

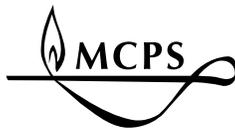


Evaluation of the Extended Learning Opportunities— Summer Title I Enrichment Program (ELO STEP) in 2019

PREPARED BY:

Juan Carlos Davila Valencia, M.S.

Program Evaluation Unit



ROCKVILLE, MARYLAND

850 Hungerford Drive
Rockville, Maryland 20850
240-740-3000

Dr. Jack R. Smith
Superintendent of Schools

Dr. Janet S. Wilson
Associate Superintendent, Office of Shared Accountability

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Evaluation of the 2019 Extended Learning Opportunities—Summer Title I Enrichment Program

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Purpose of the Study

The Extended Learning Opportunities—Summer Title I Enrichment Program (ELO STEP) in Montgomery County Public Schools (MCPS) provides traditionally underrepresented students with a curriculum heavily focused on mathematics and science. The 2019 program was available to rising Grade 3, 4, and 5 students from Title I schools, and provided free breakfast, lunch, and transportation to and from schools.

First, this evaluation assessed the implementation of 2019 ELO STEP based on the feedback provided by participating teachers, parents, and rising Grade 4 and 5 students. Then, using a non-equivalent comparison group design, it examined the effect of the program by comparing the fall 2019 MAP-M scores of participants (841 students who attended 18 or more days out of 24 days) to nonparticipants with similar characteristics (1,223 students) after controlling for pre-existing differences.

What were the students, teachers, and parents’ feedback regarding the implementation of 2019 ELO STEP?

Rising Grade 4 and 5 Students

- 75%+ liked the math and science related activities, were excited to come to the program, liked the activities with Legos, and reported their teachers made contents interesting.
- 21% suggested that more recess /free time should be given to them.

Teachers

- 75%+ liked the program because the curriculum was engaging, contributed to students’ well-being, and supported their learning needs.
- 33% suggested improving access to materials and more planning time.

Parents

- Almost all parents reported their children enjoyed and felt safe in the program, and it helped their children discover new interests and develop new skills.

Were there differences in mathematics performance between 2019 ELO STEP participants and nonparticipants?

- Grade 3. Positive effect among all student subgroups, except for Non-FARMS Hispanic/Latino.
- Grade 4. Positive effect among ESOL recipients, Non-FARMS All Other Student Groups, and FARMS Hispanic/Latino.
- Grade 5. Positive effect among ESOL recipients, Non-FARMS All Other Student Groups, Non-FARMS Black or African American, and FARMS All Other Student Groups.

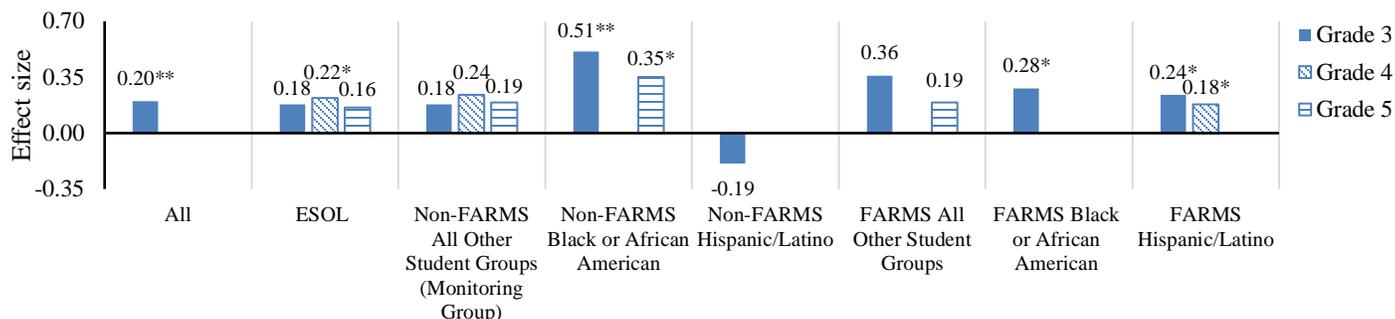


Figure I. Effect size of fall 2019 MAP-M scores for ELO STEP participants vs. nonparticipants by grade.

Note. Only groups with practically significant differences are shown (ES ≥ .15). *p < .05, **p < .01.

Were there differences in mathematics performance between two-year consecutive participants and nonparticipants?

- Grade 4. Positive effect among two-year consecutive ESOL recipients, Non-FARMS All Other Student Groups, and FARMS Hispanic/Latino.
- Grade 5. Positive effect among two-year consecutive ESOL recipients.

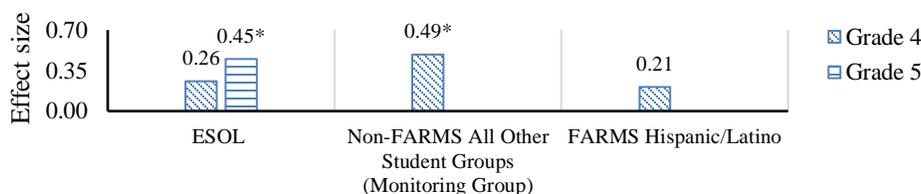


Figure II. Effect size of fall 2019 MAP-M scores for two-year consecutive ELO STEP participants vs. nonparticipants by grade.

Note. Only groups with large student samples and with practically significant differences are shown (ES ≥ .15). *p < .05.

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How did the differences in mathematics performance in 2019 differ from the 2018 ELO STEP?

- All Participants. Positive effect in 2018 among all Grade 5 participants and among all Grade 3 participants in 2019.
- ESOL Recipients. Positive effect among all ESOL recipients in both 2018 and 2019, regardless of their grade level.
- Focus groups (*not illustrated*). Positive effects in 2018 and 2019 vary by focus group. The effect in 2019, relative to 2018, was more evident among All Other Student Groups (FARMS and Non-FARMS), and FARMS Hispanic/Latino participants. The effect in 2018, relative to 2019, was more evident among Non-FARMS Hispanic/Latino participants.

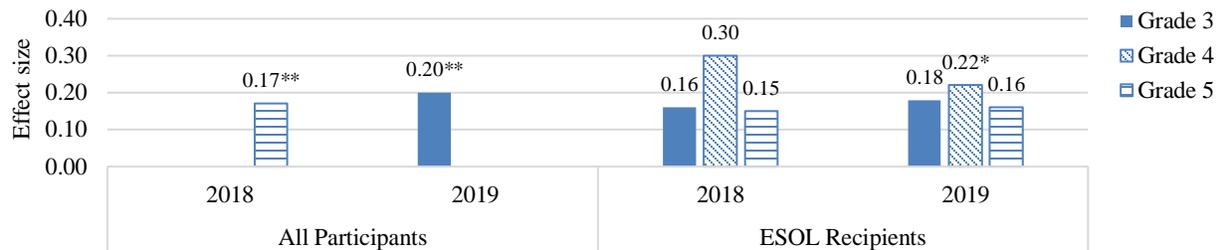


Figure III. Effect size of fall 2018 and 2019 MAP-M scores for ELO STEP participants vs. nonparticipants by grade.

Note. Only groups with practically significant differences are shown. * $p < .05$, ** $p < .01$.

Recommendations

- Continue using Lego WeDo 2.0 and other engaging science and math related activities. Also, consider adding additional activities to maintain interest throughout the program. Some suggested activities may include: an outdoor component, “Fun Fridays,” and at least one field trip.
- Ensure that the Lego WeDo 2.0 and other activities have adequate allocated time for students to work.
- Consider allocating more recess time for students during the day. Similarly, designate some time during the day for teacher planning.
- Examine ways to increase or improve food options to students and ensure that all students have access to water in all the program sites.
- Ensure that all the materials needed for instruction are complete and delivered to teachers on time. Some teachers pointed out delays in the distribution of the robotics kits or missing parts. Moreover, consider acquiring additional materials to ensure that all participants have access, which will also allow for better interaction, manipulation, and learning by all participants.
- Increase outreach efforts to increase the number of ELO STEP participants; there was a 43%-44% participation rate for the last two years of the program. Further, ensure parents receive invitations, with program dates, for their children far in advance.
- Consider adopting or creating a pre- and post-assessment that measures student performance in science or mastery of relevant skills, such as critical thinking. The incorporation of these additional measures can refine the analysis of the effect of the program and therefore, provide a more accurate calculation.

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Executive Summary

At the request of the Chief Academic Officer, the Office of Shared Accountability conducted an evaluation of the 2019 Extended Learning Opportunities—Summer Title I Enrichment Program (ELO STEP) in Montgomery County Public Schools. ELO STEP is a summer program that started in 2015 and offers an opportunity for qualified, but traditionally underrepresented, students to have more access to advanced programming, by providing a curriculum heavily focused on mathematics and science. The overall goal of this study was to assess the implementation of the program, as well as the effect of the program on mathematics performance among those who participated.

Program Overview

The 2019 ELO STEP program was offered to rising Grade 3, 4, and 5 students from 26 Title I schools. The program took place in 23 sites and reported an average class size of 16 students. A total of 2,400 students were invited, and 1,027 (43%) enrolled exclusively in ELO STEP during the summer of 2019. The program provided free breakfast, lunch, and transportation to and from schools, as well as rigorous learning opportunities five days a week for 6.5 hours, from July 1 to August 2, 2019 (24 days of instruction).

Summary of Methodology

Formative evaluation. The formative evaluation provided insights regarding the implementation of ELO STEP based on the feedback provided by Grade 4 and 5 student participants, teachers, and parents. Additionally, changes in perceptions toward mathematics and science among Grade 4 and 5 participants were reported.

Feedback from students, teachers, and parents was collected via surveys; student surveys were administered at two points in time (beginning and end of the program). Among the 706 rising Grade 4 and 5 participants, 428 students (61%) completed the pre-program survey and 527 students (75%) completed the post-program survey. Among the 66 teachers in ELO STEP, 51 (77%) completed the teacher survey and among the 1,056 parents targeted by the survey, 427 (40%) responded to the parent survey. Descriptive statistics and statistical tests were used to address the three formative evaluation questions.

Outcome evaluation. The outcome evaluation reported the attendance rates of participants and the student characteristics of participants and nonparticipants, using descriptive statistics. Additionally, using a non-equivalent comparison group, this evaluation examined the effect of ELO STEP on mathematics performance among the students who participated in the program for at least 18 days (841 participants) relative to their peers who were also invited but did not participate (1,223 nonparticipants). Further, this evaluation analyzed the effect of the program on mathematics performance among those who participated in the program for two consecutive years (261 participants) relative to those who were also invited in 2018 and 2019, but did not participate in either year (526 nonparticipants).

The outcome measure used to address the program's effectiveness in mathematics included Measures of Academic Progress—Mathematics (MAP-M). The analysis of covariance (ANCOVA) was used to test

whether the differences of adjusted means of 2019 fall MAP-M scores between participants and nonparticipants were significant or not (after controlling for pre-existing differences among students). This procedure was conducted first by grade, and within each grade level, disaggregated by student subgroup (English for Speakers of Other Languages [ESOL] status and focus groups). Effect sizes were computed to supplement the analyses and to help the interpretation of findings meaningful in educational settings. The same measurement and procedures were used to compare the two year participants.

Additionally, this evaluation compared the results from the 2018 ELO STEP evaluation with the results from this evaluation (2019) to examine if the effect of the program was consistent over time for all or some student subgroups. Finally, this evaluation explored how the most benefited student subgroups from the 2018 ELO STEP, in the schools that participated in the program, performed in math in 2019.

Summary of Findings

To what extent did students' perspectives toward mathematics and science change after attending 2019 ELO STEP?

Findings regarding students' perception toward math and science were mixed. There was a statistically significant increase in the percentage of Grade 4 and 5 students who agreed with the statements "I like to play games that use numbers," "I like science a lot," and "I cannot do science without knowing a lot of math" from the end of the program compared to the beginning of the program. However, other statements showed a statistically significant decrease in the percent of students who agreed with them at the end of the program: "I am good at working math problems," "I think I could do more difficult science work," etc. Finally, as one would hope, a statistically significant percentage of students who agreed with the statement "Scientists are mostly men who wear white lab coats" decreased at the end of the program

What were students' experiences with 2019 ELO STEP?

Rising Grade 4 and 5 students had a good experience with the program overall. At least 75% of them responded positively to 9 of the 10 statements assessing different aspects of their experience in ELO STEP. For instance, most of the students "Always" or "Most of the time" liked the activities in the program, were excited to come to the program every day, liked learning with Legos, etc. Also, participants reported that Lego (52%), science (28%), and math (17%) related activities were their favorite parts of the program. Although 21% thought that nothing should be changed in the program, the same proportion also suggested that ELO STEP should include more recess or free time for students.

What was the teachers' feedback regarding the implementation of 2019 ELO STEP?

The experience of teachers in the program was very positive. At least 75% of them agreed with seven of the eight positive statements assessing their experience in ELO STEP. For example, more than 90% of teachers agreed that: 1) the program was successful in helping students engage in enriched and accelerated academic work in math and science, 2) the program contributed to the physical, social, and psychological well-being of their students, and 3) the program supported students' learning needs. Also, 55% of teachers reported that the implementation of the program in 2019 improved compared to previous years. Additionally, 4 out of 10 teachers attributed the overall curriculum, especially the science component and related activities, as the strength of the program. However, teachers also provided some suggestions to make the program even better. At least one-third of them recommended that: a) the program should

improve the delivery and access to certain materials and supplies, and b) the program should provide more planning time or breaks for teachers.

What was the parents' feedback regarding the implementation of 2019 ELO STEP?

Parents overwhelmingly reported a positive experience with the 2019 ELO STEP. Almost all of them (96% or more) agreed with all of the 13 statements that assessed their experience with the program. For example, they thought that their children felt safe in the program; they would recommend this program to others; they would send their children again; the program made their child more confident; and the program helped their children discover new interests or develop new skills. In an open-ended question, 61% of parents reported that the math and science curriculum was their favorite part of ELO STEP, and approximately one-third of them reported that the program had a positive emotional and psychological effect on their children. When asked for suggestions, 7% -10% suggested more math and science activities, more recess, and more field trips.

What were the attendance patterns for all the students who were invited and participated in the 2019 ELO STEP?

Among the 1,027 students who enrolled in the 2019 program, 82% of them had a high attendance (at least 18 of a total of 24 instruction days). Also, attendance patterns did not differ much across student subgroups.

What were the demographic characteristics of students who were invited and participated in the 2019 ELO STEP by gender, race/ethnicity, service received, and focus group?

There were more male than female participants (54% and 46%, respectively), as well as more Black or African American and Hispanic/Latino students (35% and 47%, respectively) than other races/ethnicities. Almost two-thirds of participants received Free and Reduced-price Meals System (FARMS) services in the 2019 school year and one-fourth received ESOL services. Also, the focus groups mainly served by this program were FARMS Hispanic/Latino (36%) and FARMS Black or African American (22%) students.

After controlling for pre-existing differences among students, were there differences in mathematics performance in the fall of 2019 among students who were invited and participated in the ELO STEP program compared to their peers who were invited but did not participate? Did these differences vary by student subgroup, such as service received or focus group?

Table i summarizes the effect sizes of fall MAP-M among the 2019 ELO STEP participants relative to nonparticipants. In general, the effect of the program was more evident among third graders than fourth or fifth graders. In almost all of the Grade 3 student subgroups, differences in math performance in favor of participants, relative to nonparticipants, reached a small size effect ($ES \geq 0.15$). However, in one subgroup, the effect size was negative with a small size effect, suggesting that Non-FARMS Hispanic/Latino students who did not participate in the program outperformed participants in math. Among Grade 4 and 5 students, the effects of the program varied depending on the student subgroup.

Regardless of the grade level, the effect of the program was more evident for all participants who received ESOL services as well as for all participants in the Monitoring Group. Other benefited groups with

significant effect sizes across two grades were FARMS All Other Student Groups and Non-FARMS Black or African American participants (Grades 3 and 5), and FARMS Hispanic/Latino participants (Grades 3 and 4) (Table i).

Table i. Statistical Significance and Effect Sizes for 2019 ELO STEP Participants vs. Comparison Students on MAP-M

Group	Grade 3	Grade 4	Grade 5
All Students	** ES = 0.20	* ES = 0.10	* ES = 0.08
English for Speakers of Other Languages (ESOL) participants	ES = 0.18	* ES = 0.22	ES = 0.16
Non-FARMS All Other Student Groups (Monitoring Group)	ES = 0.18	ES = 0.24	ES = 0.19
Non-FARMS Black or African American	** ES = 0.51	ES = -0.11	* ES = 0.35
Non-FARMS Hispanic/Latino	ES = -0.19	ES = 0.10	ES = 0.03
FARMS All Other Student Groups	ES = 0.36	ES = 0.03	ES = 0.19
FARMS Black or African American	* ES = 0.28	ES = 0.09	ES = -0.06
FARMS Hispanic/Latino	* ES = 0.24	* ES = 0.18	ES = 0.10

* $p < .05$, ** $p < .01$.

Note. **Bold** indicates a practical significant difference (effect size or $ES \geq 0.15$)

Shaded cells indicate positive effect, statistically and practically significant.

How did the differences in mathematics performance reported in this evaluation differ from the differences reported in the 2018 ELO STEP evaluation?

Students in Grade 5 benefited the most from the 2018 ELO STEP program, whereas students in Grade 3 benefited the most from the program in 2019, as measured by fall MAP-M scores. The program also reported positive effects in 2018 and 2019 on participants who received ESOL services, regardless of their grade level. When the analysis was disaggregated by focus group, the effect of 2019 ELO STEP was more evident in the following groups relative to 2018: 1) Monitoring Group, 2) FARMS All Other Student Groups, and 3) FARMS Hispanic/Latino. However, the effect of the program was more evident among Non-FARMS Hispanic/Latino participants in 2018 than in 2019.

How did students who participated in both 2018 and 2019 ELO STEP perform in mathematics relative to those who were invited to both but did not participate in either year?

Table ii summarizes the effect sizes on fall MAP-M among students who participated in the program for two consecutive years, relative to their nonparticipant peers. Practically ($ES \geq 0.15$) significant

differences on math scores between participants and nonparticipants were generally consistent with the results of the program effects for 2019.

Table ii. Statistical Significance and Effect Sizes for Multi-Year Participants vs. Comparison Students on MAP-M (2018 and 2019)

Group	Grade 4	Grade 5
All Students	ES = 0.13	ES = 0.05
ESOL participants	ES = 0.26	* ES = 0.45
Non-FARMS All Other Student Groups (Monitoring Group)	* ES = 0.49	--
FARMS Black or African American	ES = 0.09	ES = 0.01
FARMS Hispanic/Latino	ES = 0.21	ES = 0.10

* $p < .05$. (--) Not calculated; sample of student was not large enough.

Note. **Bold** indicates a practical significant difference (effect size or ES ≥ 0.15)

Shaded cells indicates positive effect, statistically and practically significant.

How did the most benefited student subgroups from the 2018 ELO STEP perform in mathematics in 2019 compared to 2018? Did these overall subgroups from participating schools report an increase in their math performance from 2018 to 2019?

The most benefited student groups identified by findings from the 2018 ELO STEP evaluation were Non-FARMS focus groups. A comparison between the 2018 and 2019 Evidence of Learning (EOL) assigned school scores in math of these highly benefited groups in the 22 participating schools showed there was an increase in scores among eight schools in the Monitoring Group, nine schools in the Non-FARMS Black or African American group, and 11 schools in the Non-FARMS Hispanic/Latino group. Overall, there were more schools with an increase in scores than a decrease. These assigned school scores represent the percentage of the students in those particular focus groups meeting at least two of the three EOL measures in math.

Conclusion

This evaluation, together with previous evaluations, has demonstrated positive findings in mathematics performance among participants when compared to nonparticipants. One of the most highly benefited groups included students who received ESOL instruction regardless of their grade level. For other participants (FARMS recipients, Hispanic/Latino, or Black or African American), positive gains of the program vary depending on the grade level and year of the program.

Specific structure and components of the program may have contributed to these positive effects. For instance, the ELO STEP program has provided: 1) a structured instruction primarily focused on math and science, 2) increased hours of instruction (from 4 to 6.5 hours every day across all sites in 2019),

and 3) a curriculum with enrichment activities, including coding, technology, and engineering. Additionally, most participants had high attendance and enjoyed the program. Similarly, teacher and parents provided positive feedback regarding the program and its curriculum.

Post-survey ratings compared to pre-survey ratings showed that there was a statistically significant increase in the percentage of Grade 4 and 5 students who agreed with the statements “I like to play games that use numbers” and “I like science a lot.” However, it is imperative to discuss some of the negative changes of student perceptions after exposure to the program. Findings showed a statistically significant decrease in the percent of students who agreed with “I am good at working math problems,” “I think I could do more difficult science work,” and “I like doing science experiments” at the end of the program. Further, more students at the end of the program agreed with “I cannot do science without knowing a lot of math.” There could be several explanations for these negative changes in perceptions. For example, it might be attributed to: 1) the exposure to more challenging and advanced math and science activities, or 2) their interaction with their peers in the program. According to Nobre et al. (2019), some cognitive acquisitions that emerge during late childhood (around 8-10 years of age) support the construction of more realistic self-evaluations. Children during this age interval have the cognitive ability to understand what they possess, either positive or negative, and the use of social comparison can render a child’s self-perception to be more mature and competent (Nobre et al., 2019).

Additionally, interpretation of these results should exercise caution because the student sample from the surveys (pre and post) were not exactly the same and surveys were not individually matched; responses were analyzed in aggregate. The number of students in the pre-program survey was 428, whereas the number in the post-program survey was 527 (99 students more).

Moreover, according to program staff, suggestions from teachers and student participants requesting, respectively, more planning time and recess might be attributed to the program shift from a half-day program in 2018 to a full-day program in 2019. Similarly, some of the comments provided by teachers and parents regarding better program logistics and communication might be attributed to the fact that administrators for the program vary from year to year.

Finally, the analysis of the effect of ELO STEP has been on mathematics performance using MAP-M. However, it is recommended that other performance measures assessing science or critical thinking skills should be examined in the future since these areas were also provided by the program.

Recommendations

- Continue using Lego WeDo 2.0 and other engaging science and math related activities. Also, consider adding additional activities to maintain interest throughout the program. Some suggested activities may include: an outdoor component, “Fun Fridays,” and at least one field trip.
- Ensure that the Lego WeDo 2.0 and other activities have adequate allocated time for students to work.
- Consider allocating more recess time for students during the day. Similarly, designate some time during the day for teacher planning.

- Examine ways to increase or improve food options to students and ensure that all students have access to water in all the program sites.
- Ensure that all the materials needed for instruction are complete and delivered to teachers on time. Some teachers pointed out delays in the distribution of the robotics kits or missing parts. Moreover, consider acquiring additional materials to ensure that all participants have access, which will also allow for better interaction, manipulation, and learning by all participants.
- Increase outreach efforts to increase the number of ELO STEP participants; there was a 43%-44% participation rate for the last two years of the program. Further, ensure parents receive invitations, with program dates, for their children far in advance.
- Consider adopting or creating a pre- and post-assessment that measures student performance in science or mastery of relevant skills, such as critical thinking. The incorporation of these additional measures can refine the analysis of the effect of the program and therefore, provide a more accurate calculation.

Evaluation of the Extended Learning Opportunities—Summer Title I Enrichment Program (ELO STEP) in 2019

Juan Carlos Davila Valencia, M.S.

Background

The Extended Learning Opportunities—Summer Title I Enrichment Program (ELO STEP) was designed and implemented by the divisions of Accelerated and Enriched Instruction (AEI), Consortia Choice and Application Program Services, and Title I and Early Childhood Programs and Services of the Montgomery County Public Schools (MCPS) since 2015. The goal of this program is to provide an opportunity for qualified, but traditionally underrepresented, students to have more access to advanced programming, by providing a curriculum heavily focused on mathematics and science.

Due to the need to know how effective this program is and how MCPS can improve it, the Office of Shared Accountability (OSA) conducted an evaluation at the request of the Chief Academic Officer. Mainly, the goal of this study is to assess the implementation of the program, as well as the effect of this program on students' achievement among those who participated, relative to those who did not.

Overview of ELO STEP in MCPS

The ELO STEP program offers accelerated and enriched instructional opportunities to students impacted by poverty who may not otherwise have access to enriching summer programs. ELO STEP seeks to: 1) offer advanced pathways for students, 2) engage students in complex texts and tasks aligned to Common Core, 3) nurture critical thinking skills, 4) stimulate students through a rigorous environment, 5) allow students to take risks in academic situations, and 6) expose students to specialized instructional materials that are recommended by the National Association for Gifted Children (Montgomery County Public Schools, 2019).

Initially, in summer 2015, this program was offered only to rising Grade 3 students who met certain selection criteria and were enrolled in a Title I school. However, by summer 2018, including the 2019 ELO STEP, the target population expanded to rising Grade 3, 4, and 5 students who also were enrolled in a Title I school and met specific selection criteria. The 2019 program was a five-week initiative (24 days of instruction) that took place from July 1 to August 2, 2019. This program was offered in 23 school sites and provided breakfast, lunch, and transportation to and from schools at no cost (Hazel, 2019). See Appendix A for a list of all the Title I schools participating in the program and their assigned sites.

Student Eligibility Criteria. Rising Grade 3, 4, and 5 students from 26 Title I schools who met the following criteria during the 2018–2019 school year were invited to participate in the 2019 ELO STEP.

1. Met one of the *InView* subtests at or above the 50th percentile: 1) Analogies; 2) Quantitative; 3) Sequencing.
2. Were on or above the target Instructional Reading Level at the end of Marking Period 2.
3. Participated in mathematics enrichment as indicated on the Marking Period 2 report card.

4. Earned a score at or above the 50th percentile for the Grade 2 fall Measures of Academic Progress – Primary Grades (MAP-P) for mathematics (applied to Grade 2 students only).
5. Earned a score at or above the 50th national percentile on fall or winter Measures of Academic Progress – Reading (MAP-R) (applied to Grade 3 and 4 students only).
6. Earned a score at or above the 50th national percentile on fall or winter Measures of Academic Progress – Mathematics (MAP-M) (applied to Grade 3 and 4 students only).

Also, schools had the option to consider additional criteria to admit students in the program. For example, if a student: 1) received Free and Reduced-price Meals System (FARMS) services, 2) received school's advocacy (in cases where a student did not meet the criteria stated above, principals and/or school staff members could have advocated for them), and 3) received instruction in Jacob's Ladder and/or William and Mary Curricula.

Staff and Training. AEI hired 66 teachers for the 2019 program. Any teacher who was interested in teaching had the opportunity to apply online from April 2 to 18, 2019. The program offered a three-hour paid training for the hired Grade 3, 4, and 5 teachers, and a three-hour paid training focused on Lego WeDo 2.0.

Curriculum and Belltimes. The ELO STEP curriculum, developed by AEI, focused mainly on mathematics and science activities, and also included topics related to technology, engineering, arts, and other curricular areas. Instruction was 6.5 hours every day from 9:00 am to 3:30 pm. See Appendix A for a list of sites and bell times.

Program Cost. The cost of the 2019 ELO STEP was approximately \$814,691. This amount included part-time salaries and benefits, instructional materials, and transportation.

Participating Students and Schools. In 2019, 2,400 students from 26 Title I Elementary Schools were invited to participate in ELO STEP across 23 sites. A total of 1,056 students (44%) enrolled in the program, while 1,356 (56%) did not. It is important to note that among these 1,056 students who enrolled in the program, 29 students: 1) were not originally invited to the program, or 2) simultaneously participated in another program during the summer at least for one day (i.e. the Building Educated Leaders for Life program or BELL). Excluding these participants, the sample of students who were invited and exclusively enrolled in ELO STEP was 1,027 students and will be used as the study sample. Additionally, program staff reported that the average class size was 16 students.

Previous Evaluations of ELO STEP

2015 Evaluation. OSA evaluated the first implementation of ELO STEP in the summer of 2015 (Zhao, Modarresi, & Jang, 2016). Similar to this report, it included a formative and an outcome evaluation. The formative evaluation revealed that ELO STEP participants (entering Grade 3 students only) had positive educational experiences, suggesting that their math and science instruction was interesting. Additionally, ELO STEP teachers reported that the program had a well-designed curriculum, encompassed an instructional content that supported students' learning needs, and helped students engage in enriched and accelerated academic work. Parents also provided positive feedback regarding the program (Zhao, Modarresi, & Jang, 2016).

The outcome evaluation revealed that the 2015 program increased the performance of some student subgroups impacted by poverty. For instance, an increase in mathematics performance was observed among all Grade 3 students, including Black or African American, Hispanic/Latino, and students who received FARMS services. Similarly, an increase in reading performance was observed in some subgroups only, such as Hispanic/Latino students and students who received FARMS services (Zhao, Modarresi, & Jang, 2016).

2018 Evaluation. Further, OSA conducted an outcome evaluation of the 2018 ELO STEP (Davila Valencia et al., 2019), which assessed the effect of the program on mathematics and reading performances among participants (entering Grades 3, 4, and 5). These outcome analyses revealed that the effect of the program was more evident on mathematics than on reading, except for English for Speakers of Other Languages (ESOL) participants, who saw an increase in their performance in both subjects. For example, all non-FARMS groups (Non-FARMS All Other Student Groups, Non-FARMS Black or African American, and Non-FARMS Hispanic/Latino) reported an increase in their math scores from the spring to the fall of 2018. In reading, the effect of the program varied depending on the student group, and showed both positive and negative effects. Program staff indicated that the ELO STEP curriculum primarily focused on mathematics and science activities; therefore, the nature of the curriculum might explain these findings.

Literature Review

Many researchers demonstrated that there are achievement gaps between disadvantaged high-achieving students and their affluent peers. Smarick (2013), for instance, pointed out that the proportion of high-achieving students in schools with high levels of poverty has decreased over time. Although many efforts across the country have been put in place to address this issue, their results have been observed in a very slow pace (Plucker et al., 2013). One of the possible reasons is that high-achieving children from less affluent families do not have the same opportunities during the summer compared to their more affluent counterparts. Augustine et al. (2016) stated that low-income students are less likely to have enriching nonacademic experiences, such as sports, relative to students from well-off families; therefore, summer loss is more likely to occur among the first group compared to the latter group.

Summer programs, targeting high-achieving students, then emerged as a good alternative to tackle this problem. However, the number of programs for high-achieving children was not a priority before the passing of *Every Student Succeeds Act* (ESSA) in 2015. Before 2015, during the *No Child Left Behind Act* (NCLB) era, there was more attention on struggling students or children who were at risk of grade retention (Olszewski-Kubilius et al., 2012). ESSA provided more authority to states over their accountability regimes; therefore, states were more encouraged to focus on all pupils, including high-achieving ones (Wright, 2017). As Wright (2017) pointed out, states now can give substantial weight to measures of academic growth for all students from one year to another, or use average scale scores or performance indexes to measure academic growth beyond proficiency.

This new focus has been demonstrated by recent research. For instance, the Thomas B. Fordham Institute conducted a study comparing all the state accountability plans (including Washington, D.C.) as of October 2017. Findings revealed that more importance have been given to all students, regardless of their achievement level (Wright, 2017). Specifically, 22 states plus Washington, D.C. (45% of all states

reviewed) ranked “strong” on this objective, whereas 14 states (27%), including Maryland, ranked “medium.” (Wright, 2017).

Several efforts have been implemented, outside and inside MCPS, to reduce existing achievement gaps. For instance, Project NEXUS – Linking Middle Schools to College Success, led by the Maryland State Department of Education, was implemented from 2005 to 2008. This program intended to expand opportunities among students from low-income families to gain access to challenging coursework and be more prepared for higher education (Olszewski-Kubilius et al., 2012). Another program comprised The George B. Thomas, Sr. Learning Academy, Inc. Saturday School program, implemented in MCPS since 1986 (George B. Thomas, Sr. Learning Academy Saturday School, 2020). This program aimed to reduce the achievement gap via the acceleration of students’ mastery of reading skills, language arts, mathematics, and test taking skills (Parrilla, 2019). Other summer programs implemented in MCPS include: 1) the Extended Learning Opportunities Summer Adventures in Learning program, 2) the Summer Unleash Potential (Summer UP) program for Elementary and Middle Schools, and 3) the BELL program. Description of these initiatives and their effect on MCPS students can be found in Maina et al. (2019), Wilson et al. (2019), and Cooper-Martin (2018), respectively.

Design and Organization of the Report

This report is organized in two sections: 1) formative and 2) outcome evaluation. The formative evaluation provides findings from students, teachers, and parents, regarding their experiences in the program. Changes of perception toward mathematics and science among rising Grade 4 and 5 students are included. The second part of the report (the outcome evaluation) examines the mathematics performance among students who participated in the program relative to those who were also invited but did not participate. Each section also includes the evaluation questions and methodology associated with that evaluation.

Formative Evaluation

This section includes the evaluation questions, methodology, and findings associated with the formative component of this evaluation.

Evaluation Questions

The purpose of the formative evaluation is to: a) examine ELO STEP stakeholders’ experiences (student participants, teachers, and parents) regarding the implementation of the program and b) provide this feedback to program staff for future improvement. This formative evaluation was guided by the following questions:

1. To what extent did students’ perspectives toward mathematics and science change after attending 2019 ELO STEP?
2. What were students’ experiences with 2019 ELO STEP?
3. What was the teachers’ feedback regarding the implementation of 2019 ELO STEP?
4. What was the parents’ feedback regarding the implementation of 2019 ELO STEP?

Methodology

Study Design

A non-experimental design using multiple surveys was used to describe the implementation and experiences of ELO STEP.

Data Collection Activities

Surveys were used to collect data from students, teachers, and parents.

Student Surveys. Two online surveys, completed by student participants at the beginning and the end of the program, were conducted to observe a change in their interests and perceptions toward mathematics and science, as well as their self-perceived performance. A 2-point Likert scale (“Agree” and “Disagree”), with an option of “Not sure,” was used to measure their level of agreement with each of the statements on the survey. Most of these statements were previously used in surveys to evaluate other programs in MCPS, such as the ELO STEP program in 2015–2016 and The George B. Thomas Sr. Learning Academy, Inc. Young Scholars Program (YSP) during the 2010–2011 school year. It is important to note that these statements were tested for internal consistency when they were utilized in the evaluation of the YSP program. Their reliability coefficients, measured by Cronbach’s alpha, were of 0.90 for the pre- and post-program surveys respectively (Addison-Scott, 2012). In collaboration with program staff, it was decided to: 1) keep the number of statements to the minimum to ensure maximum completion and student full understanding of the survey items, and 2) limit the survey target population to rising Grade 4 and 5 student participants. Additionally, the student survey instrument was piloted with two students to ensure the statements were clear. Each section of the survey assessing the perception of mathematics and science included six statements, and a final section, called “general,” included five statements.

The post-program survey has the same questions as the pre-program survey and incorporated an additional section to learn more about the participants’ overall experience in ELO STEP. This section included 10 statements and used a 4-point Likert scale (“Always”, “Most of the time,” “Some of the time,” and “Never”); statements included how comfortable and safe participants felt during the program. Additionally, participants were asked if they would recommend the program to a friend or not. Finally, two open-ended questions were asked to capture their favorite part of the program, as well as any recommendations to make the program better.

Teacher Survey. An online survey was completed by ELO STEP teachers at the end of the program to examine their level of agreement with several statements, such as if they were provided with sufficient time for specific tasks, if they had adequate supplies, if the content was appropriate, and if the ELO STEP model supported their students’ learning needs and well-being. A 4-point Likert scale (from “Strongly agree” to “Strongly disagree”), with an option of “No opinion/I don’t know,” was used to determine the degree to which teachers agreed with each of the eight statements. For those teachers who taught in previous versions of ELO STEP, they were asked if the 2019 ELO STEP improved, was the same, or was worse relative to that previous experience. Finally, two open-ended questions collected teachers’ feedback on the program’s strengths and components to improve.

Parent Survey. A paper survey was used to collect information from parents pertaining the experience of their children in ELO STEP. This survey was available in English and Spanish, and included 13

statements, using a 4-point Likert scale (from “Strongly agree” to “Strongly disagree”), with an option of “No opinion/I don’t know,” to measure their level of agreement. These statements mainly addressed ELO STEP implementation in several aspects, such as communication, transportation, program environment, perception of their children attending the program, etc. At the end, two open-ended questions were asked to capture their favorite part of the program, as well as any suggestions to make the program better.

Samples

Students. Only rising Grade 4 and 5 participants completed the pre- and post-program surveys: the first week of the program and during the last two weeks of the program. Among the 706 student participants who were enrolled in ELO STEP, 428 students (61%) responded the pre-program survey and 527 students (75%) responded the post-program survey. Both, pre- and post-program surveys, were administered anonymously and online via *Google Forms*.

Teachers. Among the 66 teachers who taught in the 2019 ELO STEP, 51 responded the online survey (a response rate of 77%). Surveys were administered anonymously via *Google Forms*.

Parents. The parent survey targeted 1,056 parents or guardians whose children enrolled in the 2019 ELO STEP; 427 (40%) responded to the survey during the students’ showcase events that took place during the last week of the program. Completed paper surveys were mailed by the site coordinator to the OSA researchers and entered manually in a database format for analysis.

Analytical Procedures

Descriptive statistics were used to summarize responses to close-ended questions, which were reported using frequency distributions and percentages. In the case of students’ pre- and post-program surveys, differences in perceptions toward mathematics and science before and after exposure to ELO STEP were tested via Chi-square goodness of fit tests. These statistical tests allowed us to examine whether the distribution of agreement, disagreement, and “Not sure” at the end of the program differed from the distribution at the beginning of the program (hypothesized proportion). Because the pre- and post-program surveys were collected anonymously and were not individually matched, responses were analyzed in aggregate. Responses to open-ended questions were broken down and categorized via an open coding strategy. Similar comments were grouped into the same category, and counts and percentages of these categories were calculated and reported.

Strengths and Limitations

Strengths. One of the strengths of this formative evaluation was the multiple sources of collected information via surveys. The goal of this formative section was to capture not only students’ experiences but also teachers’ and parents’. This insightful feedback identified parts of the program that do not require any change and others that need improvement from the perspectives of these three groups. A second strength was related to the high and moderate response rates for these three groups, which ranged from 40% (parents’ response rate) to 77% (teachers’ response rate). Another strength of the program was the survey instruments themselves; the surveys were designed to be easily understood and to follow. In the case of the students’ pre- and post-program surveys, an instrument that was already tested for internal consistency was used and piloted with the assistance of two students.

Limitations. The primary limitation was that the student survey did not include rising Grade 3 students; only rising Grade 4 and 5 students were included. Therefore, findings from this survey cannot be generalized to the whole population of participants. Another limitation pertained to the analysis of student perception toward math and science. Pre- and post-program surveys were not individually matched; the student sample in the post-program survey might have included additional or different students than the student sample in the pre-program survey. Also, there is a chance that a very limited number of students completed the survey more than once. Repeated entries were noted during the analysis and then deleted from the sample; however, there is a small chance that a duplicate entry may have been missed.

Formative Evaluation Findings

The following findings are organized by evaluation question.

Evaluation Question 1. To what extent did students' perspectives toward mathematics and science change after attending 2019 ELO STEP?

Student Perception Toward Mathematics. Table 1 shows the percentages of participants who agreed with the statements pertaining to mathematics before and after exposure to ELO STEP. Almost all of the statements related to mathematics reported a decrease (non-desired direction) at the end of the program compared to the beginning. For two survey items, specifically “I am good at working math problems” and “I remember most things I learn in math,” this decrease in agreement was statistically significant (-8.7 and -5.3 percentage points, respectively). Only one statement, “I like to play games that use numbers,” reported a significant increase in the desired direction at the end of the program compared to the beginning (4.8 percentage points).

Table 1. Differences in Post-Pre Perceptions of Mathematics Among ELO STEP Participants

	Students Responding "Agree"				Post-Pre Diff in % points
	Pre (N = 428)		Post (N = 527)		
<i>Please indicate your level of agreement</i>	Pre (n)	Pre (%)	Post (n)	Post (%)	
I like math a lot	358	83.6	425	80.6	-3.0
I am good at working math problems	333	77.8	364	69.1	-8.7***
I like to play games that use numbers	266	62.1	353	67.0	4.8*
I remember most things I learn in math	328	76.6	376	71.3	-5.3***
Working math problems is fun	294	68.7	341	64.7	-4.0
I like to participate in academic competitions related to math	251	58.6	302	57.3	-1.3

Notes. * $p < 0.05$, *** $p < 0.001$. Statement response choices included: Agree, Disagree, and Not Sure.

Student Perception Toward Science. Tables 2-4 present the percentages of student participants who agreed with the statements related to science at the beginning and at the end of the program. As shown in Table 2, there was a statistically significant increase in the percentage of students who agreed with the statements “I like science a lot” (4.3 percentage points) and “I cannot do science without knowing a lot of math” (7.1 percentage points).

Table 2. Positive Differences in Post-Pre Perceptions of Science Among ELO STEP Participants

<i>Please indicate your level of agreement</i>	Students Responding "Agree"				Post-Pre Diff in % points
	Pre (N = 428)		Post (N = 527)		
	Pre (n)	Pre (%)	Post (n)	Post (%)	
I like science a lot	327	76.4	425	80.7	4.3**
I cannot do science without knowing a lot of math	159	37.1	234	44.2	7.1***

Notes. ** $p < 0.01$, *** $p < 0.001$. Statement response choices included: Agree, Disagree, and Not Sure.

However, other statements showed a statistically significant decrease in the percent of students who agreed with them at the end of the program (Table 3): “I think I could do more difficult science work” and “I like doing science experiments” (-5.1, and -2.1 percentage points, respectively).

Table 3. Negative Differences in Post-Pre Perceptions of Science Among ELO STEP Participants

<i>Please indicate your level of agreement</i>	Students Responding "Agree"				Post-Pre Diff in % points
	Pre (N = 428)		Post (N = 527)		
	Pre (n)	Pre (%)	Post (n)	Post (%)	
I think I could do more difficult science work	220	51.4	244	46.3	-5.1**
I like doing science experiments	416	97.2	501	95.1	-2.1***

Notes. ** $p < 0.01$, *** $p < 0.001$. Statement response choices included: Agree, Disagree, and Not Sure.

Finally, as one would hope, a statistically significant percentage of students who agreed with the statement “Scientists are mostly men who wear white lab coats” decreased at the end of the program (-4.6 percentage points) (Table 4). The percent of students who agreed with the statement “science is hard for me” also decreased slightly, but the change was not significant.

Table 4. Other Negative Differences in Post-Pre Perceptions of Science Among ELO STEP Participants

<i>Please indicate your level of agreement</i>	Students Responding "Agree"				Post-Pre Diff in % points
	Pre (N = 428)		Post (N = 527)		
	Pre (n)	Pre (%)	Post (n)	Post (%)	
Scientist are mostly men who wear white lab coats	111	25.9	112	21.4	-4.6***
Science is hard for me, even when I study	91	21.3	109	20.6	-0.7

Notes. *** $p < 0.001$. Statement response choices included: Agree, Disagree, and Not Sure.

Student General Self-perception. Table 5 shows the percentage of agreement post- and pre-ELO STEP regarding participants' self-perceived performance and qualities. All the statements in the survey reported a change in the non-desired direction at the end of the program relative to the beginning. Also, the change of agreement in three of the five statements were significantly negative.

Table 5. Differences in Post-Pre General Self-perceptions Among ELO STEP Participants

<i>Please indicate your level of agreement</i>	Students Responding "Agree"				Post-Pre Diff in % points
	Pre (N = 428)		Post (N = 527)		
	Pre (n)	Pre (%)	Post (n)	Post (%)	
I put a lot of effort into my schoolwork	391	91.4	461	87.5	-3.9**
I am smart	340	79.4	405	76.9	-2.6
I am good at learning new things in school	351	82.0	396	75.1	-6.9***
Doing well in school is important for my future career goals	402	93.9	493	93.5	-0.4
My classmates in school think I have good ideas	194	45.3	224	42.5	-2.8**

Notes. ** $p < 0.01$, *** $p < 0.001$. Statement response choices included: Agree, Disagree, and Not Sure.

Evaluation Question 2. What were students' experiences with 2019 ELO STEP?

Table 6 shows the counts and percentages of all Grade 4 and 5 student participants who responded "Always" or "Most of the time" to the positive statements pertaining to their overall experience in the program. More than 85% of Grade 4 and 5 participants reported that they "Always" or "Most of the time": 1) liked that their teacher provided them with adequate materials, 2) liked how their teacher made science

and math interesting, 3) liked learning with Legos, 4) liked the activities in the science class, and 5) felt comfortable talking to their teacher. Additionally, 70% or more of student participants reported that they “Always” or “Most of the time”: 1) liked the activities in the math class, 2) enjoyed working with groups, 3) were excited to come to the program every day, and 4) made new friends during the program. When data was disaggregated by grade, percentages did not differ much compared to the percentages presented for all respondents.

Table 6. Experiences of Grade 4 and 5 Participants in ELO STEP

<i>Pick the answer you think is the best</i>	Students Responding “Always” or “Most of the Time”								
	All Respondents			Grade 4			Grade 5		
	N	n	%	N	n	%	N	n	%
My teacher provided me with materials during class (for example, paper, markers, pens, erasers, etc.)	527	489	92.8	238	215	90.3	289	274	94.8
My teacher made science interesting	527	479	90.9	238	212	89.1	289	267	92.4
I liked learning with Legos	527	474	89.9	238	212	89.1	289	262	90.7
I liked the activities completed in the science class	527	466	88.4	238	206	86.6	289	260	90.0
My teacher made math interesting	527	458	86.9	238	213	89.5	289	245	84.8
I felt comfortable talking to my teacher	527	451	85.6	238	207	87.0	289	244	84.4
I liked the activities completed in the math class	527	437	82.9	238	205	86.1	289	232	80.3
I enjoyed working in groups with other students	527	405	76.9	238	190	79.8	289	215	74.4
I was excited to come to the program every day	527	400	75.9	238	189	79.4	289	211	73.0
I made new friends during the program	527	368	69.8	238	182	76.5	289	186	64.4

Note. Statement response choices included: Always, Most of the time, Some of the time, and Never.

In addition, participants were asked if they would recommend this program to a friend. Among Grade 4 and 5 students who responded to the post-program survey, 481 (91%) reported that they would recommend the program to a peer.

Participants were also asked, in an open-ended question, about their favorite part of ELO STEP. Table 7 shows the most frequently mentioned responses among Grade 4 and 5 participants. More than half of the 527 Grade 4 and 5 participants who answered the survey liked all the activities associated with Lego WeDo 2.0. Moreover, almost 30% of participants liked science related activities, which included specific science topics mentioned by the students, as well as scientific experiments and projects done in class. Further, 17% of students reported they liked the math related activities, followed by 7% who pointed out other specific academic activities (Chromebook time, showcase, learning about business, doing websites, etc.), and leisure time (recess, lunch, or social activities).

Table 7. Favorite Part of ELO STEP Reported by Grade 4 and 5 Participants

<i>Favorite part of the program</i>	N = 527	
	n	%
Lego WeDo 2.0	273	51.8
Science related activities	145	27.5
Math related activities	91	17.3
Other academic activities or tools (Chromebook time, showcase, etc.)	36	6.8
Leisure time	34	6.5
The teacher	28	5.3
General positive comment (not specific)	27	5.1
Making new friends/working with friends	26	4.9
Mindfulness activities	19	3.6
Other comments	3	0.6

Note. Respondents may provide more than one response.

In the last question of the survey, participants had the opportunity to provide suggestions to make the program better. Table 8 presents the most frequent suggestions by Grade 4 and 5 student participants. Approximately 21% of all the 527 students who completed the survey equally reported that nothing needs to be changed and more recess or free time should be given to students. Also, between 8% and 10% of participants suggested that the program should include field trips, fun activities, “Fun Fridays,” and more or better science activities. Some participants remarked that they should have field trips, similar to what students have in the BELL summer program. Approximately 7% of participants suggested to have other academic activities besides math or science, such as reading, writing, history, physical education, etc. Six percent of participants pointed out the need to improve program logistics, specifically the provision of food or materials. For instance, students recommended to improve the lunch options, to have lunch a little earlier than scheduled, and to have access to water. Approximately 5% of participants suggested to make the program shorter (in time or in length), add more Lego activities, or add more activities in general.

Table 8. Suggestions Provided by Grade 4 and 5 Participants

<i>What would you change?</i>	N = 527	
	n	%
Nothing	109	20.7
More recess/More free time	108	20.5
Have field trips	52	9.9
Do more fun activities	52	9.9
Have fun Fridays	41	7.8
More or better science activities	40	7.6
Have other specific academic activities (not math or science)	35	6.6
Improve program logistics	32	6.1
Make the program shorter	28	5.3
More Lego activities	27	5.1
Add more activities in general (not specific)	24	4.6
More or better math activities	23	4.4
Make the program longer	19	3.6
Have specials classes	15	2.8
Have better teachers	12	2.3
Less math or science	7	1.3
Other comments or don't know	53	10.0

Note. Respondents may provide more than one response.

Evaluation Question 3. What was the teachers' feedback regarding the implementation of 2019 ELO STEP?

Table 9 shows the counts and percentages of teachers who responded “Strongly agree” or “Agree” to the positive statements regarding their experience with the program. Almost all of the teachers (more than 90% of 51 teachers who completed the survey) “Strongly agreed” or “Agreed” that: 1) the ELO STEP model helped students engage in enriched and accelerated work in science and math, 2) ELO STEP contributed to the physical, social, and psychological well-being of participants, and 3) the content provided by ELO STEP supported the learning needs of their students in science. More than three-fourths of teachers “Strongly agreed” or “Agreed” that they were provided with sufficient time to set up their classrooms, the program’s lessons supported their students’ learning needs in math, and they had adequate supplies at hand. Finally, just over half of teachers (57%) agreed that they had sufficient time for lesson planning.

Table 9. Feedback Provided by Teachers About Their Experience with ELO STEP

	Teacher Respondents (N = 51)			
	Strongly Agree	Agree	Total Agreement	
<i>Please indicate your level of agreement</i>	n	n	n	%
Overall I felt the ELO STEP model was successful in helping students engage in enriched & accelerated academic work in science	30	19	49	96.1
Overall I felt the ELO STEP model contributed to the physical, social, and psychological well-being of students	25	24	49	96.1
Overall I felt the ELO STEP model was successful in helping students engage in enriched & accelerated academic work in mathematics	23	24	47	92.2
I found the content in the ELO STEP lessons supported the learning needs of my students in science	22	25	47	92.2
I was provided a sufficient amount of time to set up my classroom	19	25	44	86.3
I found the content in the ELO STEP lessons supported the learning needs of my students in mathematics	14	30	44	86.3
An adequate amount of supplies (paper, markers, pens, erasers, etc.) were available	15	24	39	76.5
I was provided a sufficient amount of time for lesson planning	13	16	29	56.9

Notes. Statement response choices included: Strongly Agree, Agree, Disagree, Strongly Disagree, and No opinion/I don't know. None of the teachers respondents selected "No opinion/I don't know" in any of the statements.

Additionally, teachers who taught in previous versions of ELO STEP were asked if they thought the 2019 program was better, the same, or worse relative to previous years. Approximately 61% of teachers (31 of 51 who responded to the survey) indicated that they taught in previous years. Among them:

- Fifty-five percent (17 of 31) reported that the implementation of ELO STEP in 2019 improved compared to previous years,
- Thirty-six percent (11 of 31) thought the implementation of 2019 ELO STEP was the same as in previous years, and
- Ten percent (3 of 31) considered that the 2019 version of the program was worse relative to previous years.

Teachers were also asked open-ended questions about the strengths of the program, as well as for any suggestion to make the program more effective. Table 10 presents the numbers and percentages of the most frequently reported strengths among teachers. More than 40% of teachers who responded to the survey mentioned that the overall curriculum was the strength of the program; they emphasized how challenging, engaging, hands-on, and rigorous the curriculum was. Also, more than 40% of teachers were specific and attributed the science curriculum and related science activities as the strength of the 2019

ELO STEP. Almost 40% of teachers reported that the activities with Legos were the strength of the program and most of them highlighted how much the students enjoyed it. Approximately one-fourth of the teachers considered the math curriculum and related math activities as the strength of the program, followed by 18% of teachers who attributed the mindfulness activities as a strength. Finally, 10% of teachers considered the availability of materials and resources for them and for their students as a strength.

Table 10. Strengths of ELO STEP Reported by Teachers

<i>Strengths of the program</i>	Teacher Respondents (N = 51)	
	n	%
Overall curriculum	21	41.2
Science curriculum	21	41.2
Activities with Legos	20	39.2
Math curriculum	13	25.5
Mindfulness activities	9	17.6
Availability of materials	5	9.8
Inquiry/research activities	4	7.8
Small class size	3	5.9
Flexibility to tailor content	3	5.9
Teacher support and coordination	2	3.9
Specific topics in curriculum (besides math or science)	2	3.9
Other strengths or comments	6	11.8

Note. Respondents may provide more than one response.

Teachers also had the opportunity to provide suggestions to improve the implementation of ELO STEP. Table 11 shows the most frequently reported suggestions among responding teachers. More than one-third of teachers (37%) suggested that the program should improve the provision and access to certain materials and supplies. For instance, some teachers remarked that the robotics kits were incomplete, were not enough for the entire class, or arrived late (in some cases, one week after the program started). Teachers also pointed out the need to have more access to paper, printers, and supplies for experiments to avoid purchasing materials out-of-pocket. Some teachers suggested to improve the binders and the shared drive provided; they mentioned the binders were hard to navigate, and online resources and handouts were sometimes not easy to find in the drive.

One-third of teachers suggested that the program should include breaks for teachers, as well as planning time. Teachers pointed out that a 30 minute lunch break is not enough for resting and planning when instruction is all day. Also, some teachers suggested to include some planning time during the day or designate one day during the week to have one. According to some, this change could make teaching more effective and reduce stress.

Approximately one-fourth of teachers (26%) suggested that the program should include more engaging lessons or curriculum should be better tailored. For example, some of them commented that the math curriculum for Grade 4 and 5 students could improve since most of them already received enriched

instruction through Compacted Math. Also, 26% of teachers suggested a better time allocation for some of the contents in the curriculum. Some of these teachers pointed out that too much time has been given to Lego activities. Students, especially in Grade 5, often finished these activities quickly; therefore, teachers were required to look for additional activities to fill the rest of the time. Further, some teachers commented that students were very engaged with Lego activities during the first three weeks of the program; however, some of them lost interest by the week 4 of the program.

This same percentage of teachers (26%) suggested that the program should allocate more recess time for students, especially if ELO STEP is a full-day program. Some of these teachers emphasized that students need to have more physical breaks and multiple breaks in general. Otherwise, the daily hours of instruction should be shortened, as 16% of teachers suggested.

Table 11. Suggestions Provided by Teachers (N = 51)

<i>Suggestions to improve the program</i>	Teacher Respondents (N = 51)	
	n	%
Better/On-time materials	19	37.3
More breaks for teachers or planning time	17	33.3
More engaging activities towards the end of the program	13	25.5
Better time allocation for some content in curriculum	13	25.5
More recess for students	13	25.5
Make instruction day shorter	8	15.7
Improve communication with central office	4	7.8
Enforce or increase eligibility criteria	4	7.8
Add a field trip	4	7.8
Do not combine classes with students of different grades	3	5.9
Make the program shorter	2	3.9
Provide key card for school access to teachers	2	3.9
Tighten rules to ensure attendance	2	3.9
Other comments	10	19.6

Note. Respondents may provide more than one response.

Evaluation Question 4. What was the parents' feedback regarding the implementation of 2019 ELO STEP?

Table 12 shows the counts and percentages of parents who responded “Strongly agree” and “Agree” to the positive statements pertaining to their experience with ELO STEP. Almost all parent respondents (96% - 100%) agreed with all the survey items. At least 96% of the parents agreed that: 1) their children felt safe in the program, 2) their children enjoyed attending ELO STEP, 3) they would recommend the program to other families, 4) the program helped their children discover new interests and develop new skills, 5) the program made their children more confident, 6) they would send their children once again to the program, 7) the morning activities encouraged their children to stay for the afternoon part, 8) their

children made new friends during the program, 9) the program was communicated in a clear language and in a timely fashion, 10) being a full-day program was convenient for them, and 11) the program provided adequate transportation.

Table 12. Feedback Provided by Parents About Their Experience with ELO STEP

<i>Please indicate your level of agreement</i>	N	Parent Respondents			
		Strongly Agree	Agree	Total Agreement	
		n	n	n	%
My child/children felt safe in the program	423	345	78	423	100.0
My child/children enjoyed attending the ELO STEP program	425	357	67	424	99.8
I would recommend this program to other families	420	351	68	419	99.8
The program helped my child/children discover new interests	419	317	101	418	99.8
The program helped my child/children develop new skills	419	323	93	416	99.3
The program made my child/children more confident	414	311	100	411	99.3
I would send my child/children once again to this program	416	341	71	412	99.0
The morning activities encouraged my child/children to attend the afternoon part	376	278	94	372	98.9
The program created an environment that helped my child/children making new friends	416	319	91	410	98.6
Information about the ELO STEP program was communicated to me clearly in a language that I could easily understand	425	315	104	419	98.6
The fact that this program was a full-day was convenient for me	419	344	67	411	98.1
Information about the ELO STEP program was communicated in a timely fashion	425	297	115	412	96.9
Transportation provided for the program was adequate	360	259	86	345	95.8

Notes. Statement response choices included: Strongly Agree, Agree, Disagree, Strongly Disagree, and No opinion/I don't know. N excludes parent respondents who selected "No opinion/I don't know" in each of the statements.

Parents also reported, in an open-ended question, what they liked the most about ELO STEP. Table 13 lists the counts and percentages of the most frequently liked aspects of the program mentioned by parents. Of the 377 parents who responded to this question, 61% liked the focus of the curriculum on math and science and all the related activities in the program; parents appreciated the new knowledge and skills learned by their children. Also, one-third of the parents remarked on the positive emotional and psychological effect of the program on their children. Some of them pointed out that the program helped their children to be more confident, excited, creative, as well as they liked that their children had fun and developed new friendships during the program. Between 7% and 8% of parents liked the teachers, the fact that it was a full-day program, and provided good and positive general comments about the program.

Table 13. Favorite Part of ELO STEP Reported by Parents

<i>What do you like the most about the program?</i>	Parent Respondents (N = 377)	
	n	%
Curriculum in math and science	231	61.3
Emotional and psychological effect on children	126	33.4
The teachers	30	8.0
Full-day program	27	7.2
General positive comments	25	6.6
Bus transportation provided	9	2.4
Breakfast and lunch provided	7	1.9
Same school that children attended during the previous school year	4	1.1
Other comments	12	3.2

Note. Respondents may provide more than one response. N excludes parent respondents who did not provide any comment to this question.

Finally, parents were able to provide suggestions to make the program more effective in the future. Table 14 shows the counts and percentages of these suggestions. Among the 228 parents who provided a suggestion, almost half of them (46%) reported that nothing should be changed because the program is good as it is.

Ten percent of parents commented that more content and activities in math and science should be added to the curriculum; for instance, some parents recommended adding specific topics in science as well as doing more experiments and projects. Also, 7% of parents suggested that the program should include more recess time and have some field trips as part of the curriculum, followed by 5% of parents who asked for better communication during the program (such as weekly updates about the activities done in class and their child's performance) and before the program starts (such as getting notification of acceptance in the program in advance to allow parents to plan their summer better).

Table 14. Suggestions Provided by Parents

<i>What would you change?</i>	Parent Respondents (N = 228)	
	n	%
Nothing	105	46.1
More content and activities in math and science	23	10.1
Have more recess	16	7.0
Add field trips	15	6.6
Improve communication during the program	11	4.8
Improve communication before the program starts	11	4.8
Better program logistics	10	4.4
Increase duration of the program	5	2.2
Reduce the daily hours of instruction	5	2.2
Improve the lunch provided	5	2.2
Give more homework	5	2.2
Provide additional services	3	1.3
Have more student group work	3	1.3
Other comments	23	10.1

Note. Respondents may provide more than one response. N excludes parent respondents who did not provide any suggestion.

Outcome Evaluation

This outcome section starts with the evaluation questions, followed by the methodology (study design, data sources, samples, analytical procedures, and strengths and limitations).

Evaluation Questions

The purpose of the outcome evaluation is to assess the effectiveness of the 2019 ELO STEP in mathematics performance among students who participated in the program, relative to those who did not. This evaluation was guided by the following questions:

1. What were the attendance patterns for all the students who were invited and participated in the 2019 ELO STEP?
2. What were the demographic characteristics of students who were invited and participated in the 2019 ELO STEP by gender, race/ethnicity, service received, and focus group?
3. After controlling for pre-existing differences among students, were there differences in mathematics performance in the fall of 2019 among students who were invited and participated in the ELO STEP program compared to their peers who were invited but did not participate? Did these differences vary by student subgroup, such as service received or focus group?
4. How did the differences in mathematics performance reported in this evaluation differ from the differences reported in the 2018 ELO STEP evaluation?

5. How did students who participated in both 2018 and 2019 ELO STEP perform in mathematics relative to those who were invited to both but did not participate in either year?
6. How did the most benefited student subgroups from the 2018 ELO STEP perform in mathematics in 2019 compared to 2018? Did these overall subgroups from participating schools report an increase in their math performance from 2018 to 2019?

Methodology

Study Design

This outcome evaluation used a quasi-experimental design, more specifically a non-equivalent comparison group design, as recommended by many researchers (Bordens & Abbott, 2008; Fraenkel & Wallen, 2009; Shadish, Cook & Campbell, 2002). This design is illustrated in Figure 1, which compares the outcomes for two groups of students who are similar on observable characteristics: 1) students who were invited and participated in the program and 2) students who were also invited but did not participate. The goal of this design is to maximize internal validity of results by controlling for confounding variables.

Figure 1. Evaluation Design of the 2019 ELO STEP

	Pre-program	ELO STEP	Post-program
ELO STEP student group	O_1	=> X =>	O_2
Comparison group (Non-ELO STEP)	O_1	=> C =>	O_2

O_1 – Spring 2019 test scores for Grades 2, 3, and 4 in mathematics

X – Five weeks of ELO STEP program treatment from July 1 to August 2, 2019

C – Non-STEP (no ELO STEP treatment)

O_2 – Fall 2019 test scores for Grades 3, 4, and 5 in mathematics

Data Sources

Pre-program Measures. The pre-program measures were Measures of Academic Progress – Mathematics (MAP-M) and Measures of Academic Progress – Primary Grades (MAP-P) from spring 2019. For the third evaluation question, the Rasch Unit (RIT) scores from the spring 2019 administration of MAP-P were used as a pre-program measure for rising Grade 3 students. For rising Grade 4 and 5 students, the RIT scores from the spring 2019 administration of MAP-M were used as a pre-program measure. For the fifth evaluation question, the RIT scores from the spring 2019 administration of MAP-M were also used as a pre-program measure for those students (Grades 4 and 5 only) who participated in both 2018 and 2019 ELO STEP.

Post-program Measures. For all grades, the RIT scores from the fall 2019 administration of MAP-M were used as a post-program measure in math.

Program Attendance of 2019 ELO STEP. Student attendance to the program was monitored in each of the program sites by ELO STEP staff. These records were shared with the evaluator to report the attendance rate of students as well as to help determine the sample of students that was included in the outcome analysis.

Student Characteristics. Demographic data, such as gender, race/ethnicity, services received, and student focus group status, were extracted from MCPS data files. Services received include the Free and Reduced-priced Meal Systems (FARMS), English for Speakers of Other Languages (ESOL), and special education services. Focus group status include six groups of students: 1) Non-FARMS Black or African American, 2) Non-FARMS Hispanic/Latino, 3) FARMS All Other Student Groups, 4) FARMS Black or African American, 5) FARMS Hispanic/Latino, and 6) Non-FARMS All Other Student Groups (Monitoring Group). As described in the MCPS Equity Accountability Model, MCPS is moving beyond the standard aggregated reporting to a performance reporting by specific student characteristics since not all the students experience the same level of access, opportunity, or success as other students (Montgomery County Public Schools, 2019).

Data from 2018 ELO STEP Evaluation. To address the evaluation questions 4 and 5, effect sizes of MAP-M scores in the fall of 2018 were retrieved from the 2018 ELO STEP evaluation (Davila Valencia et al., 2018). Also, student records of the 2018 ELO STEP were analyzed to identify which students in the 2019 program were also invited, participated, or did not participate, in the 2018 program.

Evidence of Learning School Performance in Mathematics by Focus Group. To answer evaluation question 6, MCPS's Evidence of Learning (EOL) assigned scores in mathematics by focus group were used. The EOL math scores are one component of a school's achievement in the MCPS Equity Accountability Model (Montgomery County Public Schools, 2019). Scores from each of the ELO STEP participating schools in 2018 were extracted from the MCPS Data Dashboard for two years (2017–2018 and 2018–2019). The following assigned scores represent the percentage of students in a particular focus group that met the benchmark (i.e. two or more of the three EOL measurements in math):

- A score of 4 indicates that 90% or more students in the focus group met the benchmark.
- A score of 3 indicates that between 70% and 89% of students in the focus group met the benchmark.
- A score of 2 indicates that between 50% and 69% of students in the focus group met the benchmark.
- A score of 1 indicates that between 35% and 49% of students in the focus group met the benchmark.
- A score of 0 indicates that 34% or less students in the focus group met the benchmark.

Samples

2019 ELO STEP Participants. Participants in the 2019 ELO STEP included all students who were invited and attended for at least 18 of the 24 days of instruction (around 75% of total instruction days or more). This threshold is similar to the one used in the 2018 ELO STEP evaluation (Davila Valencia et al., 2019), which is supported by prior research. Some literature suggests that the association between program attendance and estimated treatment effects for programs similar to ELO STEP tend to occur within an attendance range of 15-25 days (Augustine et al., 2016).

Additionally, students who attended at least one day in any other program in MCPS (for example, BELL) were excluded from the sample. The total number of ELO STEP participants included in the study was 841.

2019 Nonparticipants (Comparison Group). The comparison group included all the students who were invited to the 2019 program but did not participate any of the days. Also, students who attended another summer program, such as BELL, were excluded from the sample. The total number of nonparticipants (or comparison group) was 1,223.

Table 15 shows the student characteristics of both groups, 2019 ELO STEP participants and nonparticipants. In general, differences in demographic characteristics between these groups were less than five percentage points. However, participants and nonparticipants differed by more than five percentage points in the following characteristics:

- *Race/ethnicity.* The proportion of Black or African American students was higher among the participants compared to the nonparticipants (35% and 24%, respectively), whereas the proportion of White students was lower among the participants relative to the nonparticipants (4% and 14%, respectively).
- *Focus groups.* The proportion of students who belonged to the Monitoring Group was higher among the nonparticipants compared to the participants (20% and 13%, respectively). Also, the proportion of Black or African American students who did not receive FARMS services was higher among the participants than nonparticipants (13% and 8%, respectively). Similarly, the proportion of Black or African American students who received FARMS services was also higher among the participants than nonparticipants (22% and 16%, respectively).

Table 15. Characteristics of 2019 ELO STEP Participants and Nonparticipants

	Participants (18 or more days of attendance)		Nonparticipants	
	N	%	N	%
Total	841	100.0	1,223	100.0
Grade level in Fall 2019				
Grade 3	289	34.4	266	21.7
Grade 4	253	30.1	478	39.1
Grade 5	299	35.6	479	39.2
Gender				
Female	388	46.1	584	47.8
Male	453	53.9	639	52.2
Race/ethnicity				
Asian	98	11.7	112	9.2
Black or African American	291	34.6	297	24.3
Hispanic/Latino	393	46.7	589	48.2
White	32	3.8	175	14.3
Two or More Races	26	3.1	47	3.8
Receipt of services in 2018–2019				
ESOL	209	24.9	267	21.8
FARMS	538	64.0	761	62.2
Special Education	38	4.5	37	3.0
Focus groups				
Non-FARMS All Other Student Groups (Monitoring Group)	105	12.5	242	19.8
Non-FARMS Black or African American	108	12.8	96	7.8
Non-FARMS Hispanic/Latino	90	10.7	124	10.1
FARMS All Other Student Groups	52	6.2	95	7.8
FARMS Black or African American	183	21.8	201	16.4
FARMS Hispanic/Latino	303	36.0	465	38.0

Notes. Results are not reported for groups with fewer than five students. Students who have attended other programs, such as BELL, were excluded from the samples.

Multi-year ELO STEP Participants and Nonparticipants (2018 and 2019). Two samples of students were identified from the 2018 ELO STEP records: 1) students who were invited, participated, and reported a high attendance in the 2018 version of the program (19 days of attendance or more), and 2) students who were invited and did not participate in the 2018 ELO STEP program. Only those students in the 2019 ELO STEP participant sample who were also invited and participated in the 2018 program were included in the multi-year analysis sample for evaluation question 5. Similarly, only those students in the 2019 nonparticipant sample who were also invited and did not participate in 2018 were included in the

nonparticipant sample to address the fifth evaluation question. The total number of participants included in the multi-year analysis was 261, whereas the number of nonparticipants was 526.

The characteristics of participants for the multi-year analysis did not vary much from the nonparticipant sample (Table 16). Differences in demographic characteristics between these two groups were less than five percentage points, except for Black or African American, White, Non-FARMS Black or African American students, as well as for students in the Monitoring Group.

Table 16. Characteristics of Multiple-Year Participants and Nonparticipants (2018 and 2019 ELO STEP)

	2018 and 2019 ELO STEP Participants		2018 and 2019 Nonparticipants	
	N	%	N	%
Total	261	100.0	526	100.0
Grade level in Fall 2019				
Grade 4	125	47.9	316	60.1
Grade 5	136	52.1	210	39.9
Gender				
Female	117	44.8	250	47.5
Male	144	55.2	276	52.5
Race/ethnicity				
Asian	30	11.5	45	8.6
Black or African American	85	32.6	123	23.4
Hispanic/Latino	132	50.6	261	49.6
White	7	2.7	79	15.0
Two or More Races	6	2.3	16	3.0
Receipt of services during the school year 2018–2019				
ESOL	54	20.7	91	17.3
FARMS	166	63.6	321	61.0
Special Education	11	4.2	15	2.9
Focus groups				
Non-FARMS All Other Student Groups (Monitoring Group)	32	12.3	101	19.2
Non-FARMS Black or African American	35	13.4	42	8.0
Non-FARMS Hispanic/Latino	28	10.7	62	11.8
FARMS All Other Student Groups	12	4.6	41	7.8
FARMS Black or African American	50	19.2	81	15.4
FARMS Hispanic/Latino	104	39.8	199	37.8

Notes. Results are not reported for groups with fewer than five students.

Analytical Procedures

This study used descriptive analyses, tests of significance, effect sizes, and advanced statistical analysis (analysis of covariance) to assess the effect of the ELO STEP program on mathematics performance.

Descriptive Analysis. Descriptive statistics were used to report the attendance rates of participants (evaluation question 1), as well as the characteristics of students who were invited and participated in the program (evaluation question 2). Counts and percentages of student characteristics were reported in total and disaggregated by grade. Further analyses were conducted to describe students' characteristics within each grade.

Chi-square (or Fisher's exact test when applicable) were used to examine the mathematics performance of participants and nonparticipants before exposure to the program. In most of the subgroups that were tested, both participants and nonparticipants performed at a similar level in math based on data from spring 2019 MAP-M and MAP-P. However, it is important to note that in five subgroups, these pre-existing differences in math between participants and nonparticipants were statistically ($p < 0.05$) significant: 1) all rising Grade 3 and 4 students, 2) rising Grade 3 ESOL students, 3) rising Grade 5 students in the Monitoring Group, 4) rising Grade 4 Non-FARMS Black or African American students, and 5) rising Grade 5 Non-FARMS Hispanic/Latino students (Appendix B).

Furthermore, effect sizes from the 2018 ELO STEP evaluation were compared to the effect sizes from the 2019 evaluation to examine any consistent gains of the program over time. And for evaluation question 6, differences between the 2019 and 2018 EOL school assigned score in mathematics were calculated. This result indicates if a student focus group in a particular school experienced an increase, no change, or decrease in their math score at the end of 2019 compared to 2018.

Advanced Statistical Analyses. This report used the analysis of covariance (ANCOVA) to assess the effect of ELO STEP on mathematics performance. As previous researchers remarked, ANCOVA is a commonly used procedure in quasi-experimental studies that assesses the effect of a program while controlling for selection bias (Campbell & Stanley, 1963; Judd, Smith, & Kidder, 1991; Kirk, 1995; Institute of Education Sciences, 2016). This particular study addressed the problem of selection bias through the following procedures:

- *Use of propensity scores.* Propensity scores were calculated, via logistic regression, to balance both groups (participants and nonparticipants) based on gender, race/ethnicity, and service received (such as FARMS, ESOL, and special education services). These scores represent the likelihood that a student with certain pre-existing characteristics might be either in the participant or the nonparticipant group. As suggested by previous research, propensity scores, divided into quintiles, were incorporated as categorical covariates in the statistical models to control for selection bias (Rosenbaum & Rubin, 1983, 1984, 1985; Austin, 2011).
- *Adding pre-program math scores in the statistical models.* Given that prior-program abilities in math might have differed between participants and nonparticipants, especially for students with certain characteristics, pre-program scores in math (MAP-M or MAP-P administered in the spring of 2019) were included in the statistical models to also reduce any potential selection bias.

The final statistical model to address evaluation question 3 consisted of an outcome variable (post-program math score) with the following covariates: 1) treatment (dummy variable with a value of 1,

indicating participation in the program, and a value of 0, indicating no participation), 2) propensity scores (quintiles), 3) pre-program math scores, and 4) interaction between treatment and pre-program math scores. This analysis yielded the post-program math score means for participants and nonparticipants, and the difference between these two means represented the effect of the program on math scores after controlling for selection bias. This statistical model was initially conducted by grade. Then, within each grade, it was conducted by student subgroup (ESOL status and focus group).

This same analysis was conducted for evaluation question 5 (multi-year analysis); however, the student samples (participants and nonparticipants) included only those who were invited and participated (or did not participate) in both 2018 and 2019. Similarly, this analysis was done by grade, and then by subgroup with large enough samples of students (with at least 15 students in the participant or the nonparticipant group).

Effect Size Measures. In addition to the ANCOVA, this report also calculated effect sizes to determine whether the observed mean differences in post-program math scores between participants and nonparticipants were large enough to be of practical significance to educators. As suggested by the literature, measures of statistical significance should be reported along with estimations of practical significance (Kline, 2004; Rossi, Lipsey, & Freeman, 2004; Carver, 1993; Levin, 1993; American Psychological Association, 2001).

This report used the standardized mean difference, Cohen's d , which is one of the most common effect sizes measures. Cohen's d is define by the following formula:

$$ES = (Mt - Mc)/SD,$$

where ES is the effect size, Mt and Mc are the adjusted group means for the treatment group and the comparison group respectively, and SD is the standard deviation of the pooled outcome scores (Thompson, 2002; Lipsey et al., 2012). This measure is metric-free; therefore, it can be used to interpret patterns of outcome measures' differences between groups of students and across different measures (Bloom et al., 2008; Lipsey et al, 2012). Additionally, interpretation of effect sizes should exercise caution when the study samples are small since it tends to be upwardly biased in those cases (Institute of Education Sciences, 2016).

Finally, the analysis used the following thresholds to differentiate the magnitude of the effect sizes (small, medium, or large), either positive or negative: 1) $ES = 0.15$ for a small practically significant effect, 2) $ES = 0.50$ for a medium effect, and 3) $ES = 0.80$ for a large effect. These thresholds are different than the ones established by Cohen where, for example, the cutoff for a small effect size is 0.20 (Cohen, 1988). However, these new thresholds are supported by recent research indicating that effect sizes less than 0.20 should not be trivialized, especially for interventions that focus on curriculum or broad instructional programs (Lipsey et al., 2012).

Strengths and Limitations

Strengths. One strength of this study is the evaluation design and analyses conducted to infer the effect of the program on mathematics performance. There were two techniques that were used to improve internal validity and minimize the risk of getting a biased effect of the program:

- *Control by study design.* This study used a quasi-experimental design, and the students who met the program's eligibility criteria and were invited, but did not participate, were used as a comparison group. The comparison of performance in math between the comparison and the participant groups, before and after the program, allowed to infer the effect of the intervention, which might be attributed to the participation in the program rather than students' initial abilities.
- *Control by statistical techniques.* In order to control for pre-existing differences between these two groups and to maximize internal validity of the findings, ANCOVA was used as suggested by the literature (Campbell & Stanley, 1963; Judd, Smith, & Kidder, 1991).

Another strength of this study was the comparison of findings between this evaluation and the 2018 ELO STEP. Since both evaluations report effect sizes of 2018 and 2019 fall MAP-M, the effects of the program that were consistent (or not) across grades and student subgroups could be observed. Finally, this study provides findings that are consistent with current MCPS accountability efforts. The effect of the 2018 ELO STEP has been examined by student focus group, in line with the MCPS Equity Accountability Model.

Limitations. One of the limitation is associated with the nature of the evaluation design. It is important to note that many researchers state that only evaluations with experimental designs (random assignment of students to either treatment or comparison group) can have full control of issues that might hinder internal validity, such as selection bias, maturation, attrition, etc. (Campbell & Stanley, 1963; Babbie, 1992; Judd, Smith, & Kidder, 1991; Hedrick et al., 1993). Therefore, causal relationships may not be inferred from the analysis.

Another limitation is related to the post-program measures. The outcome measure (fall MAP-M) was administered from September 9 to November 1, 2019. Consequently, participants who took the assessment towards the end of this time frame were more likely to be exposed to other factors unrelated to the summer program, such as more instructional days.

Finally, this study used student performance in mathematics as its outcome measures. However, a great part of the ELO STEP curriculum also focused on science, which could not be assessed; no pre- or post-science assessment was available.

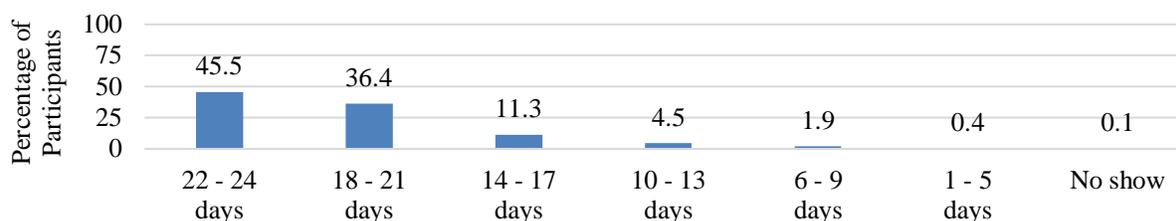
Outcome Evaluation Findings

The following findings are organized by evaluation question.

Evaluation Question 1. What were the attendance patterns for all the students who were invited and participated in the 2019 ELO STEP?

Figure 2 shows the attendance patterns for all the students who were invited and attended ELO STEP during the summer of 2019. Among the 1,027 students who enrolled, almost 100% attended at least one of the 24 days of instruction. Among the high attendees (18 days or more), 46% attended 22 days or more, whereas 36% attended between 18 and 21 days. Eighteen percent of participants attended 17 days or less. When attendance was examined by student subgroup (such as focus groups), the distribution of program attendance did not differ much.

Figure 2. Attendance Patterns of ELO STEP Participants by Days Attended (N = 1,027)



Evaluation Question 2. What were the demographic characteristics of students who were invited and participated in the 2019 ELO STEP by gender, race/ethnicity, service received, and focus group?

Table 17 shows the characteristics of students who were invited and attended the program for at least 18 days. Among the 841 ELO STEP participants, there were more male than female students in the program (54% and 46%, respectively), and almost half (47%) of students were Hispanic/Latino, followed by 35% of students who were Black or African American. Nearly two-thirds of participants received FARMS services in 2018–2019, whereas one-fourth received ESOL instruction. Also, the focus groups that were highly served by ELO STEP were Hispanic/Latino and Black or African American students who received FARMS services (36% and 22%, respectively).

Table 17. Characteristics of 2019 ELO STEP Participants by Grade

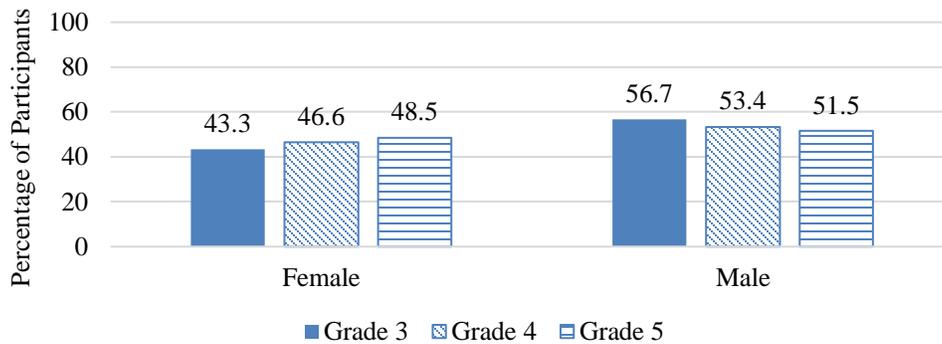
	Total		Grade 3		Grade 4		Grade 5	
	N	%	N	%	N	%	N	%
Total	841	100.0	289	100.0	253	100.0	299	100.0
Gender								
Female	388	46.1	125	43.3	118	46.6	145	48.5
Male	453	53.9	164	56.7	135	53.4	154	51.5
Race/ethnicity								
Asian	98	11.7	40	13.8	24	9.5	34	11.4
Black or African American	291	34.6	100	34.6	97	38.3	94	31.4
Hispanic/Latino	393	46.7	127	43.9	117	46.2	149	49.8
White	32	3.8	11	3.8	8	3.2	13	4.3
Two or More Races	26	3.1	11	3.8	6	2.4	9	3.0
Receipt of services in 2018–2019								
ESOL	209	24.9	73	25.3	70	27.7	66	22.1
FARMS	538	64.0	178	61.6	168	66.4	192	64.2
Special Education	38	4.5	15	5.2	13	5.1	10	3.3
Focus groups								
Non-FARMS All Other Student Groups (Monitoring Group)	105	12.5	40	13.8	26	10.3	39	13.0
Non-FARMS Black or African American	108	12.8	39	13.5	34	13.4	35	11.7
Non-FARMS Hispanic/Latino	90	10.7	32	11.1	25	9.9	33	11.0
FARMS All Other Student Groups	52	6.2	22	7.6	13	5.1	17	5.7
FARMS Black or African American	183	21.8	61	21.1	63	24.9	59	19.7
FARMS Hispanic/Latino	303	36.0	95	32.9	92	36.4	116	38.8

Notes. Results are not reported for groups with fewer than five students.

Table 17 also presented the characteristics of participants disaggregated by grade. Although the distribution across grade levels did not differ drastically, some slight differences were noted, as shown in the following figures.

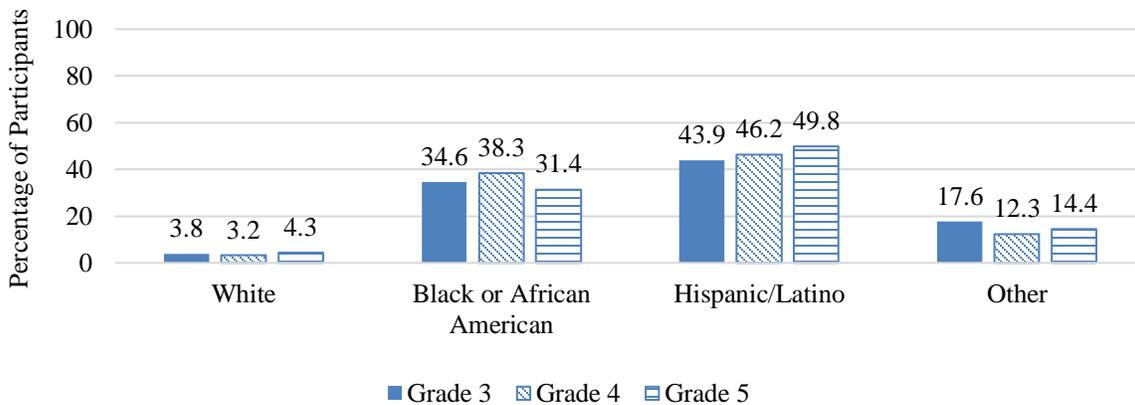
By Gender. Figure 3 examines the distribution of participants by gender and grade. The proportion of male participants, relative to female, was slightly higher among third graders than fourth or fifth graders.

Figure 3. Gender Distribution of ELO STEP Participants by Grade



By Race/Ethnicity. Figure 4 displays the distribution of participants by race/ethnicity and grade. As mentioned before, a great proportion of Black or African American and Hispanic/Latino students were served by this program compared to students of other races/ethnicities. However, the proportion of Hispanic/Latino participants was slightly higher among fifth graders, whereas the proportion of Black or African American participants was slightly higher among fourth graders.

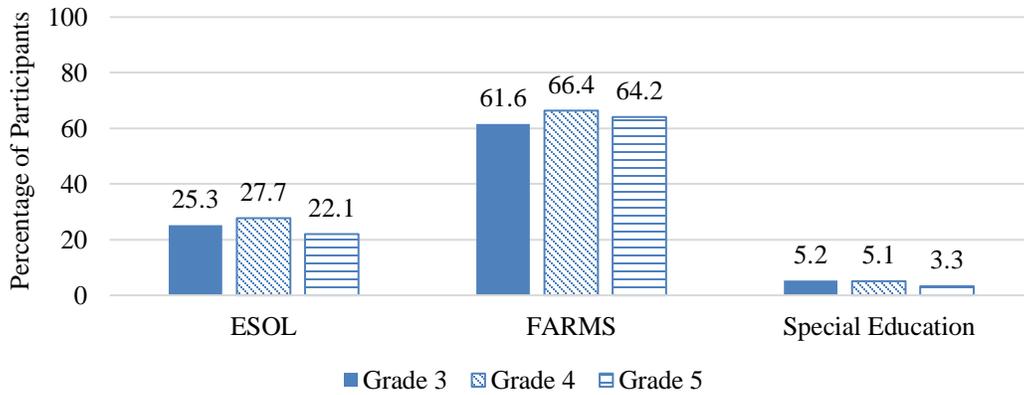
Figure 4. Race/ethnicity Distribution of ELO STEP Participants by Grade



Note. "Other" includes American Indian or Alaskan Native, Asian, and students of Two or More Races.

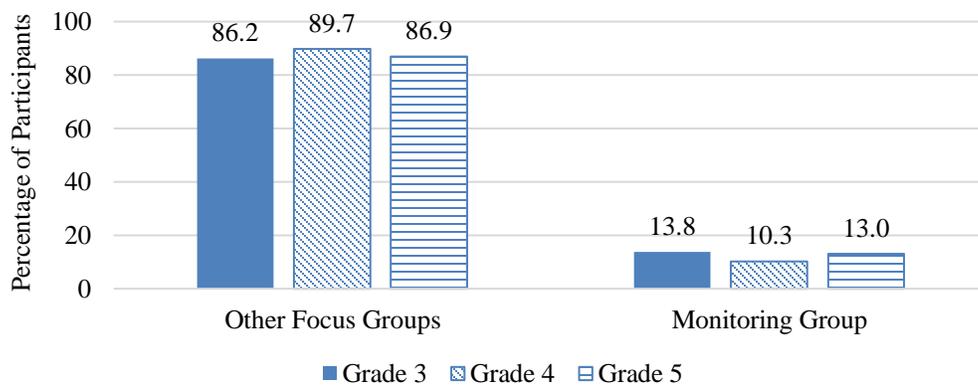
By Services Received. Figure 5 shows the distribution of the services received by ELO STEP participants during the 2018–2019 school year by grade. The percentages of participants receiving FARMS and ESOL services were large across all grades; however, the proportion of students who received both services were slightly higher among fourth graders than third or fifth graders.

Figure 5. Distribution of Services Received by ELO STEP Participants During the 2018–2019 School Year by Grade



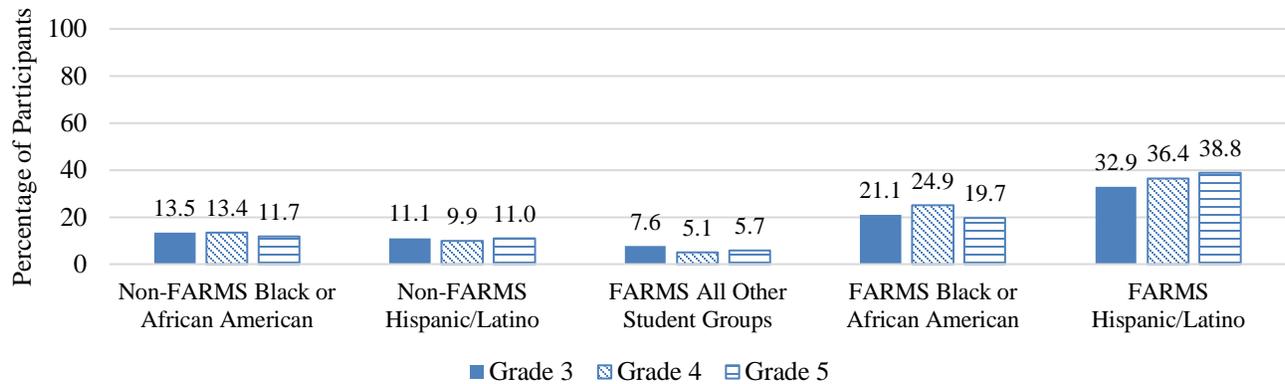
By Focus Groups. Based on Figure 6, between 10% and 14% of ELO STEP Grade 3, 4, and 5 participants were neither Black or African American nor Hispanic/Latino and did not receive FARMS services during the 2018–2019 school year (Monitoring Group), whereas the rest of participants was categorized as other focus groups.

Figure 6. Distribution of ELO STEP Participants in the Monitoring and Other Focus Groups by Grade



The distribution of participants in each of the focus groups was similar across all grades, according to Figure 7. However, the proportion of FARMS Hispanic/Latino students in Grade 5 was slightly higher than in other grades, and the proportion of FARMS Black or African American students in Grade 4 was slightly higher than in other grades.

Figure 7. Distribution of ELO STEP Participants in Focus Groups by Grade



Evaluation Question 3. *After controlling for pre-existing differences among students, were there differences in mathematics performance in the fall of 2019 among students who were invited and participated in the ELO STEP program compared to their peers who were invited but did not participate? Did these differences vary by student subgroup, such as service received or focus group?*

The effect of ELO STEP on mathematics performance was analyzed by grade, by comparing the MAP-M scores from the fall of 2019 between participants and nonparticipants. This analysis was conducted for all students and by various student subgroups. Effect sizes supplemented these results to show if the effects were large enough to be of practical significance to educators.

Grade 5

Table 18 presents the adjusted means on fall MAP-M for ELO STEP participants and nonparticipants. The calculated adjusted mean difference (0.84) for all Grade 5 students between these two groups was statistically ($p < 0.05$) significant in favor of the ELO STEP group, after adjusting for the effects of student characteristics and pre-test scores. However, this difference was not large enough to be of practical significance ($ES < 0.15$).

Conversely, the adjusted mean difference (1.50) among Grade 5 students who received ESOL services was not statistically ($p > 0.05$) but practically ($ES = 0.16$) significant, suggesting that participants in the ELO STEP program who received ESOL services in the 2018–2019 school year performed better on fall MAP-M than their nonparticipant peers (Table 18).

Among student focus groups, Table 18 shows that the adjusted mean differences between participants and nonparticipants were practically ($ES \geq 0.15$) significant in three of the six comparisons examined: 1) Non-FARMS All Other Student Groups (Monitoring Group), 2) Non-FARMS Black or African American, and 3) FARMS All Other Student Groups. These results reveal that Grade 5 participants (except Hispanic/Latino) who did not receive FARMS services performed better on fall MAP-M than their nonparticipants peers. Similarly, Grade 5 students who were not Black or African American or Hispanic/Latino and who received FARMS services performed better on fall MAP-M than their nonparticipants counterparts.

Table 18. Adjusted Means of Grade 5 MAP-M RIT Scores for ELO STEP Participants and their Peers

	Means of MAP-M RIT Scores in Fall 2019						ELO STEP Program Effect		
	ELO STEP Participants			Nonparticipants			ELO STEP vs. non-ELO STEP		
	N	Original Mean (SD)	Adjusted Mean	N	Original Mean (SD)	Adjusted Mean	Adjusted Mean Difference	St. Error	Effect Size
All Grade 5 Students	288	223.25 (9.39)	223.92	439	223.44 (10.42)	223.08	0.84*	0.41	0.08
English for Speakers of Other Languages (ESOL) participants	65	220.91 (9.39)	221.93	84	218.96 (9.81)	220.43	1.50	0.93	0.16
Non-FARMS All Other Student Groups	37	227.27 (10.78)	230.17	91	230.12 (10.39)	228.22	1.95	1.17	0.19
Non-FARMS Black or African American	30	226.80 (7.69)	224.76	32	223.16 (8.92)	221.82	2.94*	1.41	0.35
Non-FARMS Hispanic/Latino	31	219.58 (9.44)	222.25	50	223.80 (11.42)	221.92	0.33	1.40	0.03
FARMS All Other Student Groups	17	226.29 (9.90)	225.35	29	222.86 (10.15)	223.43	1.91	2.08	0.19
FARMS Black or African American	59	221.17 (9.40)	219.13	69	219.88 (8.94)	219.65	-0.53	0.97	-0.06
FARMS Hispanic/Latino	114	222.62 (8.51)	222.22	168	221.33 (9.47)	221.26	0.96	0.62	0.10

SD = Standard Deviation. * $p < .05$.

Bold indicates a practical significant difference (effect size $|ES| \geq 0.15$).

Grade 4

Table 19 presents the adjusted means on fall MAP-M for Grade 4 participants and nonparticipants in ELO STEP after controlling for effects of student characteristics and initial differences on pre-program measures. Similar to the analysis of Grade 5 students, the calculated adjusted mean difference (0.84) for all Grade 4 students between the two groups (participants and nonparticipants) was statistically ($p < 0.05$) but not practically ($ES < 0.15$) significant. However, among participants who received ESOL services in

the 2018–2019 school year, a statistically ($p < 0.05$) and practically ($ES = 0.22$) significant difference was observed. These findings indicate that Grade 4 participants who received ESOL services outperformed their nonparticipant peers on fall MAP-M.

When the analyses were disaggregated by focus group, the adjusted mean differences between participants and nonparticipants were practically ($ES \geq 0.15$) significant in only two subgroups: 1) Non-FARMS All Other Student Groups (Monitoring Group) and 2) FARMS Hispanic/Latino. Grade 4 participants in the Monitoring Group, as well as Grade 4 Hispanic/Latino participants who received FARMS services, performed better on fall MAP-M than their nonparticipants peers (Table 19).

Table 19. Adjusted Means of Grade 4 MAP-M RIT Scores for ELO STEP Participants and their Peers

	Means of MAP-M RIT Scores in Fall 2019						ELO STEP Program Effect		
	ELO STEP Participants			Nonparticipants			ELO STEP vs. non-ELO STEP		
	N	Original Mean (SD)	Adjusted Mean	N	Original Mean (SD)	Adjusted Mean	Adjusted Mean Difference	St. Error	Effect Size
All Grade 4 Students	242	210.53 (8.08)	211.47	446	211.06 (8.74)	210.63	0.84*	0.42	0.10
English for Speakers of Other Languages (ESOL) participants	65	209.11 (10.07)	210.11	91	206.83 (6.46)	208.30	1.81*	0.92	0.22
Non-FARMS All Other Student Groups	25	216.80 (10.35)	218.58	74	216.31 (9.80)	216.19	2.39	1.52	0.24
Non-FARMS Black or African American	30	209.47 (7.41)	211.67	40	214.28 (9.30)	212.65	-0.98	1.22	-0.11
Non-FARMS Hispanic/Latino	25	209.56 (6.36)	211.35	40	210.70 (6.67)	210.71	0.64	1.36	0.10
FARMS All Other Student Groups	12	212.50 (6.68)	212.90	39	212.74 (8.89)	212.67	0.23	1.67	0.03
FARMS Black or African American	61	209.15 (8.50)	210.03	79	209.94 (8.65)	209.28	0.75	0.83	0.09
FARMS Hispanic/Latino	89	210.08 (7.19)	209.64	174	208.34 (7.25)	208.33	1.31*	0.66	0.18

SD = Standard Deviation. * $p < .05$.

Bold indicates a practical significant difference (effect size $|ES| \geq 0.15$).

Grade 3

Table 20 shows the adjusted means on fall MAP-M for Grade 3 ELO STEP participants and comparison group after controlling for student characteristics and initial differences on pre-program measures.

The calculated adjusted mean difference (1.67) for all Grade 3 students between these two groups was statistically ($p < 0.05$) and practically ($ES = 0.20$) significant in favor of the ELO STEP group. This result reveals that Grade 3 participants in the ELO STEP program outperformed their peers in the comparison group on fall MAP-M. Among Grade 3 participants who received ESOL services, this adjusted mean difference was not statistically ($p > 0.05$) but practically ($ES = 0.18$) significant, also in favor of the ELO STEP group.

When the analysis was conducted by focus group, the adjusted mean differences were statistically ($p < 0.05$) significant for three subgroups and practically ($ES > 0.15$) significant for all of the six subgroups examined. The differences were positive for five of these six subgroups and negative for Hispanic/Latino students who did not receive FARMS services. Therefore, Grade 3 participants, except for those who were Hispanic/Latino and did not receive FARMS services, performed better on MAP-M than their nonparticipant peers. It is important to note that the adjusted mean difference for Non-FARMS Black or African American students reached a medium effect size ($ES = 0.51$) (Table 20).

Table 20. Adjusted Means of Grade 3 MAP-M RIT Scores for ELO STEP Participants and their Peers

	Means of MAP-M RIT Scores in Fall 2019						ELO STEP Program Effect		
	ELO STEP Participants			Nonparticipants			ELO STEP vs. non-ELO STEP		
	N	Original Mean (SD)	Adjusted Mean	N	Original Mean (SD)	Adjusted Mean	Adjusted Mean Difference	St. Error	Effect Size
All Grade 3 Students	278	200.67 (7.86)	199.98	238	197.53 (9.00)	198.31	1.67**	0.51	0.20
English for Speakers of Other Languages (ESOL) participants	70	197.63 (7.38)	196.70	68	193.78 (8.49)	195.22	1.48	0.99	0.18
Non-FARMS All Other Student Groups	39	205.90 (8.03)	204.90	49	202.86 (9.93)	203.27	1.63	1.41	0.18
Non-FARMS Black or African American	38	202.11 (7.12)	203.10	15	196.80 (7.85)	199.22	3.89**	1.41	0.51
Non-FARMS Hispanic/Latino	31	201.06 (6.96)	200.25	23	201.04 (7.73)	201.60	-1.35	1.40	-0.19
FARMS All Other Student Groups	20	201.15 (5.87)	200.45	23	197.08 (6.84)	198.07	2.38	1.55	0.36
FARMS Black or African American	59	200.32 (8.28)	199.49	37	195.24 (8.58)	197.01	2.48*	1.14	0.28
FARMS Hispanic/Latino	91	197.82 (7.29)	197.17	91	194.98 (8.29)	195.29	1.88*	0.87	0.24

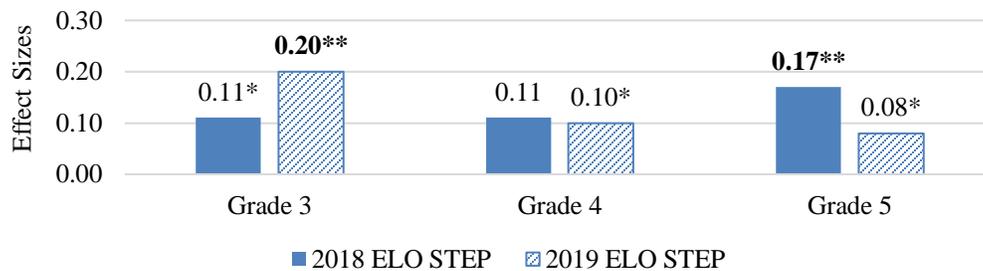
SD = Standard Deviation. * $p < .05$ and ** $p < .01$.

Bold indicates a practical significant difference (effect size $|ES| \geq 0.15$).

Evaluation Question 4. How did the differences in mathematics performance reported in this evaluation differ from the differences reported in the 2018 ELO STEP evaluation?

Figure 8 shows the effect sizes associated with the 2018 and 2019 ELO STEP in mathematics. In the 2018 program, the most benefited student group was fifth graders, whereas in the 2019 ELO STEP, the most benefited group was third graders. In both cases, statistically and practically significant effect sizes were found. Effect sizes for Grade 4 participants did not reach a practical significance level in either year of the program; however, it was statistically significant at the 0.05 level in the 2019 program.

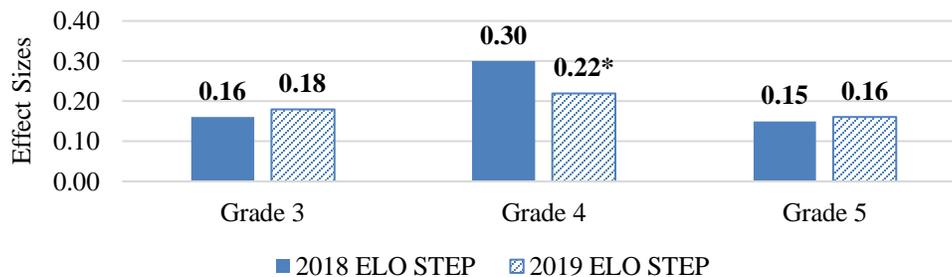
Figure 8. Effect Sizes of Fall MAP-M Scores for ELO STEP Participants in 2018 vs. 2019



Note. **Bold** indicates a practically significant difference. * $p < 0.05$, and ** $p < 0.01$.

According to Figure 9, the effect of ELO STEP has been consistently beneficial for participants receiving ESOL services. Regardless of the year (2018 or 2019), participants who received ESOL services outperformed their nonparticipant peers on fall MAP-M. Also, fall MAP-M in 2018 and 2019 were similar among third and fifth graders participants who received ESOL services; however, among fourth graders, this effect might have been more pronounced in 2018 than in 2019.

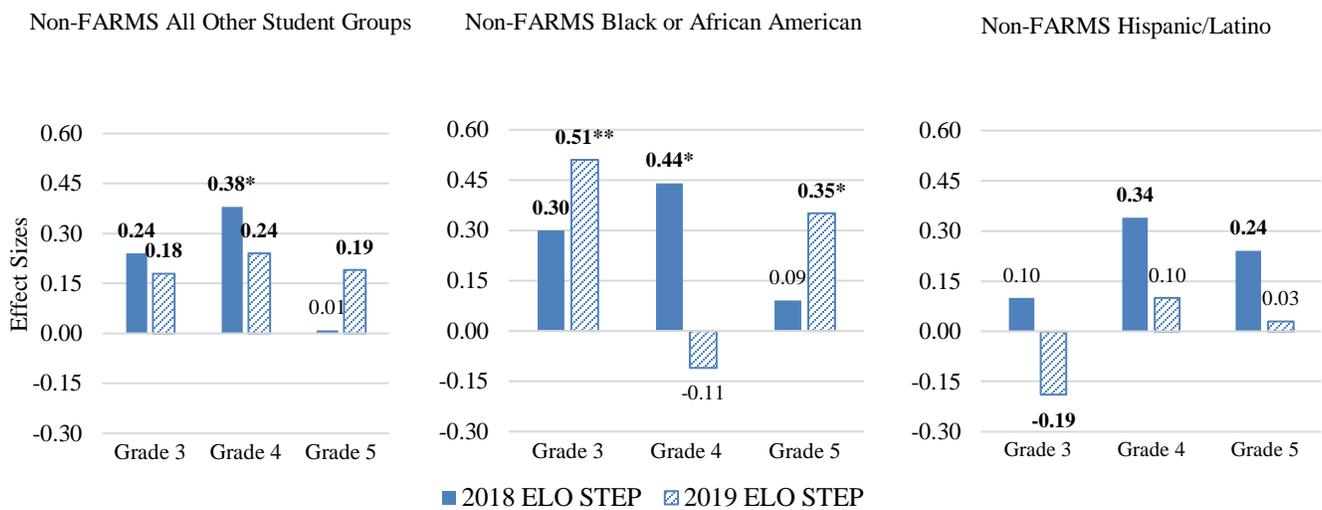
Figure 9. Effect Sizes of Fall MAP-M Scores for ELO STEP Participants who Received ESOL Services in 2018 vs. 2019



Note. **Bold** indicates a practically significant difference. * $p < 0.05$.

Figure 10 shows the effect sizes of fall MAP-M scores for 2018 and 2019 participants in the following focus groups: 1) Non-FARMS All Other Student Groups (Monitoring Group), 2) Non-FARMS Black or African American, and 3) Non-FARMS Hispanic/Latino. Among students in the Monitoring Group, the effect of ELO STEP on mathematics performance was consistent across grade levels in 2019 compared to the 2018 where Grade 5 was not practically significant. Among Non-FARMS Black or African American participants, the effect on math performance in 2019, compared to 2018, was more evident among Grades 3 and 5 students; however, Grade 4 participants has better MAP-M scores in 2018 than in 2019. For Non-FARMS Hispanic/Latino participants, the 2019 ELO STEP might have had no effect on math (or even a negative effect among Grade 3 students) compared to the positive effect on math among Grade 4 and 5 students in 2018.

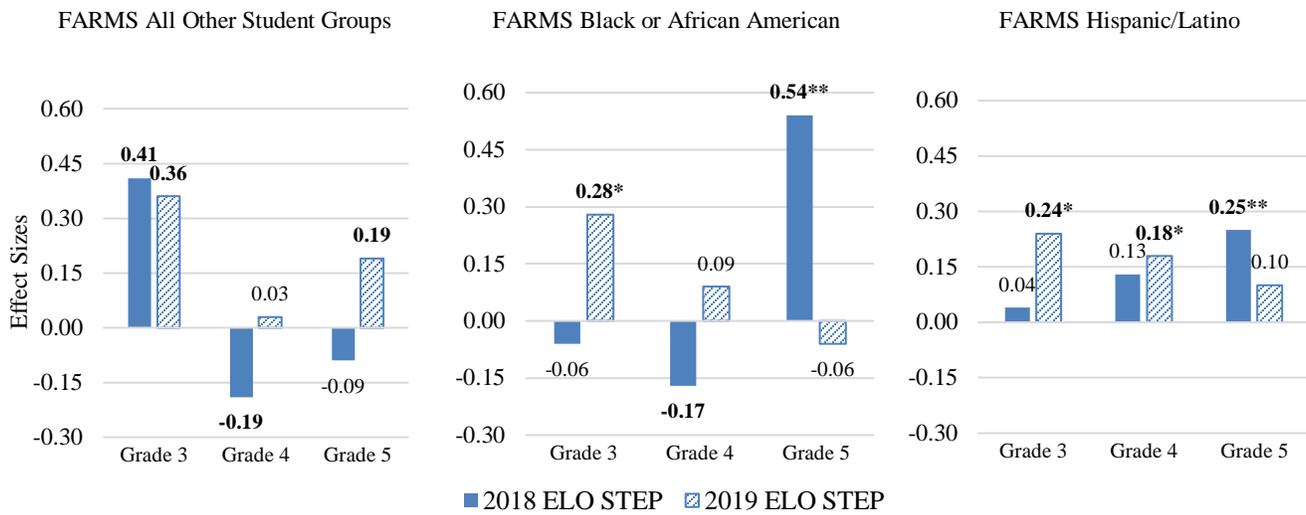
Figure 10. Effect Sizes of Fall MAP-M Scores for ELO STEP Participants in Non-FARMS Focus Groups in 2018 vs. 2019



Note. **Bold** indicates a practically significant difference. * $p < 0.05$, and ** $p < 0.01$.

Figure 11 presents the effect sizes of fall MAP-M scores for 2018 and 2019 participants in the following FARMS focus groups: 1) FARMS All Other Student Groups, 2) FARMS Black or African American, and 3) FARMS Hispanic/Latino. For non-Hispanic/Latino or non-Black or African American participants who received FARMS services, the effect of the program on math in 2019 was evident for third and fifth graders, whereas the effect of the program in 2018 was only observed for third graders (and was even unfavorable among fourth graders). For FARMS Black or African American participants, the effect of the program in 2019 was observed among Grade 3 students, while in 2018, the effect of the program was more evident among Grade 5 participants and detrimental for Grade 4 students. Finally, FARMS Hispanic/Latino students in Grades 3 and 4 were benefited by the program in 2019 compared to 2018. However, in the case of fifth graders, this effect was more evident in 2018 than in 2019.

Figure 11. Effect Sizes of Fall MAP-M Scores for ELO STEP Participants in FARMS Focus Groups in 2018 vs. 2019



Note. **Bold** indicates a practically significant difference. * $p < 0.05$, and ** $p < 0.01$.

Evaluation Question 5. How did students who participated in both 2018 and 2019 ELO STEP perform in mathematics relative to those who were invited to both but did not participate in either year?

Table 21 shows the adjusted means on fall MAP-M for Grade 4 and 5 students (and their comparison group) who participated in both 2018 and 2019, after controlling for effects of student characteristics and initial differences on pre-program measures. The calculated adjusted mean differences for ELO STEP multi-year participants were consistent to the results obtained from the overall analysis of the effect of the program on mathematics performance in 2019 (evaluation question 3). The effect sizes associated with the math scores of all Grade 4 and 5 students were not practically ($ES < 0.15$) significant among those who participated in the program for two consecutive years relative to their peers who did not participate.

However, the effect sizes of fall MAP-M scores were practically ($ES \geq 0.15$) significant for the following subgroups: 1) multi-year Grade 4 and 5 participants who received ESOL services, 2) multi-year Grade 4 participants in the Monitoring Group, and 3) multi-year Grade 4 FARMS Hispanic/Latino participants. Grade 4 and 5 students who participated in both years of the program (2018 and 2019) and who belong to any of these focus groups performed better on MAP-M than their nonparticipant peers. It is important to note that the adjusted mean differences of fall math scores for Grade 5 participants who received ESOL instruction and Grade 4 students in the Monitoring Group almost reached a medium size effect ($ES \geq 0.45$) (Table 21).

Table 21. Adjusted Means of MAP-M RIT Scores for Multiple-year Participants and Nonparticipants (2018 and 2019)

	Means of MAP-M RIT Scores in Fall 2019						ELO STEP Program Effect		
	2018 & 2019 ELO STEP Participants			2018 & 2019 ELO STEP Nonparticipants			ELO STEP vs. non-ELO STEP		
	N	Original Mean (SD)	Adjusted Mean	N	Original Mean (SD)	Adjusted Mean	Adjusted Mean Difference	St. Error	Effect Size
All Grade 5 Students	134	225.06 (9.87)	225.01	194	224.43 (9.47)	224.50	0.51	0.65	0.05
English for Speakers of Other Languages (ESOL) participants	21	224.24 (11.23)	224.33	28	220.64 (8.77)	219.89	4.44*	1.83	0.45
FARMS Black or African American	22	224.86 (9.82)	223.70	28	222.36 (8.81)	223.59	0.11	1.69	0.01
FARMS Hispanic/Latino	58	224.22 (9.21)	224.20	75	223.63 (8.70)	223.32	0.88	1.00	0.10
All Grade 4 Students	119	212.20 (7.52)	213.10	300	212.37 (8.73)	211.97	1.13	0.59	0.13
English for Speakers of Other Languages (ESOL) participants	31	210.68 (9.44)	210.42	55	207.54 (6.73)	208.33	2.09	1.23	0.26
Non-FARMS All Other Student Groups	17	218.35 (11.48)	222.24	53	217.87 (9.78)	217.32	4.92*	2.20	0.49
FARMS Black or African American	27	211.33 (6.04)	211.38	49	211.02 (8.04)	210.70	0.68	1.21	0.09
FARMS Hispanic/Latino	44	211.43 (6.00)	210.94	112	209.65 (7.54)	209.45	1.49	0.85	0.21

SD = Standard Deviation. * $p < .05$.

Bold indicates a practical significant difference (effect size $|ES| \geq 0.15$).

Evaluation Question 6. How did the most benefited student subgroups from the 2018 ELO STEP perform in mathematics in 2019 compared to 2018? Did these overall subgroups from participating schools report an increase in their math performance from 2018 to 2019?

As shown in a previous evaluation question, the most benefited groups by the 2018 ELO STEP were Non-FARMS focus groups: 1) Non-FARMS All Other Student Groups (Monitoring Group), 2) Non-FARMS Black or African American, and 3) Non-FARMS Hispanic/Latino. These groups of students reported at least two positive and practically significant effect sizes of fall 2018 MAP-M across all grade levels. Table 22 shows the Evidence of Learning (EOL) assigned scores in math of these highly benefited groups at the end of the 2018 and 2019 school year at school level. As mentioned in the methodology, these assigned school scores, ranging from 0 up to 4, represent the percentage of the students in those particular focus groups meeting at least two of the three EOL measures.

Among the Monitoring Group, eight of the 22 schools participating in the 2018 ELO STEP reported an increase of one point in their assigned math scores in 2019 relative to 2018, whereas two schools reported

a decrease and eight had no change in their assigned scores during the same period. Among Non-FARMS Black or African American students, nine of the 22 schools that participated in the 2018 ELO STEP received a one point increase in their assigned math scores between 2018 and 2019, whereas one school reported a decrease and 12 reported no change. For Hispanic/Latino students who did not receive FARMS services, 11 of these 22 schools reported a one or even two-point increase in their assigned math scores from 2018 to 2019, while two schools experienced a decrease and nine reported no change (Table 22).

Although these positive changes in the EOL school assigned scores in math of these three student subgroups cannot be exclusively attributed to the ELO STEP program, the number of schools that experienced an increase from 2018 to 2019 were higher than the number of schools that experienced a decrease.

Table 22. EOL Assigned Scores in Math Among the Most Benefited Focus Groups from the 2018 ELO STEP at School Level

Title I School	Monitoring Group			Non-FARMS Black or African American			Non-FARMS Hispanic/Latino		
	2018	2019	Change	2018	2019	Change	2018	2019	Change
Arcola	3	4	+1	2	2	0	2	4	+2
Cresthaven	3	2	-1	1	1	0	2	1	-1
Capt. James E. Daly	4	4	0	3	3	0	2	4	+2
Gaithersburg	2	3	+1	3	3	0	2	3	+1
Georgian Forest	2	3	+1	1	2	+1	1	2	+1
Harmony Hills	2	3	+1	2	2	0	2	2	0
Highland	4	4	0	1	2	+1	2	2	0
Jackson Road	4	4	0	3	4	+1	2	3	+1
Kemp Mill	4	n.a.	--	2	3	+1	1	3	+2
JoAnn Leleck at Broad Acres	n.a.	n.a.	--	2	3	+1	2	3	+1
New Hampshire Estates	n.a.	4	--	3	4	+1	3	3	0
Oak View	4	4	0	4	4	0	3	4	+1
Rolling Terrace	4	3	-1	3	4	+1	3	4	+1
Roscoe R. Nix	2	3	+1	3	4	+1	2	4	+2
Sargent Shriver	3	4	+1	3	3	0	3	3	0
South Lake	3	3	0	2	2	0	2	2	0
Summit Hall	3	n.a.	--	3	3	0	3	3	0
Twinbrook	3	3	0	2	2	0	2	2	0
Washington Grove	3	4	+1	2	3	+1	2	4	+2
Watkins Mill	3	3	0	2	2	0	2	2	0
Weller Road	3	4	+1	3	3	0	3	3	0
Wheaton Woods	3	3	0	4	3	-1	4	3	-1

Notes. n.a. = Data were not available.

Discussion and Conclusion

This evaluation, together with previous evaluations, has demonstrated positive findings in mathematics performance among participants when compared to nonparticipants. The following is a summary of the student groups with program year that showed the most gain in mathematics performance:

- *ESOL Recipients.* Student participants who received ESOL instruction showed positive gains in mathematics for both 2018 and 2019 ELO STEP.
- *FARMS Recipients.* Grade 3 participants who received FARMS services benefited by the 2015 and 2019 ELO STEP, whereas Grade 5 participants who received FARMS services benefited by the 2018 ELO STEP.
- *Hispanic/Latino Participants.* Hispanic/Latino participants in Grades 4 and 5 benefited by the 2018 ELO STEP, whereas Hispanic/Latino participants in Grade 3 benefited by the 2015 ELO STEP.
- *Black or African American Participants.* Black or African American participants in Grade 3 showed positive gains in mathematics for 2015 and 2019 ELO STEP, whereas Black or African American participants in Grade 4 showed positive gains for 2018 and 2019 ELO STEP.

Specific structure and components of the program may have contributed to these positive effects. According to Augustine et al. (2013), an effective summer programs should have: 1) a structured instruction, consistent with state and local content standards that match with students' academic needs, 2) an adequate intensity and duration of instruction, and 3) an academic content supplemented with enrichment activities. The ELO STEP program has provided: 1) a structured instruction primarily focused on math and science, 2) increased hours of instruction (from 4 to 6.5 hours every day across all sites in 2019), and 3) a curriculum with enrichment activities, including coding, technology, and engineering. Additionally, most participants had high attendance and enjoyed the program. Similarly, teacher and parents provided positive feedback regarding the program and its curriculum.

Post-survey ratings compared to pre-survey ratings showed that there was a statistically significant increase in the percentage of Grade 4 and 5 students who agreed with the statements "I like to play games that use numbers" and "I like science a lot." However, it is imperative to discuss some of the negative changes of student perceptions after exposure to the program. Findings showed a statistically significant decrease in the percent of students who agreed with "I am good at working math problems," "I think I could do more difficult science work," and "I like doing science experiments" at the end of the program. Further, more students at the end of the program agreed with "I cannot do science without knowing a lot of math." There could be several explanations for these negative changes in perceptions. For example, it might be attributed to: 1) the exposure to more challenging and advanced math and science activities, or 2) their interaction with their peers in the program. According to Nobre et al. (2019), some cognitive acquisitions that emerge during late childhood (around 8-10 years of age) support the construction of more realistic self-evaluations. Children during this age interval have the cognitive ability to understand what they possess, either positive or negative, and the use of social comparison can render a child's self-perception to be more mature and competent (Nobre et al., 2019).

Additionally, interpretation of these results should exercise caution because the student sample from the surveys (pre and post) were not exactly the same and surveys were not individually matched; responses were analyzed in aggregate. The number of students in the pre-program survey was 428, whereas the number in the post-program survey was 527 (99 students more).

Moreover, according to program staff, suggestions from teachers and student participants requesting, respectively, more planning time and recess might be attributed to the program shift from a half-day program in 2018 to a full-day program in 2019. Similarly, some of the comments provided by teachers and parents regarding better program logistics and communication might be attributed to the fact that administrators for the program vary from year to year.

Finally, the analysis of the effect of ELO STEP has been on mathematics performance using MAP-M. However, it is recommended that other performance measures assessing science or critical thinking skills should be examined in the future since these areas were also provided by the program.

Recommendations

The following recommendations are based on the findings from the formative and outcome analyses.

- Continue using Lego WeDo 2.0 and other engaging science and math related activities. Also, consider adding additional activities to maintain interest throughout the program. Some suggested activities may include: an outdoor component, “Fun Fridays,” and at least one field trip.
- Ensure that the Lego WeDo 2.0 and other activities have adequate allocated time for students to work.
- Consider allocating more recess time for students during the day. Similarly, designate some time during the day for teacher planning.
- Examine ways to increase or improve food options to students and ensure that all students have access to water in all the program sites.
- Ensure that all the materials needed for instruction are complete and delivered to teachers on time. Some teachers pointed out delays in the distribution of the robotics kits or missing parts. Moreover, consider acquiring additional materials to ensure that all participants have access, which will also allow for better interaction, manipulation, and learning by all participants.
- Increase outreach efforts to increase the number of ELO STEP participants; there was a 43%-44% participation rate for the last two years of the program. Further, ensure parents receive invitations, with program dates, for their children far in advance.
- Consider adopting or creating a pre- and post-assessment that measures student performance in science or mastery of relevant skills, such as critical thinking. The incorporation of these additional measures can refine the analysis of the effect of the program and therefore, provide a more accurate calculation.

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Appendix A. 2019 ELO STEP Program Sites and Bell Times

Title I Elementary Schools	ELO STEP Site	Bell Times
Bel Pre	Bel Pre	9:00 - 3:30
Brookhaven	Brookhaven	9:00 - 3:30
Burnt Mills	Burnt Mills	9:00 - 3:30
Clopper Mill	Clopper Mill	9:00 - 3:30
Cresthaven	Cresthaven	9:00 - 3:30
Capt. James E. Daly	Capt. James E. Daly	9:00 - 3:30
Gaithersburg	Gaithersburg	9:00 - 3:30
Georgian Forest	Georgian Forest	9:00 - 3:30
Harmony Hills	Harmony Hills	9:00 - 3:30
Highland	Highland	9:00 - 3:30
Jackson Road	Cannon Road	9:00 - 3:30
Kemp Mill	Kemp Mill	9:00 - 3:30
JoAnn Leleck at Broad Acres	JoAnn Leleck at Broad Acres	9:00 - 3:30
New Hampshire Estates	New Hampshire Estates	9:00 - 3:30
Oak View	Oak View	9:00 - 3:30
Rolling Terrace	Rolling Terrace	9:00 - 3:30
Sargent Shriver	Sargent Shriver	9:00 - 3:30
South Lake	South Lake	9:00 - 3:30
Strathmore	Bel Pre	9:00 - 3:30
Summit Hall	Strawberry Knoll	9:00 - 3:30
Twinbrook	Sargent Shriver	9:00 - 3:30
Washington Grove	Washington Grove	9:00 - 3:30
Watkins Mill	Watkins Mill	9:00 - 3:30
Weller Road	Weller Road	9:00 - 3:30
Wheaton Woods	Wheaton Woods	9:00 - 3:30
Whetstone	Whetstone	9:00 - 3:30

Appendix B. Math Performance of Participants and Nonparticipants Pre-ELO STEP Exposure

Table 23. Mean and Standard Deviation of Spring 2019 MAP-P in Grade 2 for ELO STEP Participants and their Comparison Group

	Participants vs. Nonparticipants	N	Mean	Standard Deviation	Mean Difference	p-value
All Students	Participants	289	213.9	10.0	1.82*	0.03
	Nonparticipants	262	212.1	9.8		
ESOL	Participants	73	211.2	8.3	3.21*	0.04
	Nonparticipants	73	208.0	10.0		
Non-FARMS All Other Student Groups (Monitoring Group)	Participants	40	219.6	11.7	2.53	0.26
	Nonparticipants	53	217.1	9.6		
Non-FARMS Black or African American	Participants	39	215.4	9.2	0.46	0.87
	Nonparticipants	20	214.9	11.5		
Non-FARMS Hispanic/Latino	Participants	32	214.5	7.6	2.09	0.36
	Nonparticipants	27	212.4	9.7		
FARMS All Other Student Groups	Participants	22	214.6	7.1	3.72	0.14
	Nonparticipants	23	210.9	9.5		
FARMS Black or African American	Participants	61	213.5	11.4	2.64	0.24
	Nonparticipants	38	210.9	9.6		
FARMS Hispanic/Latino	Participants	95	210.9	8.8	1.26	0.32
	Nonparticipants	101	209.6	8.9		

* $p < 0.05$.

Table 24. Mean and Standard Deviation of Spring 2019 MAP-M in Grade 3 for ELO STEP Participants and their Comparison Group

	Participants vs. Nonparticipants	N	Mean	Standard Deviation	Mean Difference	p-value
All Students	Participants	252	209.4	7.7	-1.38*	0.04
	Nonparticipants	471	210.8	9.0		
ESOL	Participants	70	207.3	8.5	0.04	0.98
	Nonparticipants	101	207.3	6.6		
Non-FARMS All Other Student Groups (Monitoring Group)	Participants	26	213.2	7.4	-1.52	0.42
	Nonparticipants	81	214.7	10.7		
Non-FARMS Black or African American	Participants	34	209.6	7.7	-4.25*	0.03
	Nonparticipants	42	213.8	8.7		
Non-FARMS Hispanic/Latino	Participants	25	207.0	7.1	-2.73	0.16
	Nonparticipants	42	209.7	7.8		
FARMS All Other Student Groups	Participants	12	211.2	6.3	-0.20	0.95
	Nonparticipants	41	211.4	10.6		
FARMS Black or African American	Participants	63	208.3	9.3	-1.92	0.23
	Nonparticipants	84	210.2	9.7		
FARMS Hispanic/Latino	Participants	92	209.4	6.5	0.74	0.40
	Nonparticipants	181	208.7	6.9		

* $p < 0.05$.

Table 25. Mean and Standard Deviation of Spring 2019 MAP-M in Grade 4 for ELO STEP Participants and their Comparison Group

	Participants vs. Nonparticipants	N	Mean	Standard Deviation	Mean Difference	p-value
All Students	Participants	299	223.5	9.7	-1.30	0.10
	Nonparticipants	475	224.8	11.2		
ESOL	Participants	66	221.1	10.0	0.51	0.77
	Nonparticipants	88	220.6	10.7		
Non-FARMS All Other Student Groups (Monitoring Group)	Participants	39	226.0	10.5	-5.89**	0.01
	Nonparticipants	106	231.8	11.2		
Non-FARMS Black or African American	Participants	35	224.4	9.5	1.63	0.49
	Nonparticipants	34	222.8	10.2		
Non-FARMS Hispanic/Latino	Participants	33	220.5	9.9	-5.38*	0.04
	Nonparticipants	53	225.9	12.1		
FARMS All Other Student Groups	Participants	17	224.6	11.0	1.28	0.66
	Nonparticipants	29	223.3	8.2		
FARMS Black or African American	Participants	59	222.2	9.6	2.51	0.11
	Nonparticipants	76	219.7	8.3		
FARMS Hispanic/Latino	Participants	116	223.7	9.2	0.66	0.58
	Nonparticipants	177	223.0	10.7		

* $p < 0.05$, ** $p < 0.01$.