An Evaluation of Michigan Education Corps Math Corps

ANNUAL EVALUATION REPORT

2023-2024

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MICHIGAN EDUCATION CORPS
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Since 1963, Hope Network has been committed to supporting underserved individuals such as those mental illness, neurological injuries, and developmental disabilities with a recent focus on children through services including literacy intervention, trauma-informed care, and residential treatment. Hope Network serves 240 plus communities, with 2,800 staff members, and more than 23,000 people annually throughout Michigan.

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Table of Contents

Executive Summary

MEC Math Corps is an AmeriCorps program that provides schools with Interventionists (also called tutors or members) to support math development for students in Grades 4 through 8. MEC Math Corps tutors are trained to provide research-based math support and to administer assessment protocols. Tutors are supported by a multi-level coaching model that includes site-based and external coaches. Full-time tutors work with approximately 24 students for 90 minutes each week. Tutoring is provided through standard-protocol interventions and is supplemental to the core math instruction provided at each school. The ultimate goal of MEC Math Corps is to accelerate individual students' math skill growth so that they are on track to meet or exceed state math proficiency standards.

The MEC Math Corps evaluation addresses these broad questions with data collected during the 2023-24 school year.

1. What is the scope of the MEC Math Corps program?

Thirty-two MEC Math Corps tutors served a total of 795 students across 26 schools. More females than males participated in MEC Math Corps, and White was the largest student racial/ethnic category.

2. To what extent was the MEC Math Corps program implemented as intended?

MEC Math Corps coaches observed tutors delivering interventions throughout the school year. These observations allow for coaches to build on the tutor's formal training and to help tutors improve their implementation of the MEC Math Corps model. The results of the observations show interventions were conducted with high levels of mean fidelity (>95% accuracy) and in accordance with their established evidence base.

On average, students received 65 minutes of tutoring per week across 18 weeks. Tutor absence was the most common reason for missed tutoring sessions followed by student absence.

3. To what extent did participating students improve their math skills?

Tutors administer the Mathway assessment – a program developed measure of student whole and rational number understanding and algebraic reasoning – to identify eligible students and track student progress during intervention. Tutors also administer a multi-skill math fluency assessment that includes basic addition, subtraction, multiplication, and division math facts.

Results from Mathway show 86% of students demonstrated growth in their math skills, indicating an increase in their likelihood of meeting grade-level benchmarks. 75% of students made growth on the Fact Fluency measure.

When asked in a survey about the impact of the program on students, the majority of tutor, Internal Coach, Administrator, and Classroom Teacher respondents indicated participation in MEC Math Corps had a positive impact on students.

4. How did serving as an MEC Tutor impact their skills and knowledge related to education and their future career goals?

Of tutor respondents to an end-of-year survey 100% indicated MEC service had a positive impact on them personally, and that their service increased their knowledge and skills related to education. Additionally, 67% answered that they are likely or very likely to pursue a career in education as a result of their service. These results indicate MEC Math Corps likely makes a noteworthy contribution to the education career pipeline in the communities where tutors serve.

5. MEC will work with participating schools to include aggregate program data in the school improvement planning process and applicable data sets.

Of those Administrators who responded, 88% indicated that MEC Math Corps was in their MICIP plan, and 12% indicated MEC Math Corps was not in their MICIP plan. Of those Internal Coaches who responded, 42% indicated yes, 16% indicated no, 37% indicated they did not know, and 5% indicated not applicable. While we pleased that a significant percentage of administrators reported positively to this, we note there are still some that are not including MEC in the MICIP plans. Further, there is a growth opportunity for ensuring Internal Coaches are informed participants in the MICIP process and/or what is included in MICIP plans.

6. MEC will work with participating schools to include MEC program data in the school's multi-tiered system of supports (MTSS) implementation and monitoring data sets; and,
7. MEC program staff will work with school districts, intermediate school districts, and MDE staff to refine the role of the MEC program within overall MTSS processes.

End-of-year survey results indicate the following:

Question 1: My site uses MEC Math Corps data to inform and monitor our multi-tier system of supports (MTSS) implementation for numeracy/math.
Of Administrators, 88% strongly agreed or agreed with this statement, 6% indicated they disagreed, and 6% indicated no opinion.

Of Teachers 66% strongly agreed or agreed with this statement, and 33% indicated no opinion.

Of Internal Coaches who responded, 52% strongly agreed or agreed with this statement, 16% indicated they disagreed, and 32% indicated no opinion.

Question 2: MEC Math Corps is integrated into our MTSS at my site.
Of Administrators, 82% strongly agreed or agreed with this statement, 6% indicated they disagreed, 6% Indicated they strongly disagreed, and 6% indicated no opinion.

Of Teachers, 83% strongly agreed or agreed with this statement, and 17% indicated no opinion.

Internal Coaches who responded, 72% strongly agreed or agreed with this statement, 5% disagreed, and 21% indicated no opinion.

There are numerous touchpoints with multiple stakeholders throughout the year including progress reports to Principals/Administrators, in-person staff visits 1-2x month, onsite tutor evaluation, etc.

MEC will provide a statement of work, which includes a timeline of the project, and budget summary, and a budget detail for progress monitoring and continuous improvement of program implementation.

This information was provided to Kellie Flaminio, Department Analyst/Early Literacy Grant Coordinator, Office of Educational Supports, on September 8, 2023.

MEC will provide trainings for newly identified schools as the programs expand.

Please see Appendix C for MEC Math Corps Trainings for all participating schools.

Introduction

MEC Math Corps Overview

MEC Math Corps is an AmeriCorps program that provides schools with Tutors who serve as AmeriCorps members providing Tier 2 math intervention for students in grades 4-8. MEC Math Corps Tutors are trained to provide research-based math support and to administer assessments.

The MEC Math Corps model aligns with Response-to-Intervention (RTI) or Multi-Tier System of Supports (MTSS), which are two descriptions of a framework for delivering educational services effectively and efficiently.[1] The key alignment features are:

- Data-driven decisions with reliable and valid screener assessments to identify students who are at-risk for poor math outcomes
- Evidence-based interventions
- Formative assessment
- High quality training in program procedures, coaching, and observations to support fidelity of implementation

In an MTSS framework, data are used for screening students for program need, and monitoring student progress toward achieving academic goals. Eligible students (defined as students below state proficiency expectations) are determined potential candidates to receive supplemental MEC Math Corps support, which is often referred to as Tier 2 support.

MEC Math Corps is focused on improving student skills in foundational math content areas focusing on numbers, numerical operations, and algebra—skills identified by the National Mathematics Advisory Panel (2008) as essential to overall math success. Tutoring is provided through standard-protocol interventions and is complementary to the core math instruction provided at each school. The ultimate goal of tutoring is to raise individual students' math skills so that they are on track to meet or exceed state math proficiency standards.

[1] Burns et al., 2016

Overview of the Evaluation

The MEC Math Corps evaluation addresses several broad questions. The evaluation report is organized around each of these questions using data that are collected throughout the school year and are recorded by MEC Math Corps. Program administrators collect data about tutors and schools, including survey responses. Tutors collect data about student dosage and math outcomes. Coaches collect specific details about Tutor implementation of interventions. These data are used to answer the following questions:

1. What is the scope of the MEC Math Corps program?
2. To what extent was the MEC Math Corps program implemented as intended?
3. To what extent did participating students improve their math skills?
4. How did serving as a tutor impact their skills and knowledge related to education and their future career goals?
5. MEC will work with participating schools to include MEC program data in the school's multi-tiered system of supports (MTSS) implementation and monitoring data sets.
6. MEC program staff will work with school districts, intermediate school districts, and MDE staff to refine the role of the MEC program within overall MTSS processes.
7. MEC will provide a statement of work, which includes a timeline of the project, a budget summary, and a budget detail for progress monitoring and continuous improvement of program implementation.
8. MEC will provide trainings for newly identified schools as the programs expand.

1. What is the scope of the MEC Math Corps program?

Schools and Tutors

MEC Math Corps partners with schools and districts to implement the program. MEC Math Corps program staff and participating schools recruit community members to serve as MEC Math Corps Tutors through AmeriCorps. Tutors commit to serving a set number of hours per week (e.g., full-time AmeriCorps members complete 1,200 hours of service). Tutors receive a living allowance, benefits, and on-going coaching by a school Internal Coach and an MEC Coaching Specialist throughout their service term. Upon completion of service, members receive a Segal AmeriCorps Education Award that can be used to pay education costs at qualified institutions of higher education, for educational training, to repay qualified student loans, or assist with other expenses associated with post-secondary education.

Table 1 shows the number of participating schools, Coaching Specialists, and Tutors that served during the 2023-24 program year.

Table 1. Schools, Coaches, and Tutors

Schools	Coaching Specialists	Tutors*
26	2	32

**Defined as having entered tutoring minutes for at least one student in the MEC Math Corps data management system.*

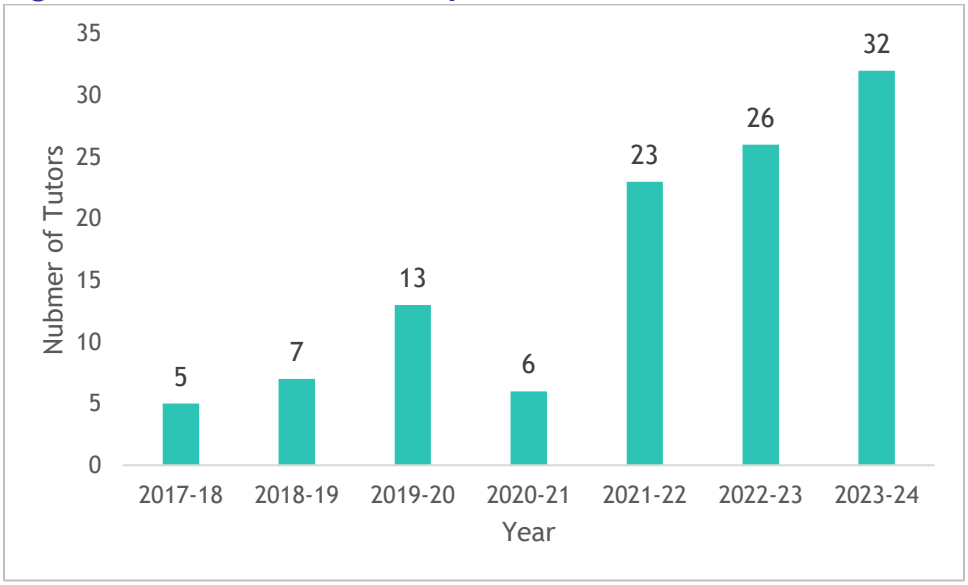
MEC Math Corps tutors receive training through an online Learning Management System (LMS). The intensive, information-filled courses on the LMS provide foundational training in the research-based math interventions employed by MEC Math Corps. Throughout the courses, tutors learn the skills, knowledge, and tools needed to serve as math interventionists. Tutors are provided a detailed program manual and online resources that mirror and supplement the contents of the manual (e.g., videos of model interventions and best practices). Both the manual and online resources are intended to provide tutors with just-in-time support and opportunities for continued professional development and skill refinement. Additional training is provided throughout the tutors' service term.

In addition to extensive training, MEC Math Corps provides tutors with multiple layers of supervision to ensure integrity of program implementation. Schools identity a staff member to serve as an Internal Coach, who is typically a math specialist, or Title I Teacher, to serve as immediate on-site supervisor, mentor, and advocate for tutors. The Internal Coach's role is to monitor tutors and provide guidance in the implementation of MEC Math Corps's assessments and interventions. As the site supervisor, the Internal Coach is a critical component of the supervisory structure.

MEC Coaching Specialists provide both tutors and Internal Coaches with expert support on math instruction and ensure implementation integrity of MEC Math Corps program elements. In addition to these two coaching layers, a third layer

of MEC AmeriCorps Program support provides administrative oversight for program implementation to schools participating in MEC Math Corps. The number of Tutors serving varies by program year based on a number of factors including tutor recruitment, Tutor types (i.e. full-time or part-time tutors), school interest, tutor retention, and available public and private funding. Figure 1 displays the number of Tutors who served each year of the program.

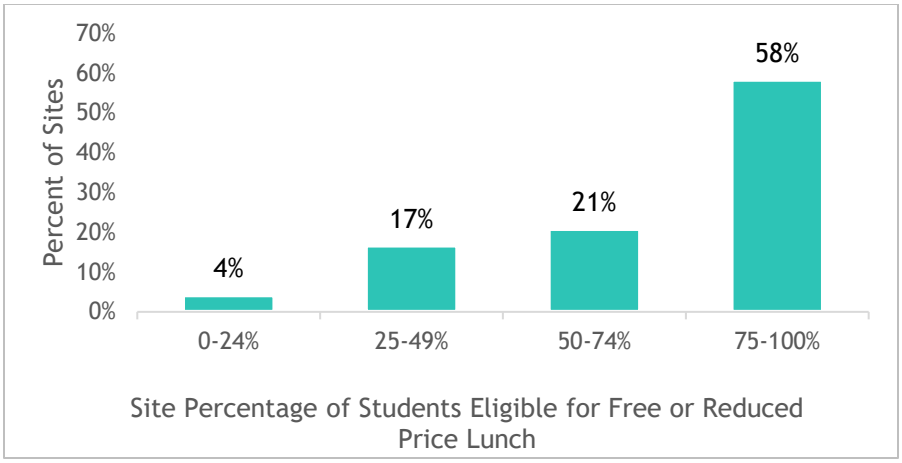
Figure 1. Number of Tutors by Year



School Characteristics

MEC Math Corps strives to serve students and schools that would benefit the most from Tier 2 math intervention. The percentage of students at the school who are eligible for the federal free and reduced-price lunch (FRPL) can be a useful indicator. Students from families with incomes at or below 185 percent of the Federal poverty level are eligible for free or reduced-price meals. Figure 2 shows the distribution of MEC Math Corps schools based on the school FRPL percentage. The majority of the students at 79% of participating schools are eligible for FRPL indicating most tutors served in schools where access to resources may be somewhat limited.

Figure 2. Schools by Student Eligibility for Free/Reduced Price-Lunch Program



Students Tutored

Students are identified as good candidates for MEC Math Corps participation through a two-step process. First, teachers or other school staff recommend students for MEC Math Corps based on student data/academic performance or previous MEC service. Second, MEC Math Corps tutors administer a benchmark assessment to recommended students. Students who score below benchmark targets that are linked to future academic success are eligible to receive MEC Math Corps tutoring (see Appendix A for more information on the benchmark targets).

The MEC Math Corps tutor works with their Internal Coach to select which students will be served, called the tutor's "caseload." Coaches set the caseload based on the school's schedule, other services for eligible students, and the tutor's service term commitment. Full-time tutors aim to serve 24 or more students at a time while part-time tutors serve 12 students. Interventions are delivered to two or three students at a time, with a goal of three students per group to maximize the number of students who receive intervention.

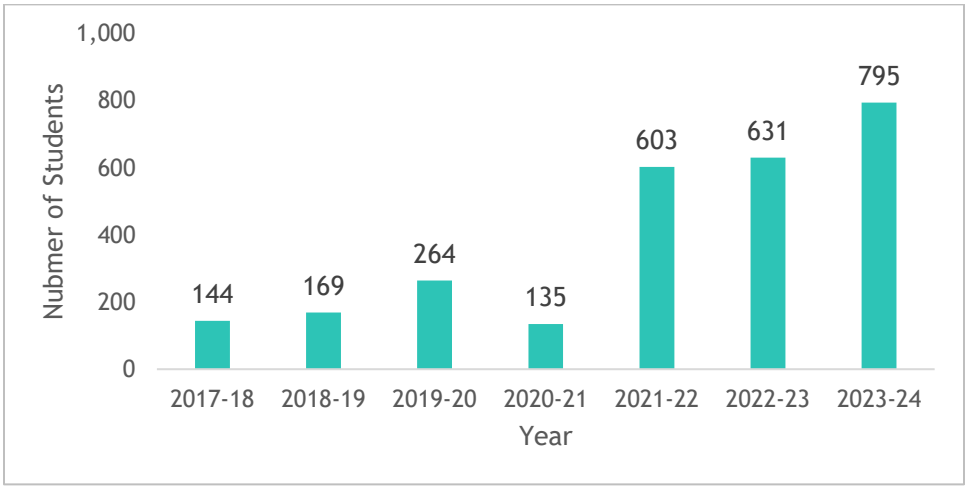
Table 2 displays the number of students served by grade across all schools. Most tutors were placed in elementary schools, leading to fourth and fifth grade having the greatest number of students served.

Table 2. Number of Students Tutored

Grade	Number of Students
Fourth	329
Fifth	282
Sixth	97
Seventh	58
Eighth	29
Total	**795**

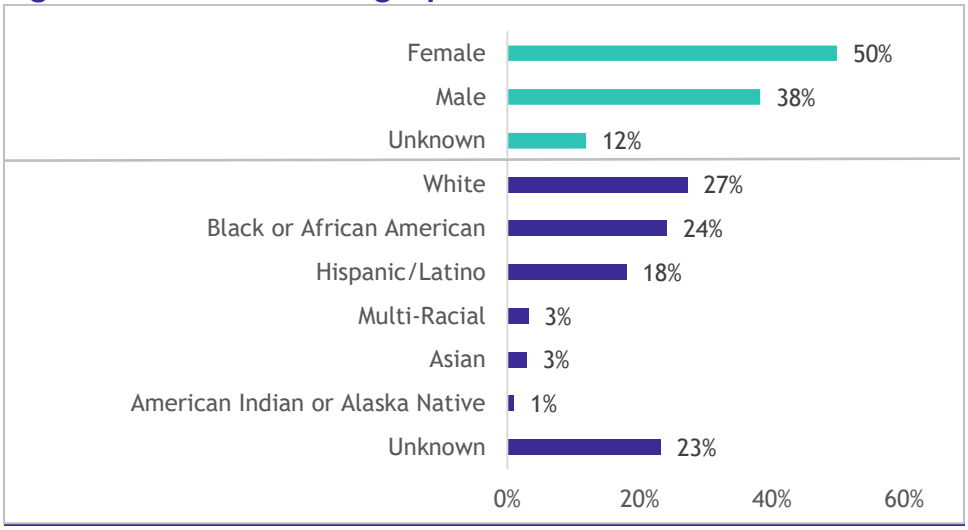
The number of students served varies by program year based on many factors including tutor recruitment and retention, tutor service terms (i.e. full-time or part-time), whether students are receiving intervention in pairs or groups of three, and the frequency of students exiting/graduating from the program. Figure 3 displays the number of students who were tutored each year of the program. Note the number of students served in 2019-20, 2020-21, and 2021-22 were significantly impacted by the COVID-19 pandemic.

Figure 3. Number of Students Tutored by Year



MEC Math Corps tutors record demographic information of students they tutor, which allows evaluators to disaggregate student outputs and outcomes by important demographics to ensure the program is having an equitable impact. The information is also used in various reports to describe the students participating in the program. Figure 4 shows more female than male students participated in the program, and White was the largest student racial/ethnic group.

Figure 4. Student Demographics



2. To what extent was the MEC Math Corps program implemented as intended?

Coaching Observations

Ensuring accurate, effective implementation is a core principle of MEC Math Corps. Both types of coaches—Internal Coaches and Coaching Specialists— provide tutors with expert support on math instruction and ensure implementation integrity of MEC Math Corps program elements through ongoing monitoring and observation.

During coaching sessions, MEC Math Corps Coaching Specialists and Internal Coaches discuss student selection for service, student progress data, and observe tutors delivering interventions. The observations allow coaches to build on a tutor's formal training and to help tutors improve their implementation of the MEC Math Corps model. Coaches are expected to observe tutors delivering interventions at least every other month to ensure fidelity to the interventions effective instructional processes.

Table 3 displays the percent of Coaching Specialists and Internal Coaches who observed tutors delivering interventions at least one time during the school year. The table also shows the percentage of coaches who met the program's expectation for observations throughout the school year. Most tutors received consistent observation support from their Coaching Specialist, while Internal Coaches provided less frequent observations for many tutors.

Table 3. Intervention Coaching Observations by Coach Role

Coaching Specialist		Internal Coach	
Percent of Tutors Observed at Least Once	**Percent of Tutors Observed in Accordance with Expectations***	**Percent of Tutors Observed at Least Once**	**Percent of Tutors Observed in Accordance with Expectations***
100%	72%	79%	38%

Note: Table includes tutors that served for a minimum of two months.
**Coaches are expected to conduct intervention observations at least once every other month.*

Tutor Fidelity

During coaching sessions, coaches complete a fidelity checklist for each intervention they observe. The checklist includes essential steps for accurate administration, e.g., lesson introduction and modeling problem completion.

After completing an observation, coaches enter the number of checklist items that the tutor delivered correctly into the online MEC Math Corps Data Management System (MCDMS). The percent fidelity is then calculated by dividing the number of items delivered correctly by the total number of items.

Table 4 displays the total number of fidelity checks completed and the average intervention fidelity.

Table 4. Intervention Fidelity

Total Checks Collected	Average Fidelity
190	96.8%

For each tutor, all observations are combined to calculate their overall intervention fidelity. A tutor's average fidelity can vary throughout the year, with lower scores being more common at the beginning of the year. Figure 5 shows the distribution of tutors by their average fidelity. Of tutors, only 7% had an average fidelity at 90% or less, suggesting they may benefit from additional training and coaching to ensure they accurately implement key program interventions.

Figure 5. Distribution of Tutors by Intervention Fidelity Range

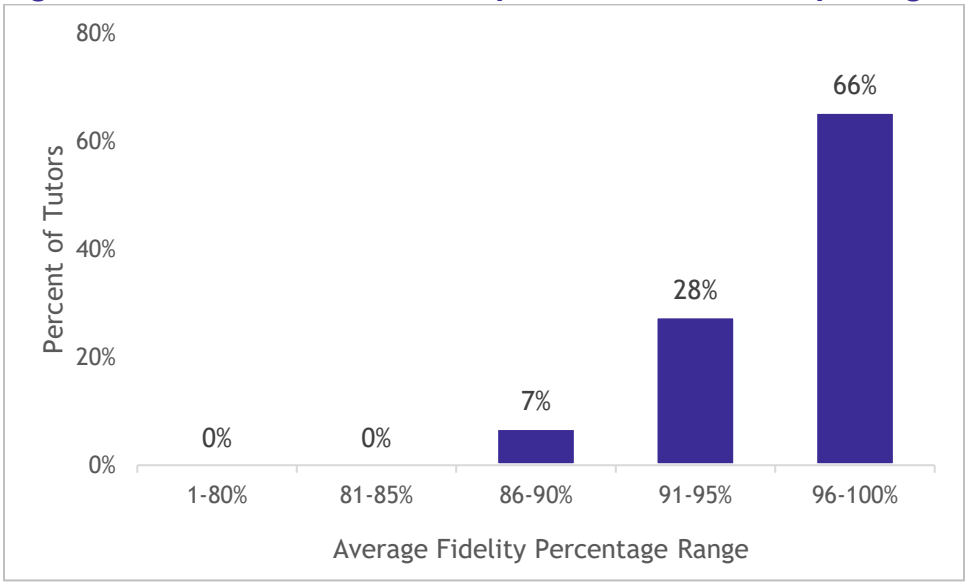
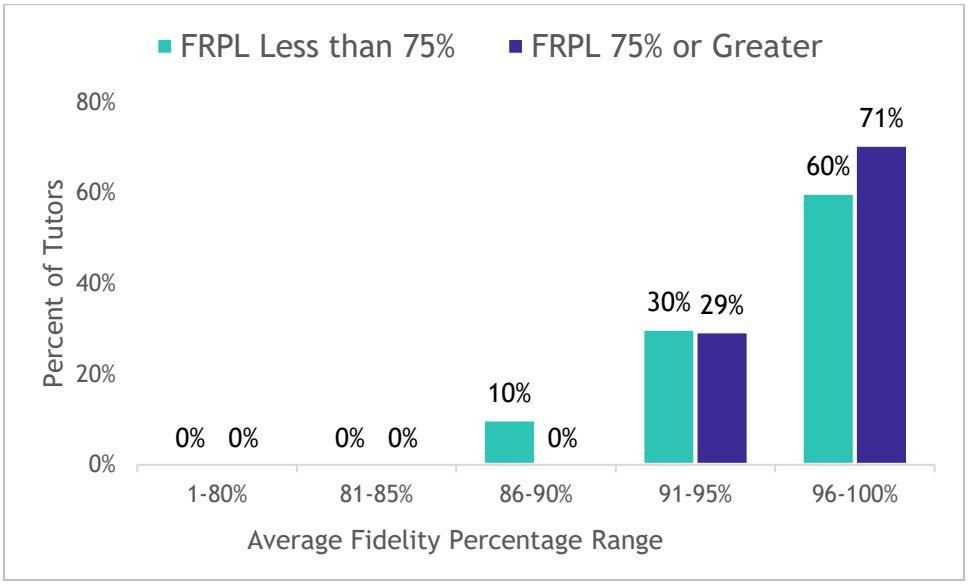


Figure 6 shows the distribution of tutors by their intervention average fidelity with data disaggregated among Tutors at schools where less than 75% of students are eligible for FRPL and tutors at schools with 75% or more students eligible. The intervention fidelity data is lower at schools with a high percentage of students eligible for FRPL, indicating tutors at these schools may need greater support delivering tutoring interventions in this context.

Figure 6. Tutor Fidelity by Percentage of Students Eligible for FRPL



Tutor Caseloads

Tutors and coaches determine which students are served based on student eligibility, other available intervention services, teacher recommendation, and local data. Table 5 shows the average number of students served per tutor based on the minimum caseload expectation. The last column shows the percentage of tutors who met or exceeded their caseload expectations for at least 80% of the weeks they served in the program. All tutors with a caseload goal of 12 students met this while 81% of tutors with a caseload goal of 24 students met this 80% of the time.

Table 5. Tutor Caseloads

Minimum Caseload Expectation	Number of Tutors	Average Total Students Served per Tutor	Percentage of Tutors Meeting Caseload Expectation
12 students	16	17.9	100%
24 students	16	32.2	81%

Student Dosage

Tutors strive to serve each student for 90 minutes per week. Tutors record each student's daily minutes in the online MCDMS. Table 6 shows the total number of tutoring sessions, and the average number of sessions, weeks, and minutes per week students received in each grade. The table also disaggregates data for white and non-white students. Students received a substantial number of tutoring sessions, averaging 65 minutes per week across 18 weeks. White students averaged more weeks of tutoring and minutes per week compared to non-white students.

Table 6. Tutoring Dosage by Grade and Race

Student Race	Students Tutored	Total Tutoring Sessions	Average Tutoring Sessions per Student	Average Tutoring Weeks per Student	Average Tutoring Minutes per Week per Student
Grade 4	**329**	**12,551**	**38.1**	**17.7**	**64.7**
White	84	4,562	54.3	22.9	67.8
Non-White	185	6,750	36.5	17.4	63.4
Grade 5	**282**	**10,343**	**36.7**	**18.5**	**64.8**
White	73	3,395	46.5	21.7	66.2
Non-White	172	6,269	36.4	18.8	64.4
Grade 6	**97**	**1,951**	**20.1**	**10.7**	**64.8**
White	33	318	9.6	5.6	67.3
Non-White	45	1,218	27.1	13.2	62.3
Grade 7	**58**	**2,342**	**40.4**	**22.4**	**72.2**
White	8	236	29.5	17.6	72.7
Non-White	24	924	38.5	19.2	66.9
Grade 8	**29**	**967**	**33.3**	**18.5**	**65.0**
White	8	143	17.9	11.5	68.6
Non-White	20	792	39.6	21.0	64.5
Total	**795**	**28,154**	**35.4**	**17.5**	**65.4**
White	206	8,654	42.0	19.0	67.4
Non-White	446	15,953	35.8	17.8	64.0

Note: The subtotals do not equal the totals as the totals include students with an Unknown race/ethnicity in the program database.

In addition to tutoring minutes, tutors also record the reason a scheduled tutoring session was not delivered. Tutors indicate if a missed session for the following reasons: student absence from school, tutor absence from school, tutor receiving training, tutor administering an assessment to the student instead of delivering an intervention, or other for any reason not provided. Table 7 displays the percentage of days tutoring sessions were delivered along with the rate of each missed tutoring session reason. The table also disaggregates the data for white and non-white students. Tutor absences and "other" were the most common reasons for missed sessions. White students had a greater percentage of sessions delivered than non-white students with non-white students more likely to miss sessions for student absences and "other" reasons.

Table 7. Tutoring Attendance by Grade and Race

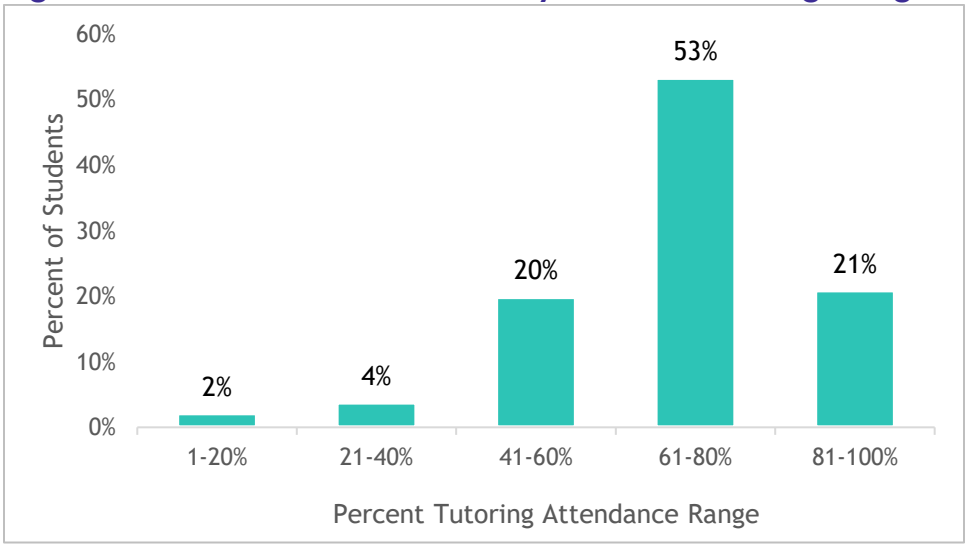
Student Race	Session Attended	Tutor Absent	Student Absent	Assessing Student	Tutor Training	Other
Grade 4	**69%**	**10%**	**9%**	**2%**	**1%**	**10%**
White	73%	11%	6%	2%	0%	8%
Non-White	66%	8%	11%	2%	1%	11%
Grade 5	**70%**	**9%**	**8%**	**3%**	**1%**	**9%**

White	71%	11%	6%	2%	0%	8%
Non-White	70%	8%	9%	3%	1%	9%
Grade 6	**64%**	**19%**	**7%**	**2%**	**0%**	**7%**
White	69%	25%	2%	0%	0%	4%
Non-White	61%	16%	11%	2%	1%	9%
Grade 7	**74%**	**7%**	**8%**	**4%**	**0%**	**6%**
White	76%	8%	5%	2%	0%	9%
Non-White	72%	2%	12%	4%	0%	9%
Grade 8	**63%**	**4%**	**19%**	**4%**	**0%**	**11%**
White	63%	3%	23%	2%	0%	9%
Non-White	63%	4%	18%	5%	0%	11%
Total	**69%**	**10%**	**9%**	**3%**	**1%**	**9%**
White	72%	13%	6%	2%	0%	8%
Non-White	67%	8%	11%	3%	1%	10%

Math Corps tracks tutoring attendance for each student throughout the school year using a 'percent tutoring' metric. A student's percent tutoring is equal to the number of tutoring sessions delivered divided by the number of days tutoring was scheduled to happen (i.e. the metric ignores days there is not school). The program also tracks a tutor's percent tutoring by combining all of their individual student's percent tutoring into a tutor average.

The program strives for each student and tutor to achieve at least 80% tutoring. Tutors falling below this target are provided extra support to improve the frequency of tutoring delivery wherever possible. Figure 7 displays the distribution of students by their percent tutoring range. Of participating students, 26% received tutoring less than 60% of their scheduled days indicating a growth opportunity for the program.

Figure 7. Distribution of Students by Percent Tutoring Range



Lesson Completion

MEC Math Corps delivers intervention by instructional lessons, which vary in number from 20 in eighth grade to 39 in sixth grade. Each lesson focuses on a particular skill, e.g., multiplication concepts & strategies. Intervention content builds across the lessons, e.g., addition lessons come before multiplication lessons). See Appendix B for the MEC Math Corps lesson research base.

Students receiving MEC Math Corps are required to demonstrate mastery of intervention lessons defined as 85% correct on a brief informal assessment of lesson content—before advancing to the next lesson. Progression through lessons is essential for students to reach mastery of each concept. Table 8 displays the average number of lessons students completed in each grade and the average number of weeks students spent on each lesson. Seventh grade students completed the most lessons while fifth and sixth grade students completed the fewest lessons. Overall, many students completed less than half the lessons, indicating a growth area for the program.

Table 8. Lessons Completed per Student

Grade	Average Lessons Completed	Average Weeks per Lesson
Grade 4	10.3	2.2
Grade 5	9.1	2.6
Grade 6	9.1	2.6
Grade 7	13.0	1.9
Grade 8	10.9	2.1
Total	**10.0**	**2.3**

3. To what extent did participating students improve their math skills?

Measures of Math Skills

Tutors administer a program developed assessment called Mathway to participating students during three seasonal benchmark windows. The assessment content aligns with state and national curricular standards related to whole and rational number understanding as well as algebraic reasoning. Mathway is specific to each grade and consists of 23 to 34 items that increase in difficulty. The web-based assessment provides information on overall student performance for evaluation and can be disaggregated by intervention units for intervention decision-making.

Tutors also administer a fact fluency assessment in conjunction with

Mathway. This one-minute multi-skill probe includes basic addition, subtraction, multiplication, and division math facts. Students who score below the fact fluency benchmark of 30 problems correct per minute receive math fact practice during at least one tutoring session each week. See Appendix A for details on assessment procedures and research base.

Student Performance on Mathway

Table 9 displays Mathway assessment data for participating students who received 6 or more weeks of Math Corps tutoring. Overall, 86% of students demonstrated growth in their math skills, indicating an increase in their likelihood of meeting grade-level benchmarks. The last column shows 43% of students improved their Mathway performance by at least 20 percentage points, which is associated with as much or more than a 2x increase in their odds of meeting grade-level benchmarks.

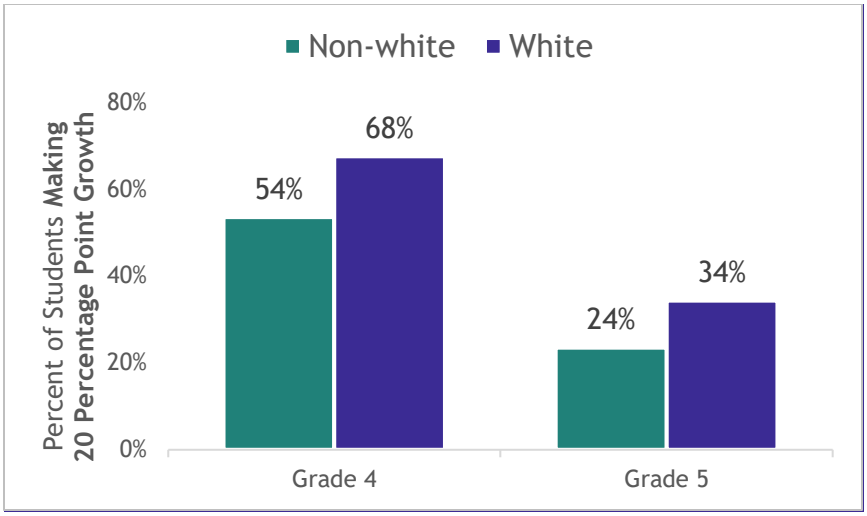
Table 9. Mathway Growth for Participating Students

Grade	Number of Students with Two Benchmarks	Average Growth (Standard Deviation)	Percentage Making Growth	Percentage Making 20 Percentage Point Growth
Grade 4	278	7.3 (5.9)	88.8%	54.7%
Grade 5	223	4.6 (5.7)	81.2%	26.5%
Grade 6	53	4.7 (4.4)	83.0%	54.7%
Grade 7	55	5.1 (5.2)	83.6%	40.0%
Grade 8	23	7.7 (4.5)	100.0%	52.2%
Total	**632**	**6.0 (5.7)**	**85.6%**	**43.4%**

Note: Includes students with at least two Mathway scores and 6 or more weeks of tutoring.

Figure 8 disaggregates the percentage of students making at least 20 percentage point growth into non-white and white students in order to better understand program impact across key demographic considerations. Across both grades, a greater percentage of white students achieved 20 percentage point growth compared to non-white students. The differences between the two groups ranged from 10 percentage points to 12 percentage points. Causal comparison studies of Math Corps demonstrate that the program consistently accelerates growth beyond what students experience without the program (Codding et al., 2022; Parker et al., 2019). Figure 8 highlights a need to ensure students *across* demographic backgrounds consistently benefit to the greatest possible extent.

Figure 8. Percentage of Students Improving Mathway Performance by at least 20 Percentage Points, by Race



Note: Grades 6, 7 and 8 are not included due to small sample sizes for disaggregated results.

Student Performance on Fact Fluency

MEC Math Corps tutors administer a one-minute fact fluency assessment to track student progress on basic math fact skills and determine if students should receive fact fluency support during tutoring. Table 10 displays the average fact fluency score collected before tutoring begins and the final score of the program year. The average student in four of the five grade levels served increased performance on the fact fluency assessment. Grade 8 students made the most growth with 91% of students increasing their score with an average growth of 6.5 items correct.

Table 10. Fact Fluency Average Growth

Grade	Number of Students with Two Scores	Average Initial Score	Average Final Score	Average Growth	Percent Making Growth
Grade 4	270	6.6	11.1	4.5	73.0%
Grade 5	219	9.5	15.2	5.6	76.7%
Grade 6	50	8.6	11.8	3.2	68.0%
Grade 7	53	9.7	14.0	4.3	75.5%
Grade 8	22	12.3	18.8	6.5	90.9%
Total	**614**	**8.3**	**13.1**	**4.8**	**74.8%**

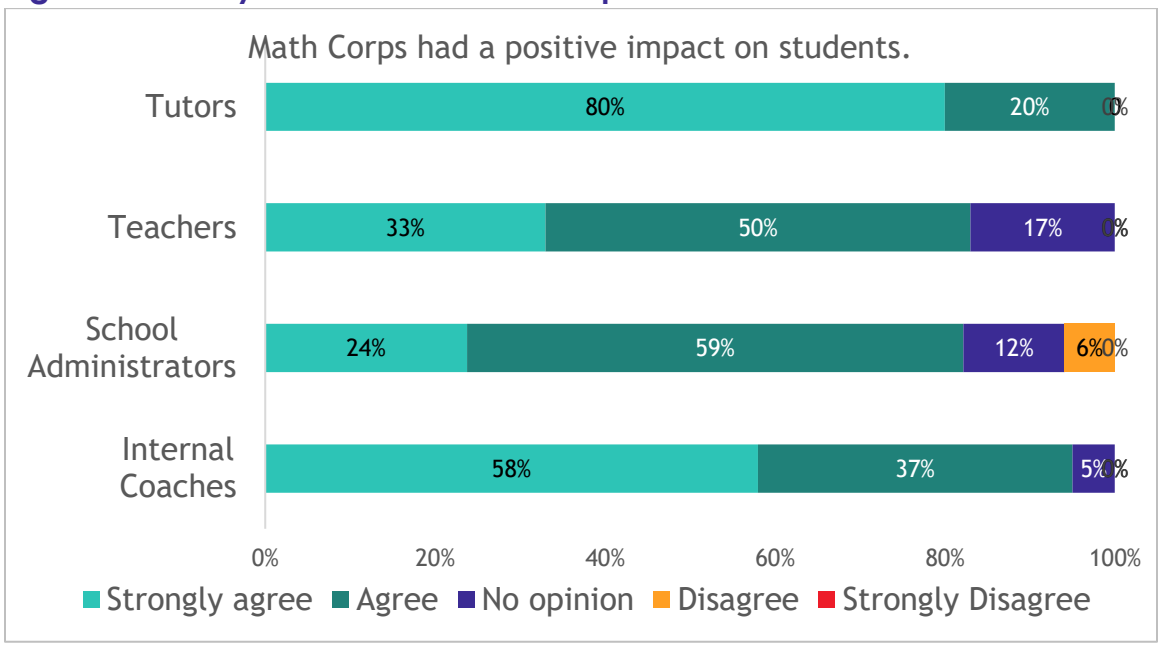
Note: Includes students with at least two fact fluency scores and 6 or more weeks of tutoring.

Perceptions of Student Performance

In the spring of each program year, MEC Math Corps evaluators distribute an online survey to tutors, Internal Coaches, school administrators, and classroom teachers of students participating in MEC Math Corps. The survey asks a wide-range of questions regarding experiences with MEC Math Corps and potential impact of the program. Figure 9 displays the percentage of respondents who agreed or disagreed that MEC Math Corps had a positive

impact on students. The majority of all roles agreed or strongly agreed Math Corps had a positive impact on students, with tutors being the most likely to respond that they strongly agree.

Figure 9. Survey Results on Student Impact



Note: Coaches, administrators, and teachers were asked to agree or disagree with the statement "Participation in MEC Math Corps had a positive impact on students" while tutors were asked "My service had a positive impact on students."

4. How did serving as a tutor impact their skills and knowledge related to education and their future career goals?

While supporting student math development in students is the primary goal for the program, MEC Math Corps also strives to provide tutors with an overall positive experience, and prepare them for any future career they might pursue, especially careers in the education field. MEC Math Corps evaluators distribute a survey to tutors in the spring of each program year. The survey asks tutors a series of questions on their experience in MEC Math Corps and the impact the program had on them, their students, and their school. Survey results are used to evaluate the program's impact on the tutors themselves.

Service Experience

A common practice in surveys is to ask the respondent if they would recommend the program to others, as one's willingness or unwillingness to recommend encompasses the overall experience of serving in MEC Math Corps. Figure 10 shows that 93% of tutors would recommend serving as a member of Math Corps, with over half of the respondents indicating they would definitely recommend the program. These results suggest tutors had a positive experience while serving in Math Corps.

The survey also asked tutors if serving in Math Corps had a positive impact on them personally. Figure 11 shows that 100% of tutors agree or strongly agree service had a positive impact on them, demonstrating the positive personal impact of serving.

Figure 10. MEC Tutor Satisfaction

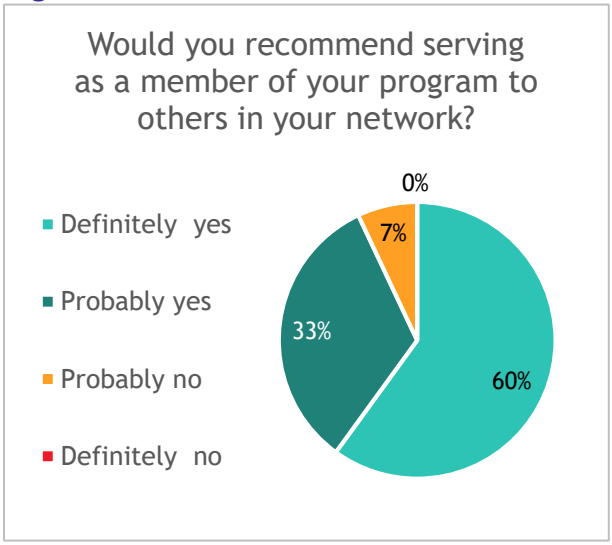
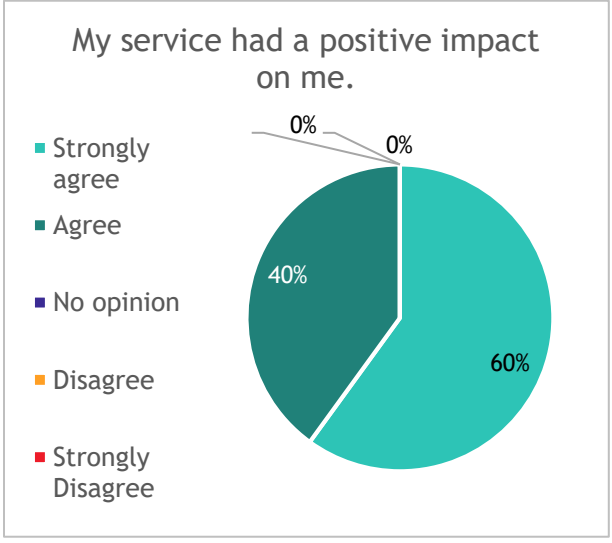


Figure 11. Impact on MEC



Skill Development and Future Careers

MEC Math Corps strives to support tutor professional development through the training, coaching, service experience, and other professional development support provided by the program. Specifically, MEC Math Corps aims to increase the teacher and school staff pipeline in communities through our tutors pursuing careers in education after their service. To evaluate these outcomes in the short term, the spring survey asks tutors to respond to questions related to their increased knowledge and skills as well as plans to pursue a career in education.

Figure 12 shows that 100% of respondents agree or strongly agree that their service increased their knowledge and skills related to education, demonstrating the program is having a positive impact on tutors in this area. Figure 13 displays tutor responses related to the likelihood they will pursue a career in education as a result of their service in Math Corps. Of respondents, 47% answered that they are very likely to pursue a career in education as a result of their service and 20% responded that they are likely to do so. These results indicate Math Corps likely makes a noteworthy contribution to the education career pipeline in the communities where tutors serve.

Figure 12. MEC Tutor Increased Knowledge and Skills

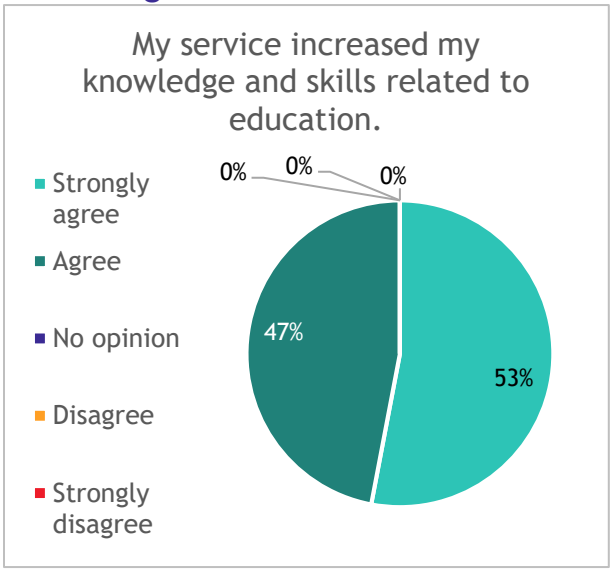
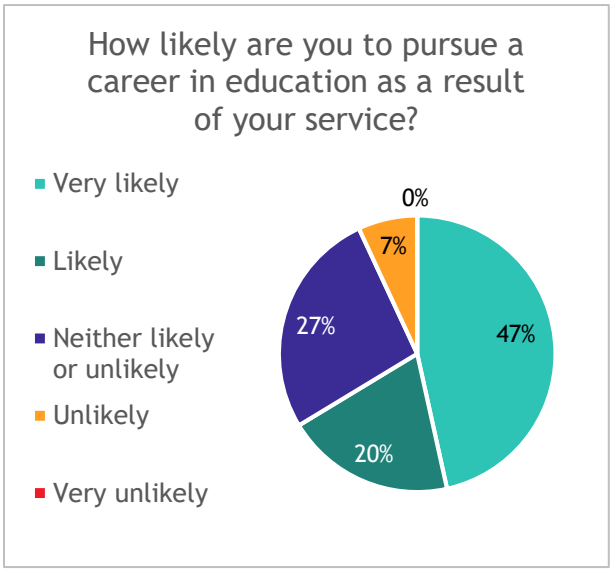


Figure 13. MEC Tutors Pursuing Careers in Education



5. MEC will work with participating schools to include aggregate program data in the school improvement planning process and applicable data sets.

This is evaluated through an end-of-year survey asking this question specifically of Administrators and Internal Coaches*: Is MEC Math Corps in your MICIP plan for 2023-2024?* Respondents answer on a Likert scale of Strongly Agree, Agree, No Opinion, Disagree or Strongly Disagree. Of those Administrators who responded, 88% indicated that MEC Math Corps was in their MICIP plan, and 12% indicated MEC Math Corps was not in their MICIP plan. Of those Internal Coaches who responded, 42% indicated yes, 16% indicated no, 37% indicated they did not know, and 5% indicated not applicable. While we pleased that a significant percentage of administrators reported positively to this, we note there are still some that are not including MEC in the MICIP plans. Further, there is a growth opportunity for ensuring Internal Coaches are informed participants in the MICIP process and/or what is part of MICIP plans.

MEC staff have worked closely with a variety of stakeholders to develop specific guidance for schools on how to include MEC Math Corps in the MICIP process and School Improvement Plans. These stakeholders included ISD School Improvement Consultants, the Michigan Department of Education, and building administrators. Guidance is provided to every school and updated regularly. MEC will continue to revise and share guidance with participating schools to support MEC Math Corps documentation in partner schools' MICIP plans and processes.

6 & 7. MEC will work with participating schools to include MEC program data in the school's multi-tiered system of supports (MTSS) implementation and monitoring data sets; and, MEC program staff will work with school districts, intermediate school districts, and MDE staff to refine the role of

the MEC program within overall MTSS processes.

To respond to these, MEC used survey results and the number of opportunities MEC staff had meetings or discussions with stakeholders specific to the role of MEC within overall MTSS processes.

Survey Results
The most direct assessment of this outcome is through the annual survey. The annual survey is sent electronically to all school Principals/Administrators, Internal Coaches, and Classroom Teachers who have students who participated in MEC Math Corps. The survey includes specific statements asking the degree to which these stakeholders agree MEC Math Corps is an integral part of the school's MTSS. Responses are on a Likert scale of Strongly Disagree, Disagree, No Opinion, Agree or Strongly Agree.

Question 1: My site uses MEC Math Corps data to inform and monitor our multi-tier system of supports (MTSS) implementation for numeracy/math.
Of Administrators, 88% strongly agreed or agreed with this statement, 6% indicated they disagreed, and 6% indicated no opinion.

Of Teachers 66% strongly agreed or agreed with this statement, and 33% indicated no opinion.

Of Internal Coaches who responded, 52% strongly agreed or agreed with this statement, 16% indicated they disagreed, and 32% indicated no opinion.

Question 2: MEC Math Corps is integrated into our MTSS at my site.
Of Administrators, 82% strongly agreed or agreed with this statement, 6% indicated they disagreed, 6% Indicated they strongly disagreed, and 6% indicated no opinion.

Of Teachers, 83% strongly agreed or agreed with this statement, and 17% indicated no opinion.

Internal Coaches who responded, 72% strongly agreed or agreed with this statement, 5% disagreed, and 21% indicated no opinion.

We are pleased to see that over half of Administrators, Internal Coaches, and Teachers are aligned in their responses, and that sites are using data for making decisions within their MTSS math frameworks, and that MEC Math Corps is integrated into math MTSS frameworks. We are concerned with responses indicating no opinion or disagreement. This may be due to a lack of common language or shared understanding for implementing MTSS, i.e., do our sites have the same understanding and definitions of MTSS as with which MEC Math Corps operates? Further, are all staff involved in MEC

Math Corps also involved in MTSS at their sites? One would assume yes; but, it is possible for "siloes" to develop – even unintentionally - and there is not collaboration and communication across stakeholders. MEC staff will need to continue working with partner sites to ensure there is clear, shared understanding on what a comprehensive definition of MTSS implementation fully entails in which data use is a necessary, but not sufficient for full MTSS implementation. Successful student outcomes in MEC Math Corps as a tier 2 intervention is integral to how well a school's MTSS framework and resource allocation supports all students (tier 1) and students who need intensive supports (tier 3).

Coaching Sessions & Other Touchpoints

There are numerous touchpoints with multiple stakeholders throughout the program year. The individuals involved vary based on the purpose for the meeting; however, the majority of conversations center on student outcomes, MEC Math Corps fidelity, and integrating MEC Math Corps to supplement core curricula. For example, Coaching Specialists and Internal Coaches meet with MEC Interventionists monthly to review each progress-monitoring graph for students receiving intervention. They identify strengths and concerns, analyze the reasons for success or lack thereof, develop a plan (may include maintaining the intervention, making an intervention change, or adding an additional intervention), discuss fidelity data, and determine a timeline for next steps. This process is referred to as problem solving. Further, coaches discuss the impact of core math instruction on all students and how students are selected as needing MEC Math Corps tier 2 support. Coaches also discuss factors impacting MEC Math Corps student progress such as attendance and behavior, which may require different, additional intervention.

MEC program staff provide summary progress reports with in-person meetings specifically targeted to school Principals/Administrators to engage them in program effectiveness within their MTSS math frameworks in the fall and winter. The reports include program outcomes including Internal Coach involvement, and a SMART goal set in the fall by Coaching Specialists and Internal Coaches for on-going strengthening of program implementation. Most goals focus on increasing fidelity checks and dosage.

All MEC staff have regularly scheduled, in-person visits to schools occurring multiple times throughout the school year. As a result, there is usually an MEC staff person at the school site at least 1-2 times per month in addition to the MEC Math Corps Coaching Specialist. Depending on the purpose of the visit, staff connect with the Administrator, the Internal Coach, and Tutors. They often observe tutoring.

All tutors are required to have a mid-year evaluation conducted by an AmeriCorps Program Director or Program Coordinator. This person not only collects detailed survey information from Internal Coaches and Tutors, but also has a lengthy in-person site visit to review the information and discuss any concerns. Tutors also participate in in-person "huddles" with peers and MEC program staff 2-3 times per year.

MEC staff are frequently asked to present to administrative teams, ISDs, School Boards, etc. who are not current partners but are interested in implementing MEC programs. It is emphasized that MEC Math Corps is a tier 2 supplement intervention most effective for students whose math skills are just below grade level. MEC Math Corps programming

meets the definition of an evidence-based intervention.[2] By starting the conversation of partnership with schools early and emphasizing what MEC Math Corps does and does not do (e.g., doesn't supplant core instruction, is not intensive, tier 3 intervention), we significantly increase the likelihood of fidelity and effective integration of MEC Math Corps into MTSS math frameworks.

8. MEC will provide a statement of work, which includes a timeline of the project, and budget summary, and a budget detail for progress monitoring and continuous improvement of program implementation.

This information was provided to Kellie Flaminio, Department Analyst/Early Literacy Grant Coordinator, Office of Educational Supports, on September 8, 2023.

MEC will provide trainings for newly identified schools as the programs expand.

Please see Appendix C for MEC Math Corps Trainings for all participating schools.

[2] E.g., www.proventutoring.org. Contact Holly Windram for specific research studies demonstrating both efficacy and effectiveness of MEC Math Corps for diverse populations of learners in diverse settings: hwindram@hopenetwork.org

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Burns, K.M., Jimerson, S.R. VanDerHeyden, A. M., & Deno, S.L., (2016). Toward a unified Response-to-Intervention model: Multi-tiered systems of support. In S.R. Jimerson, M.K.

Burns, & A. VanDerHeyden (Eds.), *Handbook of Response to Intervention, 2nd Ed.* (pp. 719-732). New York: Springer.

Codding, R. Nelson, P. M., Parker, D. C., Edmunds, R., & Klaft, J. (2022). Evaluation of a math tutoring program implemented with community support: A systematic replication & extension. *Journal of School Psychology*.

The National Mathematics Advisory Panel. (2008). Reports of the task groups and Subcommittees. Washington, DC: U.S. Department of Education

Parker, D. C., Nelson, P. M., Zaslofsky, A., Foegen, A., Kaiser, P., Kanive, R, & Heistad, D. (2019). Evaluation of a Math Intervention Program Implemented with Community Support. *Journal of Research on Educational Effectiveness.*

Appendix A: Assessment Procedures and Research Base

Math Corps uses two assessments to track student progress throughout the year – Mathway and Fact Fluency. Mathway is a web-based assessment with content that aligns with state and national curricular standards related to whole and rational number understanding as well as algebraic reasoning. Mathway is specific to each grade and consists of 23 to 34 items that increase in difficulty. The assessment is predictive of student performance on nationally adopted achievement tests and evidence supports its use as a tool for determining Math Corps eligibility and when tutoring can be removed.

Student progress on math facts is assessed using multi-skill Fact Fluency assessments that include basic addition, subtraction, multiplication, and division math facts. The Fact Fluency assessments are short duration, timed tests; students are given one minute to work through problems. Tutors score the Fact Fluency assessments by determining the total number of problems correct within the one-minute time limit and compare the number correct to the Math Corps benchmark of 30 problems correct in one minute.

Mathway and Fact Fluency Administration Schedule

Fall Aug. 14-Sept. 29	Winter Jan. 2-Feb. 2	Spring Apr. 22-May 24
Benchmark All Students	Progress Check Active Students	Benchmark All Students

Selection of Research for Mathway Assessment

- Hall, G.J. & Nelson, P.M. (2022). Mathway: A formative assessment tool for Math Corps. *National Science and Service Collaborative*.

Selection of Research for Fact Fluency Assessment

- Foegen, A. (2000). Technical adequacy of general outcome measures for middle school mathematics. Diagnostique, 25, 175–203.
- Foegen, A., & Deno, S. L. (2001). Identifying growth indicators for low-achieving students in middle school mathematics. Journal of Special Education, 35, 4–16.

Appendix B: Intervention Research Base

MEC Math Corps delivers intervention in the form of instructional lessons, which vary in number from 20 in eighth grade to 39 in sixth grade. Lessons use one of several intervention components to improve targeted subskills required to work effectively with whole and rational numbers. The first component includes conceptual-based instruction using the Concrete, Representational, Abstract (CRA) approach. The second component focuses on procedural accuracy and includes direct instruction followed by supervised practice with Cover, Copy, and Compare (CCC). The third component uses Cognitive Strategy Instruction (CSI) to support development of the skill for word problem solving.

Intervention components were applied in a sequence for each skill. For example, in 5th grade students first receive CRA to better develop the conceptual basis for adding and subtracting fractions with dissimilar denominators; then receive CCC to become efficient at accurately applying the corresponding computational strategies; and then receive CSI to be able to solve word problems involving fractions with unlike denominators. Students are required to demonstrate mastery—defined as 85% correct on a brief informal assessment of intervention content—before advancing among the intervention components. Students also receive short duration fact fluency practice using Explicit Timing weekly to improve the use and selection of efficient strategies that students already know to encourage automaticity.

For each intervention component sources of empirical evidence for intervention effectiveness are listed below.

Selection of Research in Support of Conceptual-Based Intervention

- Agrawal, J., & Morin, L. L. (2016). Evidence-based practices: Applications of concrete representational abstract framework across math concepts for students with mathematics disabilities. Learning Disabilities Research & Practice, 31(1), 34-44.
- Witzel, B. S., Mercer, C. D., & Miller, M. D. (2003). Teaching algebra to students with learning difficulties: An investigation of an explicit instruction model. Learning Disabilities Research & Practice, 18(2), 121-131.
- Flores, M. M. (2010). Using the concrete-representational-abstract sequence to teach subtraction with regrouping to students at risk for failure. Remedial and Special Education, 31(3), 195-207.
- Gersten, R., Beckmann, S., Clarke, B., Foegen, A., Marsh, L., Star, J. R., & Witzel, B. (2009). Assisting Students Struggling with Mathematics: Response to Intervention (RtI) for Elementary and Middle Schools. NCEE 2009-4060. What Works Clearinghouse.
- Carbonneau, K. J., Marley, S. C., & Selig, J. P. (2013). A meta-analysis of the efficacy of teaching mathematics with concrete manipulatives. Journal of Educational Psychology, 105(2), 380.

Selection of Research in Support of Cover, Copy, Compare

- Skinner, C. H., Turco, T. L., Beatty, K. L., & Rasavage, C. (1989). Cover, copy, and compare: A method for increasing multiplication performance. School Psychology Review.
- Poncy, B. C., Skinner, C. H., & Jaspers, K. E. (2007). Evaluating and comparing interventions designed to enhance math fact accuracy and fluency: Cover, copy, and compare versus taped problems. Journal of Behavioral Education, 16(1), 27-37.
- Codding, R. S., Eckert, T. L., Fanning, E., Shiyko, M., & Solomon, E. (2007). Comparing mathematics interventions: The effects of cover-copy-compare alone and combined with performance feedback on digits correct and incorrect. Journal of Behavioral Education, 16(2), 125-141.
- Skinner, C. H., McLaughlin, T. F., & Logan, P. (1997). Cover, copy, and compare: A self-managed academic intervention effective across skills, students, and settings. Journal of Behavioral Education, 7(3), 295-306.
- Stocker Jr, J. D., & Kubina Jr, R. M. (2017). Impact of Cover, Copy, and Compare on fluency outcomes for students with disabilities and math deficits: A review of the literature. Preventing School Failure: Alternative Education for Children and Youth, 61(1), 56-68.
- Gersten, R., Beckmann, S., Clarke, B., Foegen, A., Marsh, L., Star, J. R., & Witzel, B. (2009). Assisting Students Struggling NCEE 2009with Mathematics: Response to Intervention (RtI) for Elementary and Middle Schools. -4060. What Works Clearinghouse.

Selection of Research in Support of Cognitive Strategy Instruction

- Montague, M. (1997). Cognitive strategy instruction in mathematics for students with learning disabilities. Journal of learning disabilities, 30(2), 164-177.
- Hutchinson, N. L. (1993). Effects of cognitive strategy instruction on algebra problem solving of adolescents with learning disabilities. Learning Disability Quarterly, 16(1), 34-63.
- Montague, M., & Dietz, S. (2009). Evaluating the evidence base for cognitive strategy instruction and mathematical problem solving. Exceptional Children, 75(3), 285-302.
- Gersten, R., Beckmann, S., Clarke, B., Foegen, A., Marsh, L., Star, J. R., & Witzel, B. (2009). Assisting Students Struggling with Mathematics: Response to Intervention (RtI) for Elementary and Middle Schools. NCEE 2009-4060. What Works Clearinghouse.
- Carr, Martha, Gita Taasoobshirazi, Rena Stroud, and James M. Royer. "Combined fluency and cognitive strategies instruction improves mathematics achievement in early elementary school." Contemporary Educational Psychology36, no. 4 (2011): 323-333.

Selection of Research in Support of Fact Fluency Practice

- Nelson, P. M., Burns, M. K., Kanive, R., & Ysseldyke, J. E. (2013). Comparison of a math fact rehearsal and a mnemonic strategy approach for improving math fact fluency. Journal of School Psychology, 51(6), 659-667.
- Nelson, P. M., Parker, D. C., & Zaslofsky, A. (2016). The relative value of growth in math fact skills across late elementary and middle school. Assessment for Effective Intervention, 41, 184-192.
- Van Houten, R., & Thomas, C. (1976). The effects of explicit timing on math performance. Journal of Applied Behavior Analysis.

Appendix C: MEC Math Corps Training and Internal Coach Empower Hour

Date	MEC Math Corps	
	Cohort 1	
8/14/23	AC Training/SKO/LMS Modules	Zoom/LMS
8/15/23	Zoom/LMS Modules/in-person social gathering	Zoom/LMS/Radisson Hotel Lansing
8/16/23	In-person practice day	Radisson Hotel Lansing
8/17/23	Zoom/ LMS Modules	Zoom/LMS
8/18/23	Zoom/ LMS Modules	Zoom/LMS
8/21/23	Zoom/LMS/Corps Day	Zoom / LMS
8/22/23	Members report to school	School Site
	Cohort 2	
8/28/23	AC Training/SKO/LMS Modules	Zoom/LMS
8/29/23	Zoom/LMS Modules/in-person social gathering	Zoom/LMS/Radisson Hotel Lansing
8/30/23	In-person practice day	Radisson Hotel Lansing
8/31/23	Zoom/ LMS Modules	Zoom/LMS
9/1/23	Zoom/ LMS Modules	Zoom/LMS
9/5/23	Zoom/LMS/Corps Day	Zoom / LMS
9/6/23	Members report to school	School Site
	Cohort 3	
10/23/23	AC Training/SKO/LMS Modules	Zoom/LMS
10/24/23	Zoom/LMS Modules	Zoom/LMS
10/25/23	In-person practice day	Radisson Hotel Lansing
10/26/23	Zoom/ LMS Modules	Zoom/LMS
10/27/23	Zoom/LMS/Corps Day	Zoom/LMS
10/30/23	Members report to school	School Site
	Cohort 4	All Virtual
1/15/24	AC Training/SKO/LMS Modules	Zoom/LMS
1/16/24	Zoom/LMS Modules	Zoom/LMS
1/17/24	Zoom/LMS Modules	Zoom/LMS
1/18/24	Virtual Practice Day	Zoom
1/19/24	Zoom/LMS/Corps Day	Zoom/LMS
1/22/24	Members report to school	School Site

MICHIGAN EDUCATION CORPS

Empower Hour Monthly Call Calendar

Date	Time	Topic(s)*
August 16th and 30th	9:00 AM - 11:00 AM	MEC Kick-off Training and program year expectations
September 20, 2023	7:45 AM – 8:45 AM 3:00 PM - 4:00 PM	Assessment data, intervention selection, teacher buy-in
October 18, 2023	7:45 AM – 8:45 AM 3:00 PM - 4:00 PM	Member support and monthly observations
November 14, 2023** (MEMBERS JOIN CALL)	7:45 AM – 8:45 AM 3:00 PM - 4:00 PM	Looking at data and student growth; barriers
December 2023	NO MEETING	NO MEETING
January 17, 2024	7:45 AM – 8:45 AM 3:00 PM - 4:00 PM	Looking at fidelity and fit
February 21, 2024	7:45 AM – 8:45 AM 3:00 PM - 4:00 PM	Program Alignment
March 20, 2024	7:45 AM – 8:45 AM (only option)	Remaining Diligent
April 2024	NO MEETING	NO MEETING
May 15, 2024 (MEMBERS JOIN CALL)	7:45 AM – 8:45 AM 3:00 PM - 4:00 PM	EOY Wrap-Up

*Topics subject to change

**November call will occur on Tuesday, November 14 due to many schools closed on Wednesday, November 15