

eMINTS Comprehensive Program

Intervention Report | Teacher Excellence Topic Area

WHAT WORKS CLEARINGHOUSE™

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Research has shown that teacher effectiveness is the most important school-based factor that influences student outcomes, including student achievement. Studies have also shown that there is substantial variation in teacher effectiveness to improve student outcomes.¹ The strong influence of teachers on student outcomes, as well as the variation in teacher effectiveness, has led to the creation of programs designed to help teachers improve their effectiveness in the classroom. The *eMINTS Comprehensive Program* aims to help teachers improve their practice and the outcomes of their students by offering structured professional development, coaching, and support for integrating technology into the classroom. The program’s goals include supporting teachers in using classroom technology to implement

high-quality, inquiry-based learning, in which students develop understanding and knowledge of content matter by engaging in meaningful investigations that require reasoning, judgement, and decision making. The intervention can provide support to teachers in any subject area, including math, literacy, and science.²

This What Works Clearinghouse (WWC) report, part of the WWC’s Teacher Excellence topic area, explores the effects of the *eMINTS Comprehensive Program*, referred to as *eMINTS* in this report, on student achievement. The WWC identified eight studies of *eMINTS*. Two of these studies meet WWC standards. The evidence presented in this report is from two studies of the impact of *eMINTS* on students in grades 4, 5, 7, and 8.

What Happens to Students When Their Teachers Participate in *eMINTS*?³

The evidence indicates that implementing *eMINTS*:

- May increase general mathematics achievement
- May result in little or no change in general literacy achievement

Findings on *eMINTS* from two studies that meet WWC standards are shown in Table 1. The table reports an

effectiveness rating, the improvement index, and the number of studies and students that contribute to the findings. The improvement index is a measure of the intervention’s effect on an outcome. It can be interpreted as the expected change in percentile rank for an average comparison group student if that student had been placed in the classroom of an *eMINTS* teacher.

Table 1. Summary of findings on *eMINTS* from studies that meet WWC standards

Outcome domain	Effectiveness rating	Study Findings	Evidence meeting WWC standards (version 4.0)	
		Improvement index (percentile points)	Number of studies	Number of students
General mathematics achievement	Potentially positive effects	+2	2	3,096
General literacy achievement	No discernible effects	0	2	3,245

Note: The improvement index can be interpreted as the expected change in percentile rank for an average comparison group student if that student had received the intervention. For example, an improvement index of +2 means that the expected percentile rank of the average comparison group student would increase by 2 points if the student were placed in an *eMINTS* classroom. The improvement index values are generated by averaging findings from the outcome analyses that meet WWC standards, as reported by Brandt et al. (2013) and Martin et al. (2009). A positive improvement index does not necessarily mean the estimated effect is statistically significant. General mathematics and literacy achievement outcomes reported in these studies are scores from the Missouri Assessment Program standardized tests in each subject. The effects of *eMINTS* are not known for other outcomes within the Teacher Excellence topic area protocol, including general science achievement, general social studies achievement, general achievement, English language proficiency, staying in school, progression in school, completing school, student social interaction, observed individual behavior, student emotional status, student engagement in school, instructional practice, teacher attendance, teacher retention at the school, teacher retention in the school district, teacher retention in the state, or teacher retention in the profession.

BOX 1. HOW THE WWC REVIEWS AND DESCRIBES EVIDENCE

The WWC evaluates evidence based on the quality and results of reviewed studies. The criteria the WWC uses for evaluating evidence are defined in the [Procedures and Standards Handbooks](#) and the [Review Protocols](#). The studies summarized in this report were reviewed under WWC Standards (version 4.0) and the Teacher Excellence topic area protocol (version 4.0).

To determine the effectiveness rating, the WWC considers what methods each study used, the direction of the effects, and the number of studies that tested the intervention. The higher the effectiveness rating, the more certain the WWC is about the reported results and about what will happen if the same intervention is implemented again. The following key explains the relationship between effectiveness ratings and the statements used in this report:

Effectiveness Rating	Rating interpretation	Description of the evidence
Positive (or negative) effects	The intervention is <i>likely</i> to change an outcome	Strong evidence of a positive effect, with no overriding contrary evidence
Potentially positive (or negative) effects	The intervention <i>may</i> change an outcome	Evidence of a positive effect with no overriding contrary evidence
No discernible effects	The intervention <i>may result in little to no change</i> in an outcome	No affirmative evidence of effects
Mixed effects	The intervention <i>has inconsistent effects</i> on an outcome	Evidence includes studies in at least two of these categories: studies with positive effects, studies with negative effects, or more studies with indeterminate effects than with positive or negative effects

How is *eMINTS* Implemented?

The following section provides details of how *eMINTS* was implemented. This information can help educators identify the requirements for implementing *eMINTS* and determine whether implementing this intervention would be feasible in their district or school. Information on *eMINTS* presented in this section comes from the studies that meet WWC standards (Brandt et al., 2013; Martin et al., 2009) and from correspondence with the developer.

- **Goal:** *eMINTS* aims to help teachers improve student outcomes by integrating technology into their curriculum, implementing high-quality lesson plans, and building a learning community within their school.
 - **Target population:** *eMINTS* is offered to teachers of students in kindergarten through grade 12.
 - **Method of delivery:** Teachers receive training in *eMINTS* through professional development offered online or in person and through coaching visits in their classrooms. Additional teaching resources are available through an online *eMINTS* portal.
- Comparison group:** In the two studies that contribute to this intervention report, students in the comparison group were taught by teachers who did not receive *eMINTS* training. Teachers may have received other training and professional development offered by their schools or school districts.
- **Frequency and duration of service:** Over the course of 2 or more years, teachers participate in approximately 140 hours of professional development through a series of sequenced learning sessions. Instructional specialists provide as many as 10 coaching sessions for teachers in their classrooms, with each session lasting up to 2 hours. Refer to Table 2 for additional details.
 - **Intervention components:** The key components of *eMINTS* are described in Table 2. A shorter version of the *eMINTS* program called *eMINTS4All* includes fewer professional development sessions and coaching visits. The main findings in this report measured the effectiveness of the *eMINTS Comprehensive Program*.

Table 2. Components of *eMINTS*

Key component	Description
Sequenced professional development	Over the course of 2 or more years, teachers participate in approximately 140 hours of professional development focused on integrating technology into the classroom and developing lessons that use inquiry-based learning, in which students engage in open-ended and meaningful investigations. Session topics also support building a community of learning in schools, student assessment, and classroom management. Sessions are offered in person or online and are held over 3 to 6 hours. The studies of <i>eMINTS</i> summarized in this review each provided more than 200 hours of professional development, rather than the recommended 140 hours.
Coaching	Instructional specialists provide up to 10 coaching sessions in teachers' classrooms over 2 or more years. Each session is offered one on one and lasts from 1 to 2 hours. Specialists also offer coaching to groups of teachers to support collaboration and building a learning community within a school. In one of the studies of <i>eMINTS</i> summarized in this review (Martin et al., 2009), teachers received at least 20 coaching sessions over 2 years.
Technology integration	Instructional specialists help <i>eMINTS</i> classrooms integrate technology as a tool to support inquiry-based instruction, differentiated learning, and student assessment. Technology integration can take various forms. Examples of integration include computerized student assessments, or a teacher leading instruction from a computer blackboard while students participate at individual workstations.
Online resources	Teachers can access a range of materials through <i>eMINTS</i> ' online portal, including formative and summative assessments, teacher lesson plans and guides, and examples of high-quality classroom websites. The <i>eMINTS</i> program also provides online courses for teachers to supplement the professional development and coaching. At the end of the first year, teachers develop a classroom website with the help of the instructional specialist as a resource for students and their families (for example, to provide class schedules, homework assignments, and sample assessments).

What Does *eMINTS* Cost?

This preliminary list of costs is not designed to be exhaustive; rather, it provides educators an overview of the major resources needed to implement *eMINTS*. The program costs described below are based on the information available as of July 2019.

- **Equipment and materials costs:** To support technology integration, each student must have individual access to an Internet-connected computer or tablet. For schools that lack this access in the classroom or in a computer lab, the cost of providing computers is approximately \$500 per student. The program can be adapted to the existing technology in the school.
- **Personnel costs:** For a fee of \$10,000 per teacher for each year of the two-year program, *eMINTS* will provide instructional specialists to lead professional development and coaching activities. The developer may offer a discount on this fee when providing a custom quote to a district that meets certain criteria. Each participating classroom teacher is offered approximately 140 hours of professional development in sessions that are up to 6 hours long. In addition, teachers participate in as many as 10 coaching sessions that are 1 or 2 hours long. Schools may choose to schedule professional development and coaching sessions within or outside of the school day.

- **Facilities costs:** Professional development and coaching activities are offered online or in person at the school. For activities that occur in person, the school or district will need to supply space to host the teacher training.
- **Costs paid by students or parents:** There is no charge to students or parents.
- **In-kind supports:** To help offset the costs of *eMINTS*, schools that meet certain criteria may be eligible to receive discounts on educational products from *eMINTS* partners.
- **Sources of funding:** The developer has provided *eMINTS* through various U.S. Department of Education grant programs, including the Student Support and Academic Enrichment program, the Investing in Innovation Fund, the Supporting Effective Educator Development grant program, and the Education Innovation and Research program. In Missouri, where the program was developed, grant funds from the Missouri Department of Elementary and Secondary Education have supported the program.

For More Information:

About *eMINTS*

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About the cost of *eMINTS*

Information about *eMINTS*' costs was provided by the developer.

Research Summary

The WWC identified 11 studies that investigated the effectiveness of *eMINTS* (Figure 1):

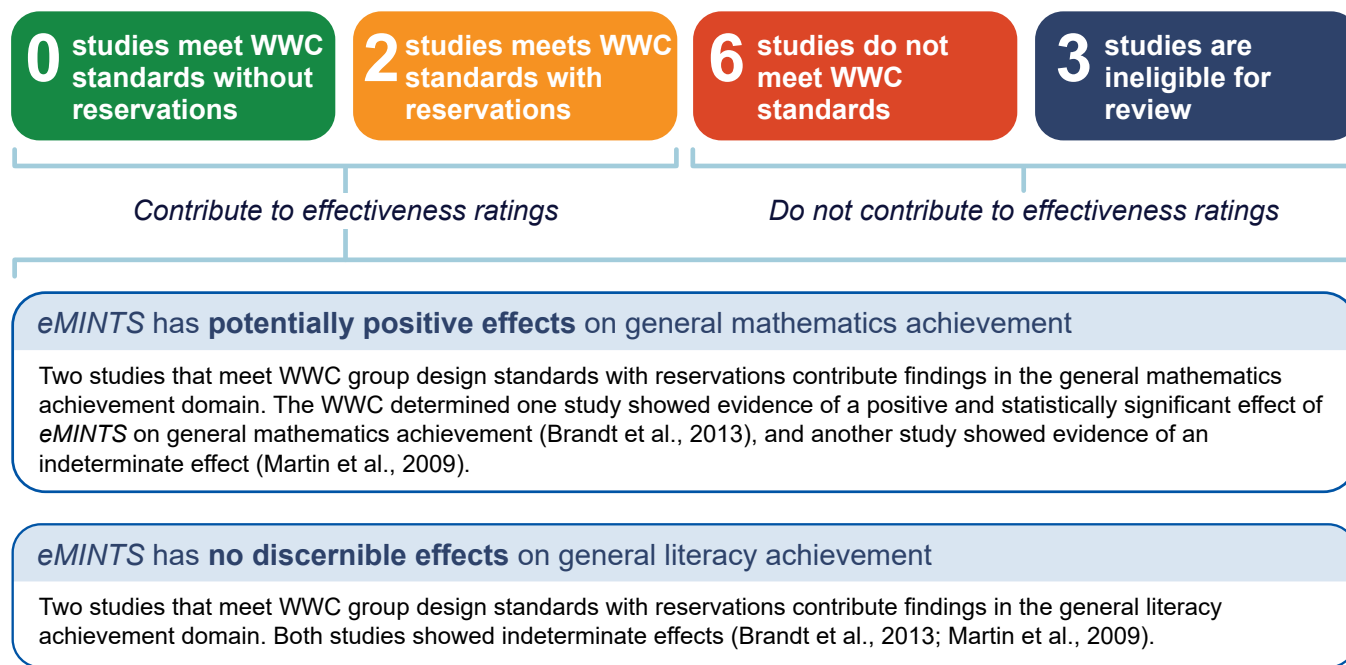
- Two studies meet WWC group design standards with reservations
- Six studies do not meet WWC group design standards
- Three studies are ineligible for review

The WWC reviews findings on the intervention’s effects on eligible outcome domains from studies that meet standards, either with or without reservations. Based on this review, the WWC generates an effectiveness rating, which summarizes how the intervention impacts, or changes, a particular outcome domain. The WWC reports additional supplemental findings, such as those the study authors reported as intermediate outcomes that reflect partial exposure to the intervention, on the

WWC website (<https://whatworks.ed.gov>). These supplemental findings and findings from studies that either do not meet WWC standards or are ineligible for review do not contribute to the effectiveness ratings.

The two studies of *eMINTS* that meet WWC group design standards reported findings on general mathematics achievement and general literacy achievement. No other findings in the studies met WWC group design standards within any outcome domain included in the Teacher Excellence topic area.⁴ Citations for the eight studies reviewed for this report are listed in the References section, which begins on page 10. Citations for the three studies that are ineligible for review and the reasons the WWC determined they were ineligible are also listed in the References section.

Figure 1. Effectiveness ratings for *eMINTS*



Main Findings

Table 3 shows the findings from two *eMINTS* studies that meet WWC standards. The table includes WWC calculations of the mean difference, effect size, and performance of the intervention group relative to the comparison group. Based on findings from the two studies that meet WWC standards, the effectiveness rating for general mathematics achievement

is *potentially positive effects*, indicating evidence of a positive effect with no overriding contrary evidence. These findings are based on 3,096 students. The effectiveness rating for general literacy achievement is *no discernible effects*. These findings are based on 3,245 students.

Table 3. Findings by outcome domain from studies of *eMINTS* that meet WWC standards

Measure (study)	Study sample	Sample size	Mean (standard deviation)		WWC calculations			p-value
			Intervention group	Comparison group	Mean difference	Effect size	Improvement index	
Missouri Assessment Program: Mathematics test (Brandt et al., 2013)^a	7th and 8th grade students	1,931	0.08 (nr)	-0.05 (nr)	0.13	0.13	+5	.04
Missouri Assessment Program: Mathematics test (Martin et al., 2009)^b	4th grade students	640	648.36 (30.03)	651.17 (30.72)	-2.81	-0.09	-4	.55
Missouri Assessment Program: Mathematics test (Martin et al., 2009)^b	5th grade students	525	670.22 (33.71)	669.67 (36.12)	0.55	0.02	+1	.93
Outcome average for general mathematics achievement across all studies						0.04	+2	
Missouri Assessment Program: Communication arts test (Brandt et al., 2013)^a	7th and 8th grade students	2,079	0.05 (nr)	0.09 (nr)	-0.04	-0.04	-1	.48
Missouri Assessment Program: Communication arts test (Martin et al., 2009)^b	4th grade students	640	659.29 (31.12)	663.89 (30.53)	-4.60	-0.15	-6	.34
Missouri Assessment Program: Communication arts test (Martin et al., 2009)^b	5th grade students	526	680.51 (30.09)	674.34 (31.64)	6.16	0.20	+8	.25
Outcome average for general literacy achievement across all studies						-0.01	0	

Notes: For mean difference and effect size values reported in the table, a positive number favors the intervention group and a negative number favors the comparison group. The effect size is a standardized measure of the effect of an intervention on outcomes, representing the average change expected for all individuals who are given the intervention (measured in standard deviations of the outcome measure). An indicator of the effect of the intervention, the improvement index can be interpreted as the expected change in percentile rank for an average comparison group student if that student had received the intervention. For example, an improvement index of +2 means that the expected percentile rank of the average comparison group student would increase by 2 points if the student were placed in an *eMINTS* classroom. A positive improvement index does not necessarily mean the estimated effect is statistically significant. Some statistics may not sum as expected due to rounding. nr = not reported.

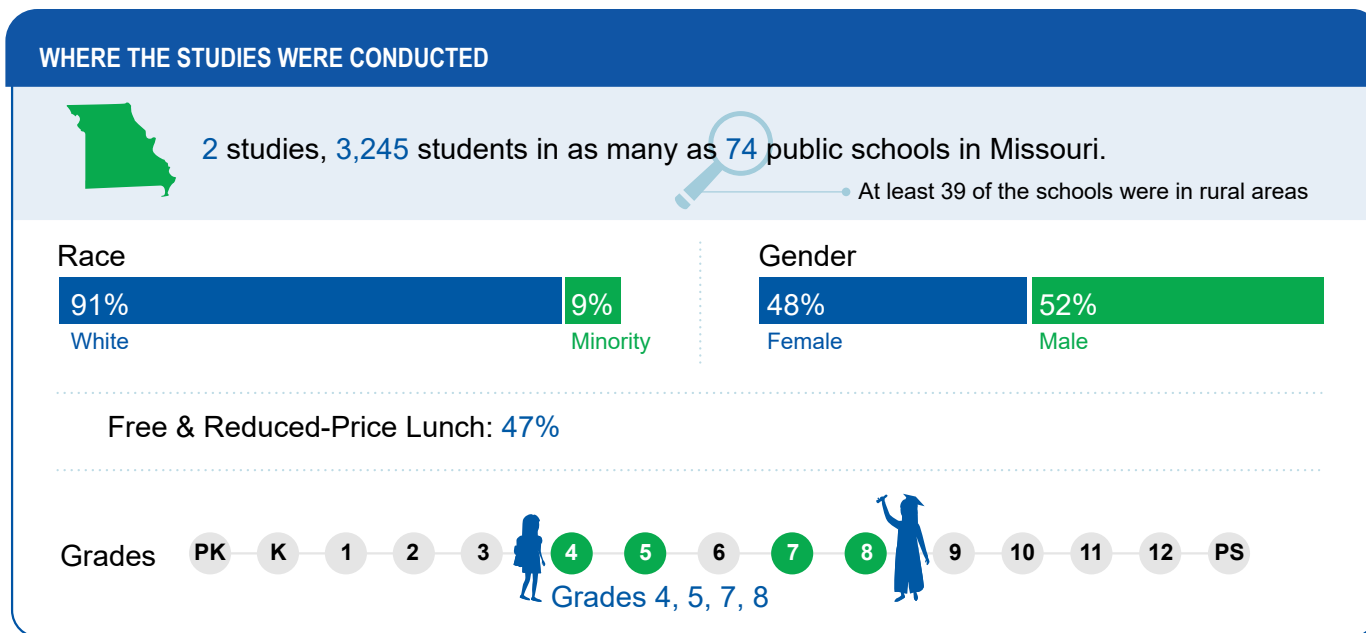
^a Brandt et al. (2013) did not require corrections for clustering or multiple comparisons nor difference-in-differences adjustments. The study-reported means are standardized z-scores that combine the 7th and 8th grade tests and are adjusted for baseline student achievement and student, teacher, and school characteristics. This study is characterized as having a statistically significant positive effect on general mathematics achievement. The study is characterized as having indeterminate effects on general literacy achievement because the mean effect reported is not statistically significant. For more information, please refer to the WWC Procedures Handbook, version 4.0, page 22.

^b Martin et al. (2009) required corrections for clustering and multiple comparisons as well as a difference-in-differences adjustment. The p-values presented here were calculated by the WWC because the p-values reported in the study did not account for the clustered assignment of students to condition by classroom. Because the study did not report the number of clusters, the WWC calculated statistical significance using an assumption of at least 15 students per teacher in order to apply the WWC clustering correction, which led to no findings being statistically significant. The study reported the findings for the 4th and 5th grade communication arts tests as statistically significant, but they are not statistically significant after applying the WWC clustering correction. The finding for the 4th grade communication arts test is based on a regression adjustment, so a difference-in-differences adjustment was not needed. The WWC applied difference-in-differences adjustments to the unadjusted intervention group means and mean differences for the 5th grade communication arts test, and 4th and 5th grade mathematics tests. The WWC did not report the regression-adjusted results reported in the study for the 5th grade test because the regression adjusted for both the baseline 3rd grade test score and the test score in 4th grade (an intermediate outcome). The magnitude of the regression-adjusted finding for the 4th grade mathematics test was not reported in the study. The sample sizes and unadjusted intervention and comparison group means were provided in response to an author query. This study is characterized as having indeterminate effects on general mathematics achievement and general literacy achievement because the mean effects reported are not statistically significant. For more information, please refer to the WWC Procedures Handbook, version 4.0, page 22.

In What Context Was eMINTS Studied?

The following section provides information on the setting of the two studies of eMINTS that meet WWC standards, and a description of the participants in the research. This information

can help educators understand the context in which the studies of eMINTS were conducted and determine whether the program might be suitable for their setting.



Details of Each Study that Meets WWC Standards

This section presents details for each study of eMINTS that meets WWC standards. These details include the full study reference, findings description, findings summary, and description of study characteristics. A summary of domain findings for each study is presented below, followed by a description of the study characteristics. These study-level details include contextual information about the study setting, methods, sample, intervention group, comparison group, outcomes, and implementation details. For additional information, readers should refer to the original studies.

Findings from Brandt et al. (2013) show evidence of a statistically significant positive effect of eMINTS in the general mathematics achievement domain (Table 4). This finding is based on an outcome analysis that includes 1,931 students. The finding on general literacy achievement, which shows evidence of an indeterminate effect, is based on an outcome analysis that includes 2,079 students. The findings and research details summarized for this study come from four related citations, including the primary study listed above. See the References section, which begins on page 10, for a list of all related publications.

Research details for Brandt et al. (2013)

Brandt, C., Meyers, C., & Molefe, A. (2013). *The impact of eMINTS professional development on teacher instruction and student achievement: Year 1 report*. Washington, DC: American Institutes for Research.

Table 4. Summary of findings from Brandt et al. (2013)

Meets WWC Group Design Standards With Reservations				
Outcome domain	Sample size	Study findings		
		Average effect size	Improvement index	Statistically significant
General mathematics achievement	39 schools/1,931 students	+0.13	+5	Yes
General literacy achievement	39 schools/2,079 students	-0.04	-1	No

Table 5. Description of study characteristics for Brandt et al. (2013)

WWC evidence rating	Meets WWC Group Design Standards With Reservations. This is a cluster randomized controlled trial with low cluster-level attrition and individuals who are representative of the clusters. ⁵ For more information on how the WWC assigns study ratings, please see the WWC Procedures and Standards Handbooks (version 4.0) and WWC Standards Briefs, available on the WWC website.
Setting	The study was conducted in 39 rural, high-poverty schools in Missouri in grades 7 and 8. Eligible schools were in rural areas and were either Title I schools or had a majority of students who were eligible for the free- or reduced-price meal program.
Methods	<p>The study used a cluster randomized controlled trial. The researchers randomly assigned 20 schools to each of three conditions in fall 2010: (1) the <i>eMINTS</i> program for 2 years and no further intervention in a third year, (2) <i>eMINTS</i> for 2 years and a supplemental intervention (<i>Intel Teach</i>) in a third year, or (3) a business-as-usual condition for all 3 years. The study randomly assigned the schools separately in three groups based on the grade ranges offered by the schools: schools with grades from pre-kindergarten to grade 8, schools with grades 5 to 8, and schools with grades 6 to 12. The analytic samples include students who entered schools after random assignment, and this review considered these students to pose a risk of bias. This study was therefore not eligible to be rated meets WWC group design standards without reservations, and the findings in the review potentially represent a combination of (1) the effect of the intervention on students and (2) a composition effect due to different types of students entering intervention and comparison schools.</p> <p>The main findings for this review compare outcomes for two groups: (1) students in <i>eMINTS</i> classrooms for up to 2 years who did not receive the supplemental intervention and (2) outcomes for students in the business-as-usual comparison condition. The <i>eMINTS</i> intervention was offered beginning in fall 2011, a year after random assignment, and concluded in fall 2013. The outcomes were measured in spring 2014, at the end of the first year after teachers completed their training in <i>eMINTS</i>.</p> <p>One school in the business-as-usual comparison condition closed during the study period, and students in that school did not contribute outcomes to the analytic sample. For both outcome measures, the sample loss of one school after random assignment (attrition) was within the acceptable threshold for the review: overall attrition was 2.5%, and differential attrition was 5 percentage points. Also for both outcome measures, the students included in the analytic sample were representative of all students in those grades present in the schools at follow-up: overall, 8.4% of the students present in the schools at follow-up were not included in the analytic sample, and the difference in non-response between the intervention and comparison schools was 2.2 percentage points.</p>
Study sample	The 39 schools in the analytic sample included at least 2,079 students in grades 7 and 8. About 58% of students were eligible for free or reduced-priced lunch, less than 1% were limited English proficient, and 12% had an individual education plan. Fifty-one percent were male and 95% were White.
Intervention group	Over 2 school years, teachers in the intervention group were offered the <i>eMINTS</i> program with approximately 240 hours of online and in-person professional learning and support, which included 46 sessions of sequenced professional learning and approximately 10 in-classroom coaching and mentoring visits. Teachers had access to additional online and in-person learning opportunities and resources designed to support high-quality instruction and student assessment. Teachers worked individually and collaboratively with <i>eMINTS</i> instructional specialists and others in the training to complete learning activities, such as creating lesson plans and a class website. Additionally, a technology coordinator in each school was trained to support technology integration in <i>eMINTS</i> teachers' classrooms.
Comparison group	Students in the comparison group were taught by teachers who did not receive the <i>eMINTS</i> program. Teachers may have received other business-as-usual training and professional development offered by their schools or school districts.

<p>Outcomes and measurement</p>	<p>Study authors reported findings on two outcome measures in student achievement that are eligible for review under the Teacher Excellence topic area and meet WWC group design standards. These outcomes were measured by the Missouri Assessment Program mathematics and communication arts tests in spring 2012, 2013, and 2014. The outcomes measured in spring 2014 are considered the main findings for this review because they are measured in the first year after teachers completed their training in <i>eMINTS</i>, which occurred from fall 2011 to spring 2013. The findings in other years are considered supplemental findings and are reported on the WWC website (https://whatworks.ed.gov). The supplemental findings do not factor into the intervention's rating of effectiveness.</p> <p>Two additional student outcomes were collected but did not meet WWC group design standards. The 21st Century Skills test was used to measure students' creativity and innovation, problem solving, decision making, and comfort with technology. A student survey was used to measure student engagement in the school. The findings for these measures did not meet WWC group design standards because they included outcomes for students who entered study schools after random assignment. This review considered these students to pose a risk of bias, and the WWC was unable to assess either the representativeness of the analytic samples of students or the equivalence of the analytic intervention and comparison groups at baseline.</p> <p>The study also measured teacher outcomes related to instructional practice using teacher surveys and classroom observations. The teacher survey measures and the teacher technology use measure based on classroom observations were not eligible for review in the instructional practice domain. Eligible measures in this domain must have a statistical relationship with a student outcome (such as student achievement) that is documented by the study authors or cited in another publication, but this information was not available for these measures. Other classroom observation measures were assessed using the Classroom Assessment Scoring System-Secondary. Findings for these outcomes did not meet WWC group design standards because they included outcomes for teachers who entered study schools after random assignment. This review considered these teachers to pose a risk of bias, and the WWC was unable to assess either the representativeness of the analytic samples of teachers or the equivalence of the analytic intervention and comparison groups at baseline.</p> <p>The study also reported findings for student and teacher outcomes for schools that provided the <i>eMINTS</i> program for 2 years followed by the supplemental <i>Intel Teach</i> intervention for 1 year. <i>Intel Teach</i> was offered to further increase teachers' technology integration skills in the classroom and involved 42 hours of professional development in person and online, four to five coaching sessions, and access to online resources. Because the <i>eMINTS</i> intervention was bundled with <i>Intel Teach</i> for this supplemental intervention condition, the findings were not eligible for review and do not contribute to the effectiveness rating for <i>eMINTS</i>.</p>
<p>Additional implementation details</p>	<p>The <i>eMINTS</i> professional development was facilitated by trained <i>eMINTS</i> staff supported by staff at the <i>eMINTS</i> National Center who monitored and supervised program delivery. Study authors conducted a study of implementation and found that the professional development and essential technology resources and guidance needed to support the <i>eMINTS</i> program in study schools were delivered as designed.</p>

Research details for Martin et al. (2009)

Martin, W., Strother, S., & Reitzes, T. (2009). *eMINTS 2009 program evaluation report: An analysis of the persistence of program impact on student achievement*. New York: Center for Children & Technology. Retrieved from <http://emints.org/wp-content/uploads/2014/11/eMINTS-2009-Program-Evaluation.pdf>.

Findings from Martin et al. (2009) show evidence of indeterminate effects of *eMINTS* on general mathematics achievement and general literacy achievement (Table 6). These findings are based on outcome analyses that include 1,165 and 1,166 students in each domain, respectively.

Table 6. Summary of findings from Martin et al. (2009)

Meets WWC Group Design Standards With Reservations				
Outcome domain	Sample size	Study findings		
		Average effect size	Improvement index	Statistically significant
General mathematics achievement	1,165 students	-0.04	-2	No
General literacy achievement	1,166 students	+0.02	+1	No

Table 7. Description of study characteristics for Martin et al. (2009)

WWC evidence rating	Meets WWC Group Design Standards With Reservations. This is a cluster quasi-experimental design study that satisfies the baseline equivalence requirement for the individuals in the analytic intervention and comparison groups. ⁶
Setting	The study took place in 35 schools across 10 school districts in Missouri.
Methods	<p>The study used a cluster quasi-experimental design and compared outcomes for two groups: (1) students in classrooms with teachers who were trained in <i>eMINTS</i> and (2) students in classrooms without <i>eMINTS</i>-trained teachers. The comparison group classrooms were mostly those in the same grade and school as <i>eMINTS</i> classrooms. If that was not possible because all teachers in a school and grade received <i>eMINTS</i> training, the researchers instead included classrooms with teachers who did not receive the intervention who were in the same grade and within the same school district, but in another school that the researchers considered comparable. From within the intervention classrooms, the researchers included students in the analytic sample who had been taught by an <i>eMINTS</i>-trained teacher in 2 consecutive years. Similarly, from within the comparison group classrooms, the researchers included students in the analytic sample who had been taught by a teacher not trained in <i>eMINTS</i> in 2 consecutive years.</p> <p>The study findings that meet WWC group design standards include students in 4th and 5th grades. The 5th grade students were exposed to <i>eMINTS</i> in both 4th and 5th grades. Although the 4th grade students were exposed to <i>eMINTS</i> in both 3rd and 4th grades, the findings for the grade 4 sample reflect just a single year of exposure to the intervention because the analysis adjusts for baseline achievement measured at the end of grade 3.</p>
Study sample	The study sample in 4th grade included 640 students (328 and 312 in the intervention and comparison groups, respectively). The study sample in 5th grade included 526 students (206 and 320 in the intervention and comparison groups, respectively). The authors do not report the number of teachers and classrooms in the study. Forty-seven percent of the students were female, 16% were students the authors described as belonging to a minority group, and 28% were eligible for the free- or reduced-price meal program.
Intervention group	Over 2 school years, teachers in the intervention group were offered the <i>eMINTS</i> program with 250 hours of professional development and support, including 10 to 12 classroom coaching visits each year by <i>eMINTS</i> instructional specialists. Technology coordinators in each school were trained by <i>eMINTS</i> to support teachers' integration of technology in the classroom.
Comparison group	Students in the comparison group were taught by teachers who did not receive training by <i>eMINTS</i> . Teachers may have received other business-as-usual training and professional development offered by their schools or school districts.
Outcomes and measurement	Study authors reported findings on two student outcome measures that are eligible for review under the Teacher Excellence topic area. These are the Missouri Assessment Program tests of mathematics and communication arts skills in grades 4 through 6. These same tests administered in grade 3 are used as baseline measures for analyses of grade 4 and 5 outcomes, while the grade 4 test is used as the baseline measure for grade 6. Findings for these tests given in grades 4 and 5 meet WWC group design standards with reservations. However, findings for the tests given in grade 6 do not meet WWC group design standards because the baseline equivalence requirement is not satisfied.
Additional implementation details	The <i>eMINTS</i> professional development was implemented by <i>eMINTS</i> instructional specialists. The study authors conducted an implementation study and found that <i>eMINTS</i> was implemented with a high degree of fidelity based on observations of professional development sessions, records of classroom visits, and reviews of teacher artifacts.

References

Studies that meet WWC group design standards with reservations

Brandt, C., Meyers, C., & Molefe, A. (2013). *The impact of eMINTS professional development on teacher instruction and student achievement: Year 1 report*. Washington, DC: American Institutes for Research.

Additional sources:

Brandt, C., Meyers, C., Molefe, A., Dhillon, S., & Zhu, B. (2014). *The impact of eMINTS professional development on teacher instruction and student achievement: Year 2 report*. Washington, DC: American Institutes for Research. Retrieved from <https://eric.ed.gov/?id=ED562508>.

Meyers, C., Molefe, A., Dhillon, S., & Zhu, B. (2015). *The impact of eMINTS professional development on teacher instruction and student achievement: Year 3 report*. Washington, DC: American Institutes for Research.

Meyers, C. V., Molefe, A., Brandt, W. C., Zhu, B., & Dhillon, S. (2016). Impact results of the eMINTS professional development validation study. *Educational Evaluation & Policy Analysis*, 38(3), 455–476. Retrieved from <https://eric.ed.gov/?id=EJ1108395>.

Martin, W., Strother, S., & Reitzes, T. (2009). *eMINTS 2009 program evaluation report: An analysis of the persistence of program impact on student achievement*. New York: Center for Children & Technology. Retrieved from <http://emints.org/wp-content/uploads/2014/11/eMINTS-2009-Program-Evaluation.pdf>.

Studies that do not meet WWC group design standards

Bickford, A. (2005). *Analysis of 2004 MAP results for eMINTS students*. Columbia, MO: Office of Social and Economic Data Analysis. Does not meet WWC standards because the equivalence of the clusters in the analytic intervention and comparison groups is necessary but the requirement was not satisfied.

Additional source:

Tharp, S., Bickford, A., & Hager, D. (2005). *The effects of eMINTS enrollment on Title I students*. Columbia, MO: Office of Social and Economic Data Analysis.

Bratberg, W. D. (2002). *Comparison of student achievement based upon participation in the enhancing Missouri's Instructional Networked Teaching Strategies project as measured by the Missouri Assessment Program*.

ProQuest Dissertations and Theses. Does not meet WWC standards because the equivalence of the clusters in the analytic intervention and comparison groups is necessary but the requirement was not satisfied.

Carver, C. J. (2008). *The impact of systematic professional development on selected areas of student performance in selected Missouri school buildings*. ProQuest Dissertations and Theses. Does not meet WWC standards because the intervention and comparison groups are not shown to be equivalent at baseline.

Office of Social and Economic Data Analysis. (2001). *Analysis of 2000 MAP results from the Jennings School District*. Columbia, MO: Office of Social and Economic Data Analysis. Does not meet WWC standards because the equivalence of the clusters in the analytic intervention and comparison groups is necessary but the requirement was not satisfied.

Additional sources:

Dranginis, T. (2004). *Analysis of MAP results for expansion classrooms*. Columbia, MO: Office of Social and Economic Data Analysis.

Greever-Rice, T. & Huntley, L. (2007). *Analysis of 2005 MAP results for eMINTS students*. Columbia, MO: Office of Social and Economic Data Analysis.

Office of Social and Economic Data Analysis. (2002). *Analysis of 2001 MAP results for eMINTS students*. Columbia, MO: Office of Social and Economic Data Analysis.

Office of Social and Economic Data Analysis. (2003). *Analysis of 2002 MAP results for eMINTS students*. Columbia, MO: Office of Social and Economic Data Analysis.

Office of Social and Economic Data Analysis. (2004). *Analysis of 2003 MAP results for eMINTS students*. Columbia, MO: Office of Social and Economic Data Analysis. Does not meet WWC standards because the equivalence of the clusters in the analytic intervention and comparison groups is necessary but the requirement was not satisfied.

Additional source:

Hager, D.R. (2004). *An exploratory study of the Black-White achievement gap in eMINTS student MAP results*. Columbia, MO: Office of Social and Economic Data Analysis.

Shoots, A. M. (2015). *A quasi-experimental study of technology usage and minority student achievement on standardized tests*. ProQuest Dissertations and Theses. Does not meet WWC standards because the measures of effectiveness cannot be attributed solely to the intervention.

Studies that are ineligible for review using the Teacher Excellence topic area protocol

Crane, C. M. (2005). Teacher perceived impact of technology on elementary classrooms and teaching. ProQuest Dissertations and Theses. The study is ineligible for review because it does not use a study design eligible for review under the WWC's group design standards, regression discontinuity design standards, or pilot single-case design standards, as described in the [WWC Standards Handbook \(Version 4.0\)](#).

Kaplan, L. F. (2011). Exploring the contextual factors related to transfer of learning in a high school implementation of the eMINTS program. ProQuest Dissertations and Theses. Retrieved from <https://eric.ed.gov/?id=ED550385>. The study is ineligible for review because it does not use a study design eligible for review under the WWC's group design standards, regression discontinuity design standards, or pilot single-case design standards, as described in the [WWC Standards Handbook \(Version 4.0\)](#).

Martin, W., Strother, S., Beglau, M., Bates, L., Reitzes, T., & Culp, K. M. (2010). Connecting instructional technology professional development to teacher and student outcomes. *Journal of Research on Technology in Education*, 43(1), 53–74. Retrieved from <https://eric.ed.gov/?id=EJ898528>. The study is ineligible for review because it does not use a study design eligible for review under the WWC's group design standards, regression discontinuity design standards, or pilot single-case design standards, as described in the [WWC Standards Handbook \(Version 4.0\)](#).

Endnotes

¹ [Hanushek \(2011\)](#) and [Chetty et al. \(2014\)](#), for example, describe differences across teachers in their impacts on academic achievement and earnings.

² The descriptive information for this intervention comes from the studies that contribute to this intervention report and the intervention developer. The What Works Clearinghouse (WWC) requests developers review the intervention description sections for accuracy from their perspective. The WWC provided the developer with the intervention description in July 2019 and the WWC incorporated feedback from the developer. Further verification of the accuracy of the descriptive information for this intervention is beyond the scope of this review.

³ The literature search reflects documents publicly available by June 2019. Reviews of the studies in this report used the standards from the WWC Procedures and Standards Handbooks (version 4.0) and the Teacher Excellence review protocol (version 4.0). The evidence presented in this report is based on available research. Findings and conclusions could change as new research becomes available.

⁴ The effects of eMINTS are not known for other outcome domains within the Teacher Excellence topic area, including general science achievement, general social studies achievement, general achievement, English language proficiency, staying in school, progression in school, completing school, student social interaction, observed individual behavior, student emotional status, student engagement in school, instructional practice, teacher attendance, teacher retention at the school, teacher retention in the school district, teacher retention in the state, and teacher retention in the profession.

⁵ Because Brandt et al. (2013) included joiners who pose a risk of bias but had low cluster-level attrition, to meet WWC group design standards, the study must either demonstrate that the samples of students contributing outcome data to the analytic samples were representative of all students in those schools and grades or establish baseline equivalence of the analytic intervention and comparison groups. The study meets WWC group design standards with reservations because it establishes that the analytic samples are representative. The WWC assesses how representative the analytic sample is by comparing the number of students present in the analytic sample of study schools at follow-up who do not contribute outcome data to the total number of students in those schools (that is, the non-response rate). This proportion overall and the difference in non-response between the intervention and comparison group is compared to the published WWC attrition table using the attrition boundary specified in the review protocol, which is the optimistic boundary for the Teacher Excellence review protocol (see the WWC Procedures and Standards Handbooks, version 4.0, available on the WWC website). This review of Brandt et al. (2013) and the rating decision differ from the prior review of the study conducted for the Institute of Education Sciences (IES) grant competition (using the Version 3.0 review standards and the Teacher Training, Evaluation, and Compensation Review Protocol, Version 3.1). The prior review rated the study *Meets WWC Group Design Standards Without Reservations*. The difference in rating decisions is due to the updated review standards for cluster-design studies.

⁶ Martin et al. (2009) is a quasi-experimental design study that satisfies the baseline equivalence requirement by demonstrating equivalence of the intervention and comparison groups on the math and literacy outcome measures for the 4th and 5th grades. Thus, the study meets WWC group design standards with reservations. This review of Martin et al. (2009) and the rating decision differ from the prior review of the study conducted for the IES grant competition (using the Version 3.0 review standards and the Single Study Review Protocol, Version 2.0). The prior review rated the study *Does Not Meet WWC Group Design Standards*. The difference in rating decisions is because the prior review considered differences in student economic disadvantage (the percentage eligible for the free- or reduced-price meal program) between the intervention and comparison group as evidence that the study does not satisfy the baseline equivalence requirement. The current review protocol only requires that the study satisfy the baseline equivalence requirement on the pre-intervention measure of the outcome.

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