



**Superintendent's Summer Learning Academy:
Year 1 Program Evaluation – Student Outcomes**
Prepared by the Department of Research & Performance Management

Date: October 24, 2018

Author: Marie Sell, Ph.D.

Key Findings

The summer 2017 Superintendent's Summer Learning Academy (SSLA) was designed as an attempt to mitigate summer learning loss. Data from 4,380 participants with assessment scores from the 2016-17 school year and the 2017-18 school year were analyzed to examine program impact. Additional analyses examined whether program participation affected student scores on the year-end state achievement tests.

- Using propensity score analysis, a comparison cohort was selected that matched the SSLA participant group on covariates that influence academic outcomes.
- There were no differences between the SSLA participants and comparison cohort for all measures of reading.
- In mathematics, academic progress and academic achievement did not differ for the two groups. However, SSLA participants demonstrated more academic growth from spring (before the program) to fall (after the program) than the comparison cohort indicating that program participation did mitigate potential summer learning loss in mathematics. The same result was also found for spring to winter growth.
- Despite demonstrating more growth than the comparison cohort, SSLA participants were still below the needed NWEA MAP percentile in mathematics projected to be categorized as proficient on the TNReady achievement assessment.

Program Description and Participation

For a six-week period during summer 2017, Shelby County Schools (SCS) offered its first year of the Superintendent's Summer Learning Academy (SSLA) for rising first-grade through sixth-grade students. The program, created to help combat academic summer learning loss, emphasized reading and math instruction, engaged students in science, art, and physical education activities, and provided several off-campus field trip opportunities. The goal was to present a program of high interest to students while engaging them in academic enrichment opportunities.

The SSLA was active in 385 classrooms in 26 elementary schools across the District. Although 5,775 students enrolled in SSLA, data analyses were limited to students for whom there were SCS data available for both the 2016-17 and the 2017-18 school years. Since summer learning loss was one of the questions being addressed in the program evaluation, it was necessary to have student data from both years. Ultimately, 4,380 students were included in the analyses for the present report. This sample group attended SSLA 2017 and had both Reading and Mathematics scores in NWEA MAP for spring 2017, fall 2017, and winter 2017.

Additional information regarding the SSLA program description and the criteria for including students in the program evaluation analyses are available in the mid-year report which was completed in January 2018.¹

Creating a Matched Comparison Cohort: Propensity Score Analysis

Program evaluations that are designed to examine the impact of a program on student outcomes can draw the strongest conclusions if participating students can be matched with a similar comparison cohort. When students are matched on characteristics that influence the outcomes being analyzed, any differences found between the participating students and the comparison cohort



**Superintendent's Summer Learning Academy:
Year 1 Program Evaluation – Student Outcomes**
Prepared by the Department of Research & Performance Management

can be attributed to program participation. Alternately, participating students could be compared to themselves over time. This approach examines student progress after program participating by comparing outcomes to pre-participation student data, similar to a pre-test/post-test analysis. However, the limitation of this approach is that it is not possible to determine whether changes in outcomes are due to program participation or other factors, such as classroom instruction.

To examine the impact of attending SSLA on student outcomes, a matched cohort was selected from a pool of rising first-grade through sixth-grade students in the District for whom there were reading and mathematics scores in NWEA MAP for the spring 2017, fall 2017, and winter 2017 assessment windows. There were 32,177 students who met the criteria and were included in the pool.

To create pre-participation equivalence between the SSLA participant group and the matched sample group, students were selected to be in the comparison cohort using the process of propensity score analysis. Propensity score analysis is a statistical process involving multiple steps. In the first step, a propensity score was calculated for each student in the selection pool based on certain characteristics of the SSLA participant group. The propensity score is the likelihood that a student in the sample pool could have been in the participant group based on the specified characteristics.

The characteristics are factors that affect the outcomes being analyzed and serve as covariates in calculating the propensity score. In the present analysis, the outcome measures analyzed included NWEA MAP scores of academic progress assessed in fall and winter of 2017, and TNReady achievement scores from spring 2018. Previous research has documented that student demographic characteristics, attendance rate, and prior academic level influence these outcome measures. Therefore, demographic data, attendance rate and pre-participation Reading and Mathematics scores were used as covariates in calculating the propensity scores. The complete list of covariates included: gender, race, socioeconomic status (economically disadvantaged vs. not), disability status, English learner status, rising grade level, attendance rate for the 2016-17 school year, spring 2017 NWEA MAP reading and mathematics scores, and spring 2017 Lexile score (which indicates the level of complexity of texts that readers comprehend). Students in the matching pool that are most similar to the SSLA participants on these characteristics receive higher propensity scores.

In the second step, using the propensity scores, a weight was then calculated for each student in the sample pool that was used to determine which students would create the comparison cohort. The goal is to have the comparison group be as similar as possible to the participant group on the characteristics that were used to create the matches. For this analysis, the weight calculated was the average treatment effect for the students who participated in SSLA. Technically, this is known as the average treatment effect on the treated (ATT) weights, with “the treated” in this case being the SSLA participants. All SSLA participants received an ATT weight equal to one (1) since they are in the treatment group. The weighting formula calculates ATT weights for the sample pool such that students with higher propensity scores have higher ATT weights and are more likely to be included in the matched sample.

The final step in the process is to compare the SSLA participants to the comparison cohort on the covariates that were used to calculate the propensity scores. Since the goal is to select a comparison cohort that is as similar as possible compared to the SSLA participants, the two groups should be relatively similar on these covariates. To examine this, a covariate comparison is presented in the following table. Data for the SSLA participants is in the middle column and the comparison cohort



**Superintendent's Summer Learning Academy:
Year 1 Program Evaluation – Student Outcomes**
Prepared by the Department of Research & Performance Management

information is presented in the right column. As can be seen, percentages and mean scores for all covariates are quite similar across the two groups. Given the virtual equivalence of the SSLA participant group and the comparison cohort on the covariates, the selected matched sample was deemed to be valid as a comparison cohort for analyses examining the impact of participation in SSLA.

Spring 2017 Student Demographic, Attendance, and Academic Information		
	SSLA Participants (N = 4,380)	Comparison Cohort (N = 4,378)
Male	47.7%	47.8%
Female	52.3%	52.2%
African-American	87.9%	87.9%
Hispanic	7.0%	7.1%
White	1.6%	1.6%
More than one race	2.6%	2.7%
ED*	77.1%	77.2%
Non-ED	22.9%	22.8%
SWD*	8.1%	8.2%
Non-SWD	91.9%	91.8%
EL*	3.6%	3.7%
Non-EL	96.4%	96.3%
Rising Grade Level		
1	17.3%	19.8%
2	19.0%	17.9%
3	19.0%	17.7%
4	18.2%	17.2%
5	17.5%	15.6%
6	9.0%	11.8%
2016-17 Attendance Rate	96.4%	96.4%
Mean MAP Reading Scale Score	185.6	185.6
Mean MAP Math Scale Score	188.5	188.4
Mean Lexile Score	342.0	341.4
Promoted	99.5%	99.5%

*ED - Economically Disadvantaged; SWD - Students with Disabilities; EL - English Learner

Analyzing SSLA Program Impact

Three sets of analyses were conducted to examine the impact of SSLA participation, each examining a different type of outcome measure. The first looked at whether there were differences between the SSLA participation group and the comparison cohort in reading or mathematics skills as measured



**Superintendent's Summer Learning Academy:
Year 1 Program Evaluation – Student Outcomes**
Prepared by the Department of Research & Performance Management

by NWEA MAP in fall (shortly after SSLA ended) and again in winter (after students had been in school for approximately one semester).

The second set examined whether there were differences growth of reading and mathematics skills between three different time periods: 1) between spring 2017 and fall 2017, which would capture any immediate growth due to SSLA participation; 2) between spring 2017 and winter 2017, which would capture any long term impact of SSLA participation in combination with classroom instruction; and 3) between fall 2017 and winter 2017, which would capture whether SSLA participation primed students so they were able to show more academic growth during the subsequent school year.

The final set of analyses looked at the impact of participation in SSLA on student achievement in reading or mathematics as measured by TNReady administered at the end of the 2017-18 school year. This analysis essentially examined whether students received an academic boost from participating in SSLA that carried through the school year and was evident in year-end testing.

Usually when analyzing a program's impact on student outcomes, the factors that might also influence the outcome measures are included in the analyses as covariates. However, given that in this evaluation the comparison cohort was selected using propensity score analysis, the influence of any covariates has already been addressed. As discussed above, the goal of propensity score analysis was to select a comparison cohort as similar as possible to the SSLA participants on the covariate characteristics. Therefore, covariates are not included in any of the subsequent analyses in this report.

Analysis of Academic Progress

A series of independent t-tests were conducted to examine the impact of SSLA participation on academic progress. First, fall 2017 NWEA MAP reading and mathematics scale scores were analyzed to determine whether there was an immediate impact of participating in SSLA. Since there was only a two-week break between the end of SSLA and the beginning of the school year, any immediate benefits to academic progress would be captured in the fall test administration. Analyses revealed there was not a statistically significant¹ difference in fall NWEA MAP scores for reading ($t_{(8,756)}=.97$; $p=.33$) or mathematics ($t_{(8,756)}=1.80$; $p=.07$) between the SSLA participation group and the comparison cohort, although the difference in Mathematics was approaching significance.

A second set of t-tests examined whether SSLA participants might have received an academic boost over the summer that allowed students to gain more from classroom instruction during the year. To determine this, winter 2017 NWEA MAP reading and mathematics scale scores were analyzed. Again there were no statistically significant differences between the SSLA participants and the comparison cohort in reading ($t_{(8,756)}=.66$; $p=.51$) or mathematics ($t_{(8,756)}=1.70$; $p=.09$), with the difference in mathematics approaching significance.

Analysis of Academic Growth

Although there were no statistically significant differences in NWEA MAP scores between the groups in fall and winter, analyses that looked at student growth found slightly different results. For this set of analyses, student scores were examined to determine whether they increased, remained unchanged, or decreased between different test administrations.

¹ The criterion for statistical significance in this evaluation is .05. A p-value greater than this number indicates the finding was not statistically significant.



**Superintendent's Summer Learning Academy:
Year 1 Program Evaluation – Student Outcomes**
Prepared by the Department of Research & Performance Management

Spring to Fall Differences. The first comparison examined differences in NWEA MAP scale scores between spring 2017 (before the SSLA program) to fall 2017 (immediately after the SSLA program). The table below shows the percentage of students in the SSLA participation group and the comparison cohort with scores in each of the categories.

In reading, 43.3% of the SSLA participants demonstrated score increases from spring to fall compared to 41.8% of the comparison cohort; and 52.4% of the SSLA participants' scores decreased compared to 53.7% of the students' scores in the comparison cohort. A chi-square analysis of reading scores was not statistically significant ($p=.36$), meaning that the number of students in each category (increase, no change, decrease) did not differ from what was expected for either the SSLA participant group or the comparison cohort.

NWEA MAP Score Change from Spring 2017 to Fall 2017		
	SSLA Participants	Comparison Cohort
Reading		
Increase	43.3%	41.8%
No Change	4.3%	4.5%
Decrease	52.4%	53.7%
Mathematics		
Increase	41.9%	39.0%
No Change	5.9%	5.1%
Decrease	52.1%	55.8%

In mathematics, the chi-square analysis was statistically significant ($X^2_{(2)}=12.85$; $p=.002$) such that more SSLA participants than expected (41.9%) showed an increase in mathematics scores and fewer than expected (52.1%) demonstrated a decrease in scores. By contrast, in the comparison cohort, fewer students than expected (39.0%) had an increase in scores while more students than expected (55.8%) had a decrease in scores from spring 2017 to fall 2017. The relevant categories are highlighted in light blue in the above table.

Spring to Winter Differences. A second analysis examined differences between spring 2017 and winter 2017 scores to determine whether there was a longer term impact of SSLA participation that primed students for classroom instruction. In reading, approximately 65% of the students showed an increase in scores, and approximately 31% of students showed a decrease in scores, in both groups. A chi-square analysis of reading scores was not statistically significant ($p=.71$).

For mathematics scores, the chi-square analysis was again statistically significant ($X^2_{(2)}=9.39$; $p=.009$). As was the case above, for the SSLA participants more students than expected had increases in scores and fewer than expected had decreases in scores from spring to winter. The opposite was true for the comparison cohort. Fewer students than expected had increases in scores and more than expected had decreases in mathematics scores. The relevant percentages are highlighted in the table below.



**Superintendent's Summer Learning Academy:
Year 1 Program Evaluation – Student Outcomes**
Prepared by the Department of Research & Performance Management

NWEA MAP Score Change from Spring 2017 to Winter 2017		
	SSLA Participants	Comparison Cohort
Reading		
Increase	65.5%	64.8%
No Change	3.7%	3.7%
Decrease	30.7%	31.5%
Mathematics		
Increase	68.1%	65.2%
No Change	4.0%	3.9%
Decrease	27.9%	30.9%

Fall to Winter Differences. The final analysis of student growth analyzed changes in student scores from the beginning of the year in fall 2017 to mid-year assessed, in winter 2017. Using this timeframe restricts the analysis to an analysis of academic growth due to classroom instruction. The percentage of students with increasing, unchanged, and decreasing scores for both the SSLA participation group and the comparison cohort are presented in the table below. Neither the chi-square analysis for reading nor the analysis for mathematics was statistically significant (both p -values $> .38$). Thus, for both reading and mathematics, and for both SSLA participants and the comparison cohort, the percentage of students in each category did not differ from what was expected.

NWEA MAP Score Change from Fall 2017 to Winter 2017		
	SSLA Participants	Comparison Cohort
Reading		
Increase	73.9%	74.5%
No Change	4.1%	3.9%
Decrease	22.1%	21.6%
Mathematics		
Increase	79.5%	79.8%
No Change	4.9%	4.3%
Decrease	15.6%	15.9%

Summary of Analyses of Academic Growth. In the series of analyses above, student academic growth was examined three different times to capture growth over a number of time periods. There were no statistically significant findings from the analyses of reading scores. However, statistically significant differences were found between spring and fall and between spring and winter for academic growth in mathematics. More SSLA participants than expected showed increases in scores and fewer than expected showed decreases in scores over those two time periods. The opposite was true for the comparison cohort, where fewer students than expected demonstrated increases in scores and more than expected showed decreases. There were no statistically significant findings for the fall to winter analyses. Taken together, these findings indicate that participating in SSLA positively impacted academic growth in mathematics immediately after the program ended and that the benefits were sustained during the first semester of the school year.



**Superintendent’s Summer Learning Academy:
Year 1 Program Evaluation – Student Outcomes**
Prepared by the Department of Research & Performance Management

Analysis of Academic Achievement

A final set of analyses was conducted to determine whether participating in the SSLA impacted student achievement as measured by the year-end state TNReady assessment administered in spring 2018. These analyses are limited to the students in the SSLA participation group and the comparison cohort who were in grades 3-6 in 2017-18. Approximately 98% of the 5,518 students in the SSLA group and the comparison cohort who were in grades 3-6 had TNReady scores (5,423 for reading and 5,431 for mathematics). Using the TNReady scale scores as the outcome measure, analyses revealed there was not a significant difference between the SSLA participants and the comparison cohort for either reading or mathematics ($t_{(5,421)}=-1.35$; $p=.18$ and $t_{(5,426)}=.42$; $p=.67$, respectively).

Discussion

Academic Growth versus Academic Achievement

The analyses indicated that participating in SSLA did not impact student academic progress or achievement in reading. In mathematics, SSLA participants did show more academic growth as measured from spring to fall and from spring to winter than the comparison cohort. However, there was no difference in mathematics achievement as measured by TNReady at the end of the year.

A recently published linking study conducted by NWEAⁱⁱ may help clarify the relationship between performance on NWEA MAP assessments and proficiency on TNReady. Using NWEA MAP scores and TNReady scores from spring 2017, NWEA identified cut scores for NWEA MAP RIT scale scores that linked to the four levels of proficiency as indicated by the TNReady achievement assessment. (The four levels of TNReady proficiency are *below*, *approaching*, *on track*, and *mastered*. Students who score either *on track* or *mastered* are considered proficient in the tested subject area by the State.) Using the NWEA MAP cut scores, NWEA was able to accurately classify 86% of the students’ proficiency levels for reading (for grades 3-6) and 88% of the proficiency levels for mathematics (for grades 3-6). The percentile rankings associated with the cut scores were also identified.

Two tables are below. The first contains information about reading and the second about mathematics. The far right columns in both tables list the percentile ranges that were identified in the linking study as being needed in fall and winter to earn a score of *on track* on the TNReady achievement assessment the following spring. The columns on the left and in the middle show the median percentile of the NWEA MAP scores for students in the SSLA participation group and the comparison cohort when assessed in fall and winter.

MAP Reading Median Percentile and Percentile Range for TNReady <i>On Track</i>						
Grade	SSLA Participants		Comparison Cohort		MAP Percentile Range for TNReady <i>On Track</i>	
	Fall	Winter	Fall	Winter	Fall	Winter
3	46	42	46	44	70-96	68-95
4	38	38	41	41	66-95	66-94
5	39	37	39	42	70-94	68-93
6	38	43	44	38	65-93	65-91



**Superintendent’s Summer Learning Academy:
Year 1 Program Evaluation – Student Outcomes**
Prepared by the Department of Research & Performance Management

MAP Mathematics Median Percentile and Percentile Range for TNReady On Track						
Grade	SSLA Participants		Comparison Cohort		MAP Percentile Range for TNReady On Track	
	Fall	Winter	Fall	Winter	Fall	Winter
3	44	43	44	43	54-82	54-80
4	37	33	37	36	49-89	50-88
5	31	30	34	33	61-91	61-90
6	30	29	27	26	53-91	54-90

The median percentiles of both the SSLA participants and the comparison cohort are well below the percentile ranges projecting proficiency on TNReady in both reading and mathematics. Thus, although the SSLA participants demonstrated more growth in mathematics than the comparison cohort, as a group their scores are still too low to demonstrate proficiency.

Data Limitations

A major limitation of the current evaluation was the lack of attendance data for SSLA participants. During summer 2017, the District switched its student information system from PowerSchool SMS to PowerSchool. The transition of student data from one online platform to the other prevented teachers from recording attendance online. Instead, teachers were asked to keep attendance records in Excel spreadsheets. Although an attempt was made to gather attendance data, the records were too inconsistent across the different classrooms and different sites to know if they accurately reflected actual program attendance. Additionally, in some instances, attendance records were incomplete (for example, if teachers only recorded attendance for their class for the first week or two of SSLA).

Students’ attendance rates (or amount of participation) would impact their exposure to the materials and instruction provided during SSLA and possibly influence their performance on academic measures during the following school year. Therefore, having not been able to include attendance data in the analyses may well have tempered the findings because it is not possible distinguish results between students who attended the program consistently and those who attended SSLA partially or very little.

Year 2 Evaluation

The second year of SSLA, held during summer 2018, will also be evaluated with regard to how program participation impacted student academic outcomes. During the second year, some changes were made to the SSLA that allowed the program to be offered to more students. Parents were able to register students for SSLA at the same time they registered for the next school year. Additionally, SSLA expanded to offer opportunities for both middle-school and high-school students. While the questions that will be analyzed in the second evaluation are still being identified, some possibilities include examining program impact for students with high attendance rates, comparing students who participated for one versus two years, and analyzing program impact for older students. A final determination will be made in conjunction with SSLA program staff.



**Superintendent's Summer Learning Academy:
Year 1 Program Evaluation – Student Outcomes**
Prepared by the Department of Research & Performance Management

Endnotes

- ⁱ Sell, M. A. (2018, January). *Summer Learning Academy Mid-Year Report*. Department of Research and Performance Management. Shelby County Schools: Memphis, TN.
- ⁱⁱ NWEA Psychometric Solutions. (May 2018). *2018 Linking Study: Predicting Performance on the TNReady Assessments based on MAP Growth Scores*. Retrieved online 10/1/2018. <https://www.nwea.org/content/uploads/2018/08/TN-MAP-Growth-Linking-Study-2018-05-30.pdf>