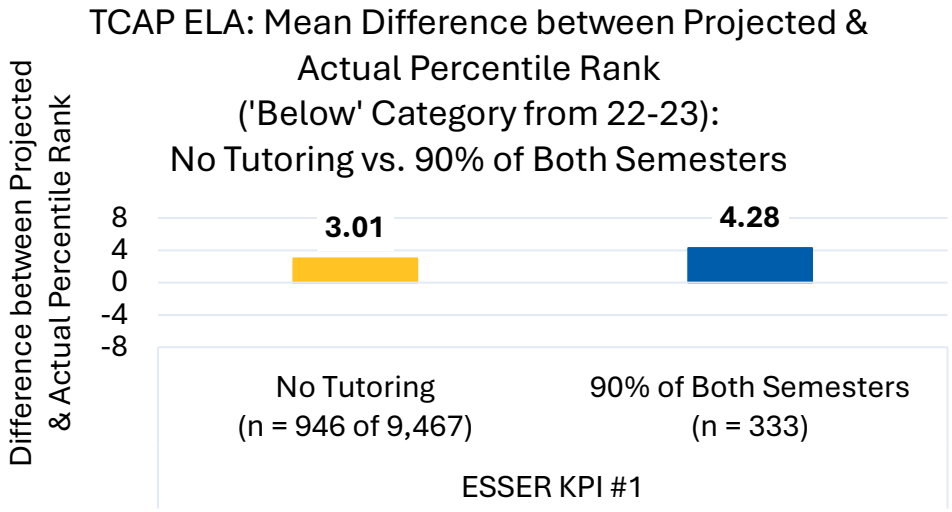


Figure 3.



TCAP Math

Students who attended 90% of the year (or both semesters) had a higher positive difference between projected and actual percentile rank than their non-tutored peers, in general (shown to be statistically significant) and for those who were in the Below category the previous year. Figures 4 and 5 show these results below.

Figure 4.

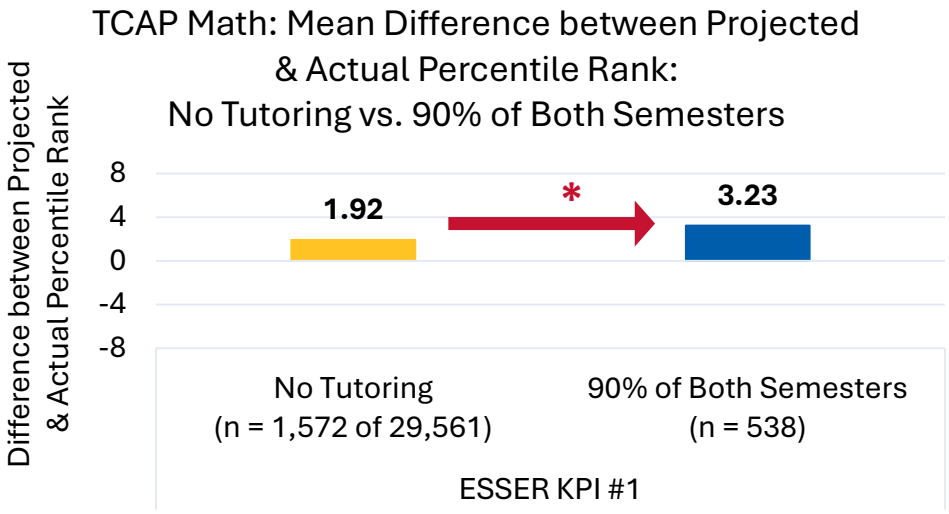
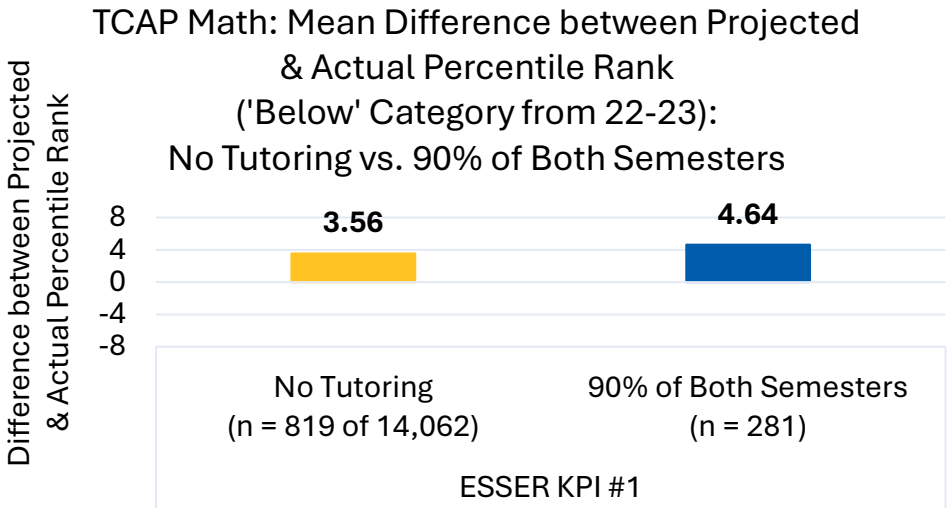


Figure 5.



None of the results for the 90% participation of one semester groups in either subject were statistically significant. Please see the Appendix for these charts.

KPI 2:

Tutored students in the high dosage group (90%+) will outperform non-tutored students on EOC exams (9-10th grade).

EOC English I & English II

While there were no statistically significant findings, students who attended 90% of the year (or both semesters) had a higher positive difference between projected and actual

percentile rank than their non-tutored peers, in both English I for 9th graders and English II for 10th graders. Figure 6 and Table 5 below show these results.

Figure 6.

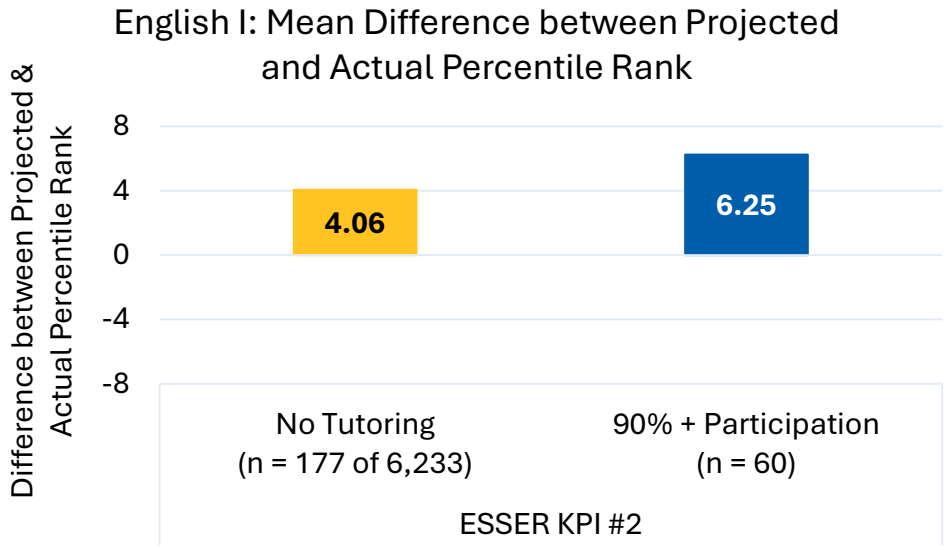


Table 5.

Subject	Non-Tutored	Tutored
English II	4.71	7.88
	(n = 6,214)	(n = 58)

EOC Algebra I, Algebra II, & Geometry

There were too few cases of 90% tutored students in Algebra I, Algebra II, and Geometry with EOC scores to determine if tutoring was statistically significantly effective. However, the descriptive statistics and mean differences between projected and actual percentile ranks for these subjects are listed in table 6 below.

Table 6.

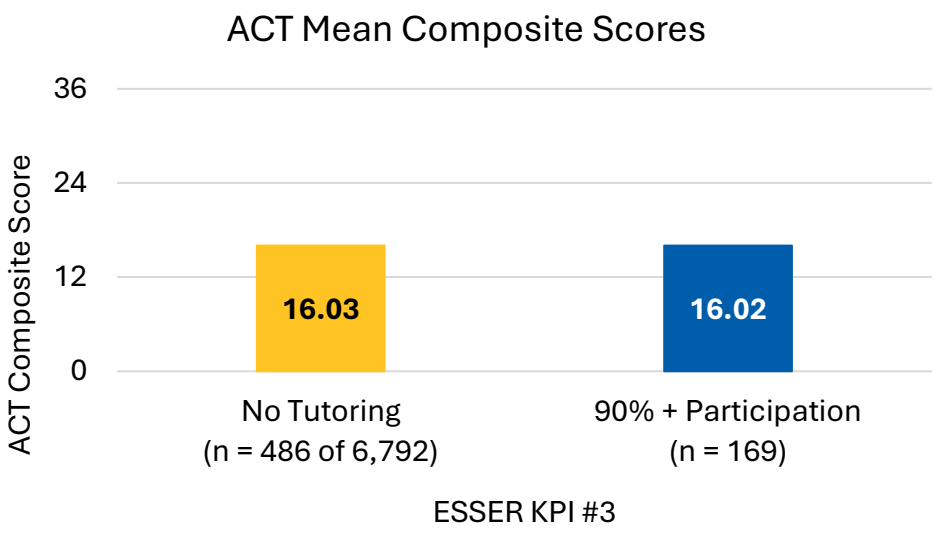
Subject	Non-Tutored	Tutored
Algebra I	4.88 (n = 6,063)	2.68 (n = 37)
Algebra II	6.00 (n = 1,370)	10.31 (n = 16)
Geometry	9.75 (n = 4.861)	-1.1 (n = 7)

KPI 3:

Tutored students in the high dosage group (90%+) will outperform non-tutored students on ACT (11th & 12th grade).

Students who attended 90% of the year (or both semesters) did not outperform their non-tutored peers when looking at ACT Composite Scores in 11th and 12th graders.

Figure 7.



KPI 4:

Tutored students in the high dosage group (90%+) will outperform non-tutored students on student growth metrics (i-Ready K–8).

i-Ready ELA

In most cases, non-tutored students still outperformed high dosage tutored students. ELA 90% tutored in one semester students were outperformed by their non-tutored peers in a statistically significant way. This may indicate that sporadic attendance across the year or only having one semester of ELA tutoring offered could cause more harm than help.

Students who both scored within the bottom quartile and who attended 90% of both semesters outperformed their non-tutored peers, though this was not found to be statistically significant. Figures 8-10 below show these results.

Figure 8.

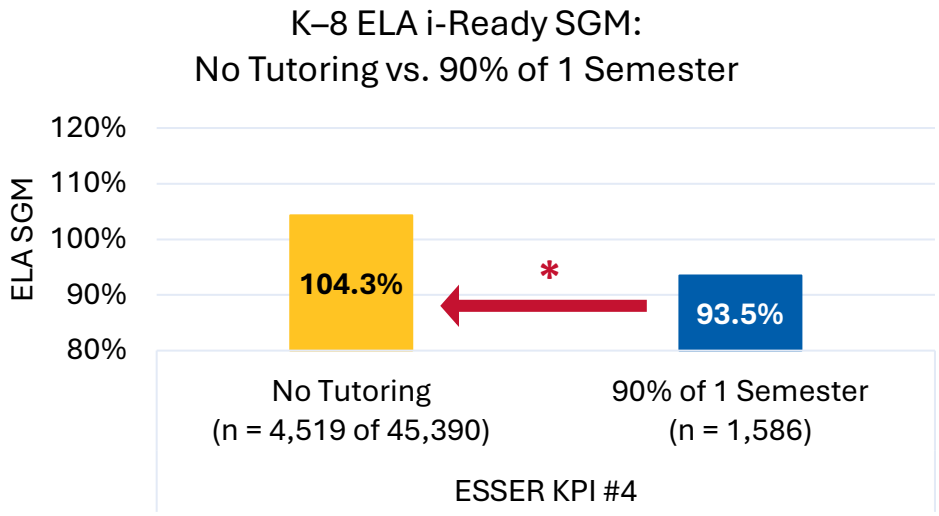


Figure 9.

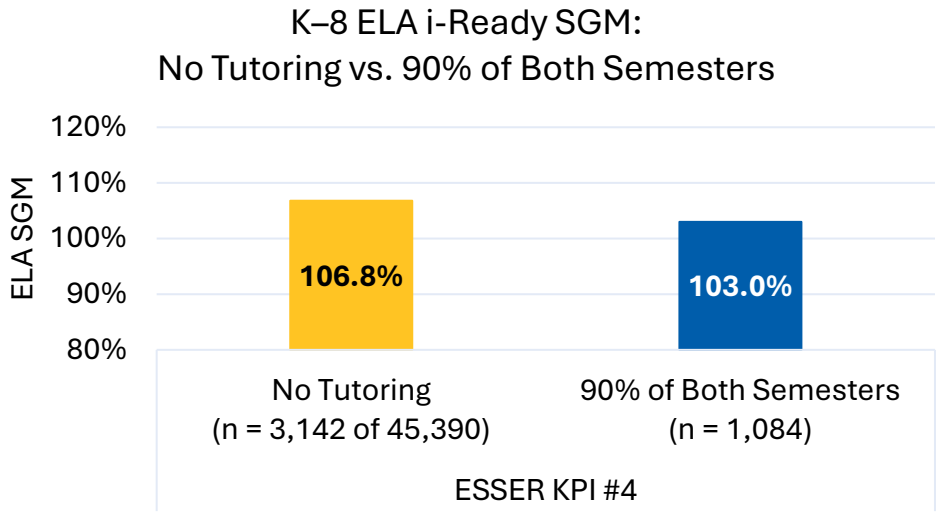
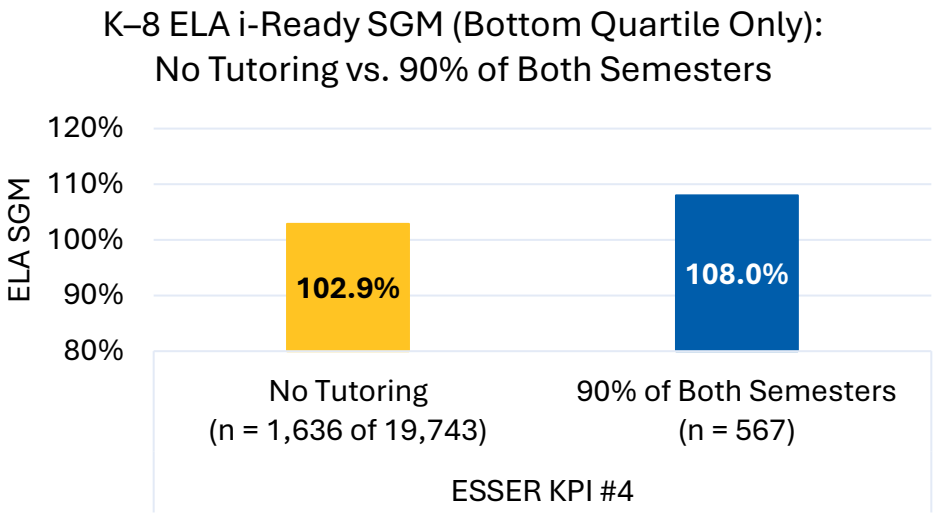


Figure 10.



i-Ready Math

In all cases, 90% tutored students outperformed their non-tutored peers in a statistically significant way. This was the case with students who participated 90% of one semester and those who participated 90% of both semesters. This was also the case with students who scored within the bottom quartile of fall i-Ready window in both participation groups. This shows that tutoring was effective for increasing student's math SGM, regardless of if they were involved 90% of only one semester or both semesters, and regardless of if they were in the bottom quartile in the fall i-Ready window or not. Figures 11-14 below show these results.

Figure 11.

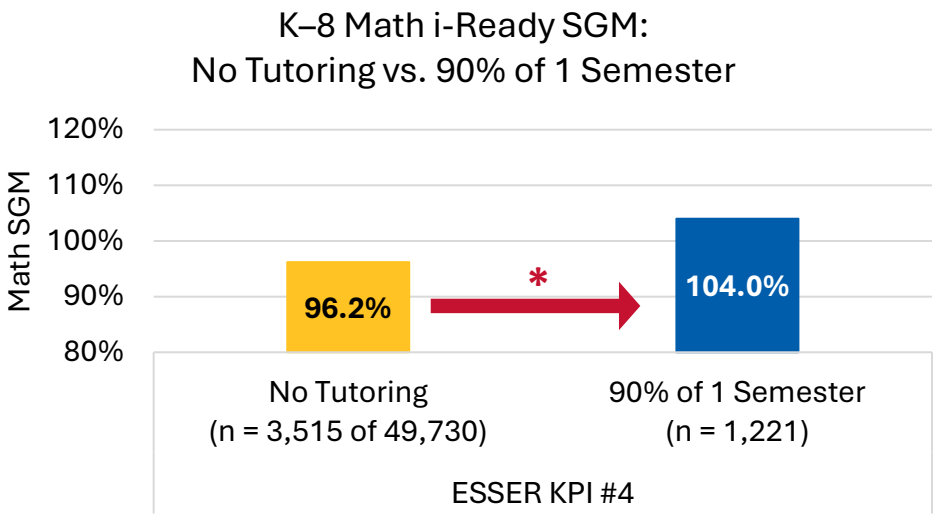


Figure 12.

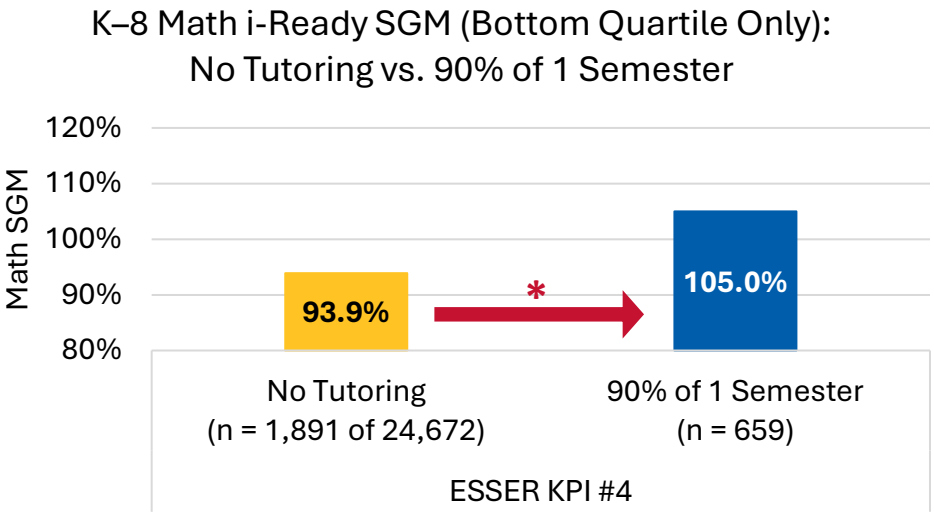


Figure 13.

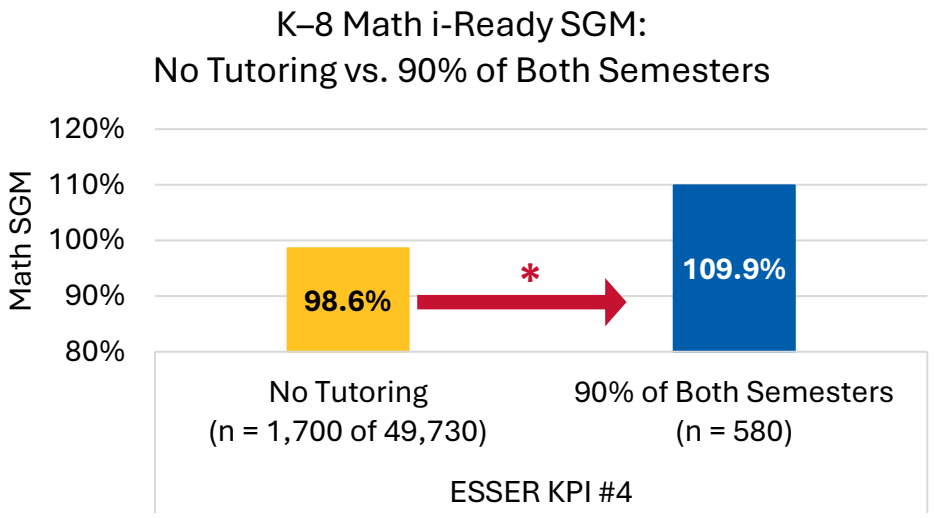
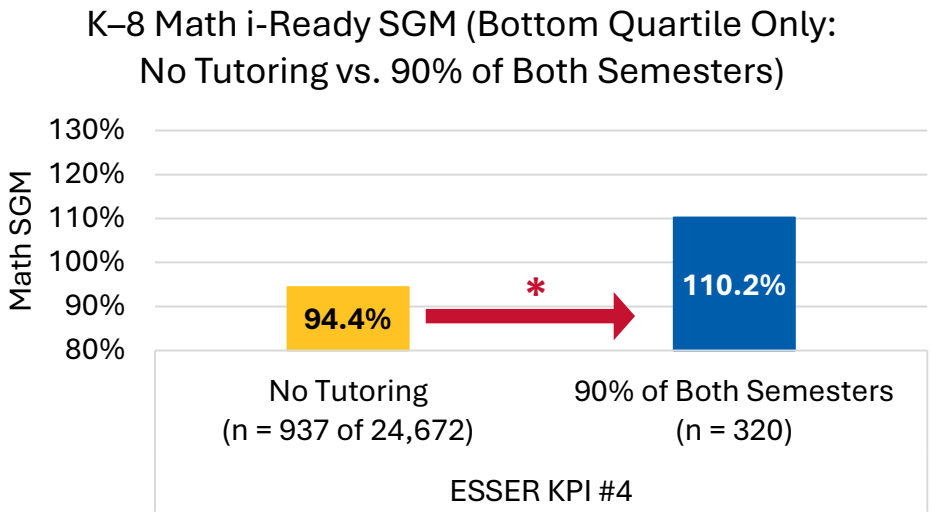


Figure 14.



KPI 5:

Increase the percentage of students in the high dosage group scoring in the 65th percentile or higher on spring i-Ready assessments.

i-Ready ELA 65th Percentile

Among those who were tutored 90% of one semester, the percent of students who met the 65th percentile remained steady over the year. Among those who were tutored 90% of both semesters, the percent of students who met the 65th percentile increased from the fall assessment to the spring assessment by 2 percentage points. Figures 15 and 16 show these results below.

Figure 15.

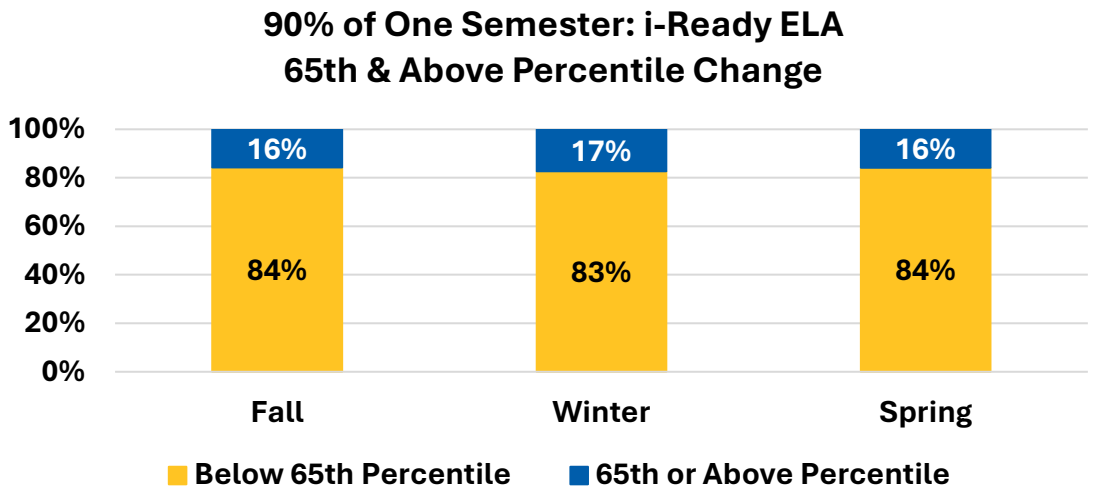
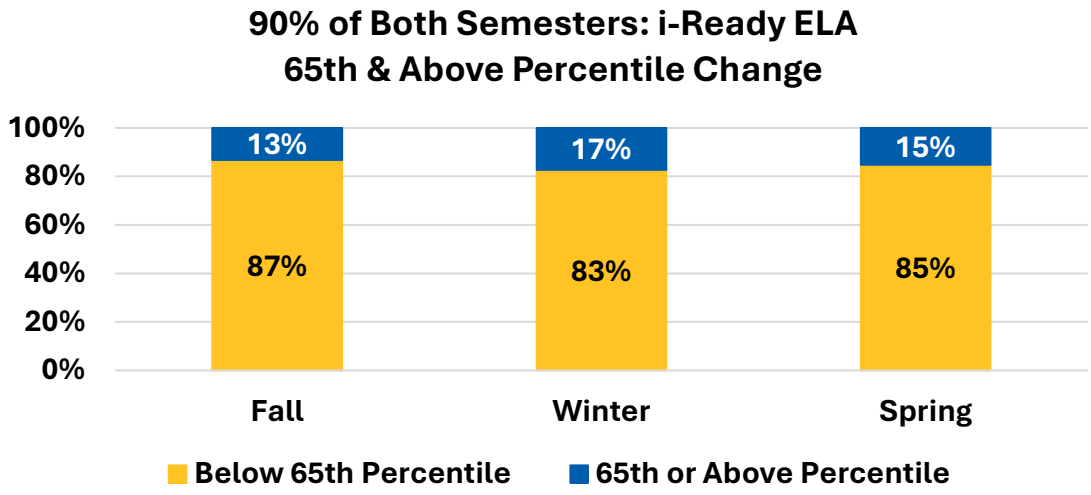


Figure 16.



i-Ready Math 65th Percentile

Among those who were tutored 90% of one semester, the percent of students who met the 65th percentile increased from the fall assessment to the spring assessment by 4 percentage points. Among those who were tutored 90% of both semesters, the percent of students who met the 65th percentile increased from the fall assessment to the spring assessment by 6 percentage points. Figures 17 and 18 show these results below.

Figure 17.

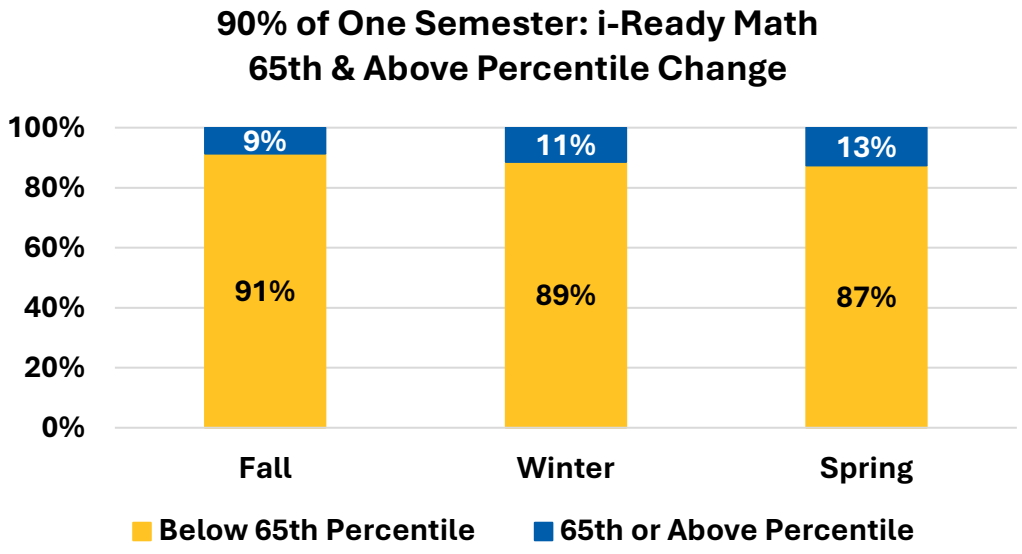
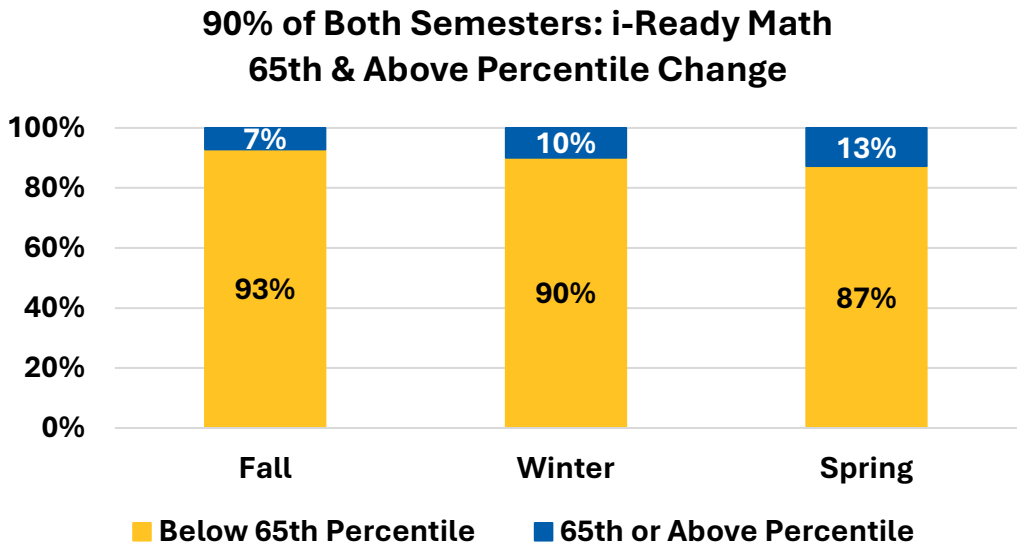


Figure 18.



Next Steps and Conclusion

When looking at the results of this evaluation, it is notable that students who were in high dosage math tutoring had a statistically significantly higher average SGM than their non-tutored peers on the i-Ready assessment. By using the propensity score and balancing weighting, a causal effect can be claimed, meaning, tutoring is the reason for the difference between the high dosage tutored students and non-tutored students in the math i-Ready assessment. There was also a statistically significant difference between tutored for 90% of both semester students and non-tutored students on the math TCAP. The high dosage tutored students had a higher positive difference between their projected percentile rank and their actual percentile rank on the math TCAP when compared to their non-tutored peers. This year's tutoring was shown to be more effective in math than in ELA. In fact, the non-tutored students had a statistically significantly higher SGM on i-Ready when compared to students who were tutored 90% of one semester. This could be because the tutored students sporadically attended ELA tutoring over the year and this was found to be ineffective. This could also be because the school only offered one semester of ELA tutoring and this was also seen to be ineffective. While there were not statistically significant findings for ELA tutoring, in most cases students who went to 90% of both semesters had a higher average than their non-tutored peers.

This evaluation focused on students who were participating 90% of one semester or 90% of both semesters. In the previous year's evaluation, this level of participation often showed statistically significant differences in comparison to non-tutored students. When looking at math specifically, tutoring was shown to be more effective when students participated 90% of both semesters. And while it was not statistically significant, students who participated at a higher rate over the year often outperformed their non-tutored peers. Because of this and because of past evaluations that have had statistically significant results based on high participation, it is recommended that the tutoring program encourage students to

participate and attend as much as they can. It is also recommended that schools offer year-long tutoring support for both ELA and math, if possible.

Another recommendation is to track attendance as accurately as possible at each school, with each coordinator. It is impossible to clean up all attendance data issues at the end of the year when removed from the tutoring program. Those who are in the field seeing students day in and day out are much more likely to catch an attendance data issue.

While there were not many statistically significant findings in this evaluation, that is not to say that this program is not effective. As with most programs, it takes time for the program to see effectiveness. It is important to remember that providing an academic space for students to spend their time before or after school can be beneficial for them socially and emotionally as well.

Appendix A

Tutoring Coordinator Details

Tutoring Coordinators' essential roles & responsibilities/duties may include, but are not limited to, the following:

- Contact families & recruit/enroll students in tutoring program
- Coordinate, organize and oversee the operations of before or after school tutoring
- Schedule and oversee the work of tutoring curriculum prepared by C & I and i-Ready/Imagine Teams
- Respond to requests and inquiries from the Office of Academics regarding all aspects of the tutoring program in a timely manner
- Participate in selecting and overseeing tutors;
- Ensure completeness, accuracy, and conformance with District/departmental standards;
- Monitor recruiting, registration, and attendance procedures for tutors;
- Establish routines and procedures for operational/logistics (pick-up/drop-off procedures, sign in/out process for before/aftercare programs);
- Review timesheets for signatures and verify accuracy of the payroll;
- Participate in selecting and overseeing tutors;
- Ensure completeness, accuracy, and conformance with District/departmental standards;
- Monitor recruiting, registration, and attendance procedures for tutors;
- Establish routines and procedures for operational/logistics (pick-up/drop-off procedures, sign in/out process for before/aftercare programs);
- Ensure Tutoring PowerSchool database is current and updated regularly (student attendance, class set-up, class rosters, tutor placements etc.)

KPI 1: 90% of 1 Semester ELA

Figure 19.

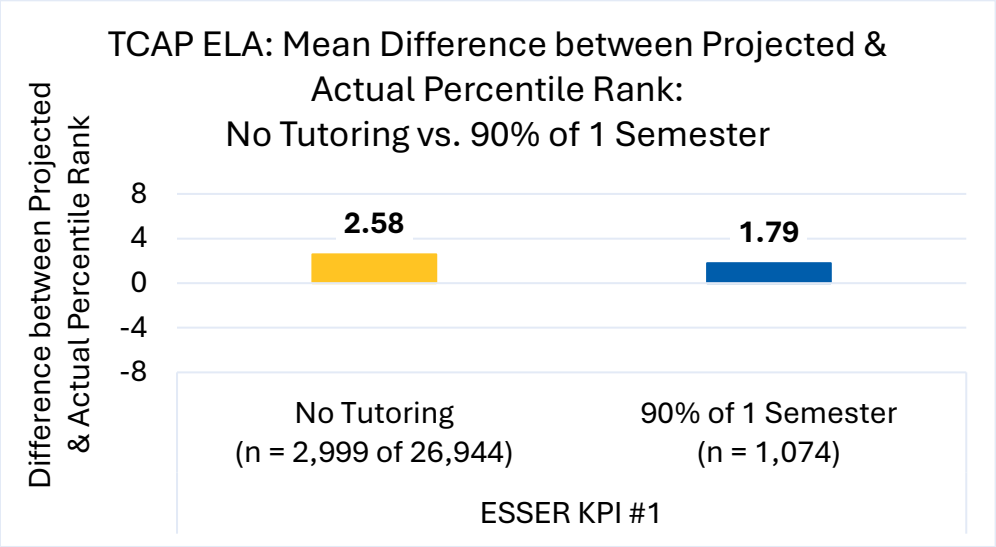
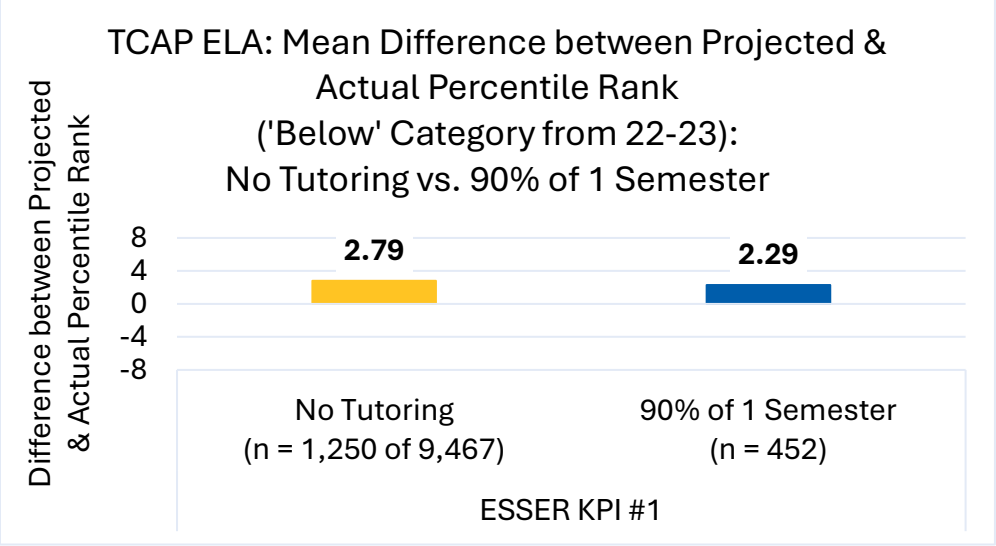


Figure 20.



KPI 1: 90% of 1 Semester Math

Figure 21.

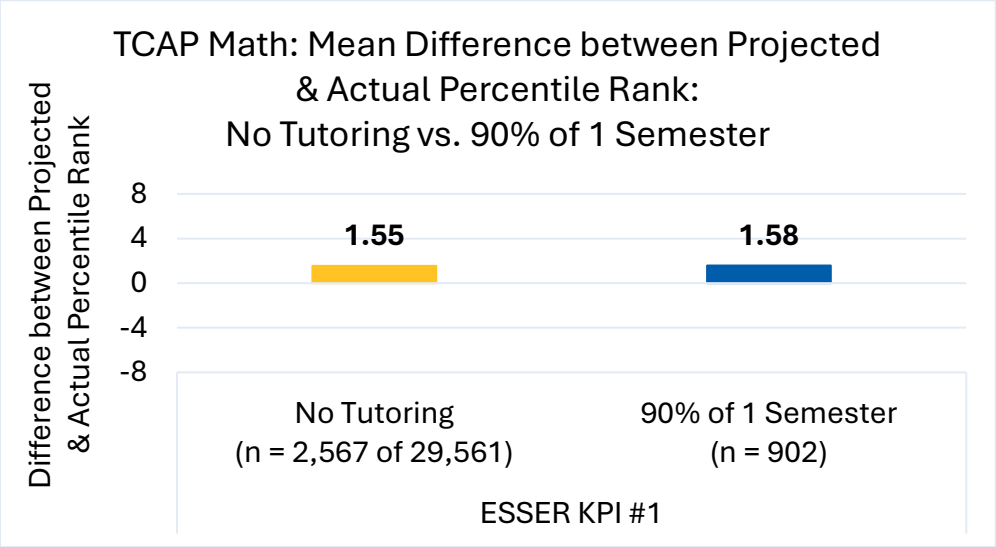
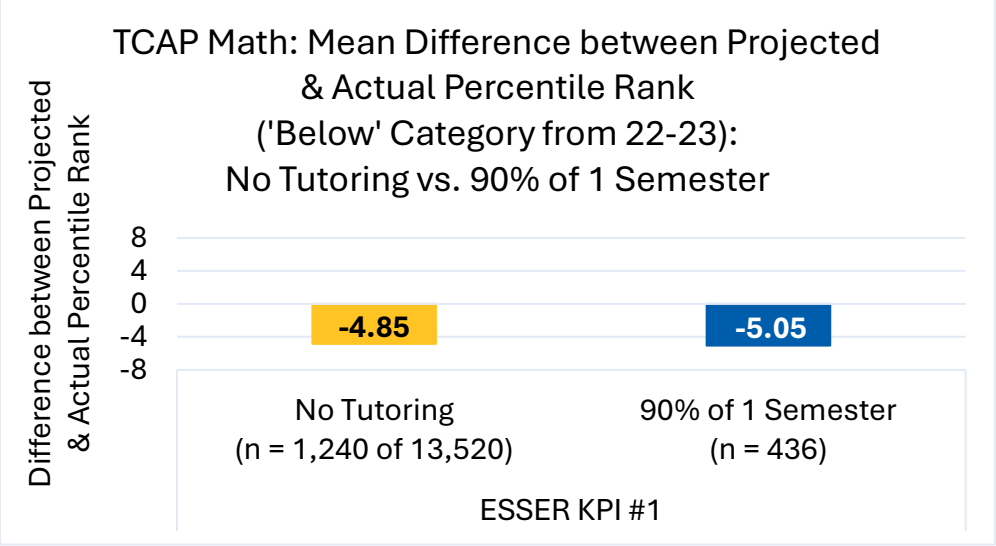


Figure 22.



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