
January 27, 2003

Analysis of 2002 MAP Results for eMINTS Students

This policy brief examines the quantitative impacts of the eMINTS Program on the second cohort of participating classes. The analysis compares 2002 Missouri Assessment Program (MAP) results for eMINTS students and non-eMINTS students in the same school building and for eMINTS students and all students statewide. eMINTS students in the fourth grade scored significantly higher than non-eMINTS students. Similar results were not seen among third grade students. eMINTS students in classes characterized by teachers who consistently implement the inquiry-based teaching practices emphasized by the eMINTS professional development program scored higher than students in other types of classes. While there were fewer significant differences in some aspects of the program, these results in general substantiate the positive trends associated with eMINTS enrollments reported in the policy brief “Analysis of 2001 MAP Results for eMINTS Students,” published in January 2002.

Introduction

This report presents MAP test results from the second cohort of eMINTS schools. This cohort began the professional development program in the autumn of 2000 and completed it in the spring of 2002. Thirty-nine elementary schools participated in this cohort. This report analyzes the overall difference in MAP scores by eMINTS enrollment, the differential impacts of eMINTS enrollment on students in three special statuses (special education students, Title I students and low income students) and the differences in MAP scores associated with the consistent application of inquiry-based instructional practices.

There are many differences between the schools in the first and second eMINTS cohorts. Schools in the second cohort were selected through a competitive process, while schools in the first cohort were not. In the second year, there were more ways for teachers to participate in the program; approximately 26 percent of the eMINTS teachers in the FY01 schools joined the program in the middle of the professional development curriculum. The program allowed several schools to participate on a “training only” basis, which provided training without direct hardware support from eMINTS. There are also differences in the evaluation activities in which each set of schools participated. eMINTS teachers in the first cohort of schools were observed and interviewed twice during their participation in the program. Members of the evaluation team did not contact teachers in the second cohort.

This report is one product of the eMINTS evaluation project. Other reports and information about evaluation activities are available at <http://emints.more.net/evaluation>.

The eMINTS Evaluation focuses on understanding the program’s impacts on students and teachers, the changes in learning environment in eMINTS classrooms and the use and outcome of project services.

There are also differences in the MAP results. There were consistently positive impacts associated with enrollment in an eMINTS classroom among the schools in the first cohort. There are fewer differences associated with eMINTS enrollment in the second cohort. Some of the differences between the first and second cohort of schools are examined in Appendix A.

The eMINTS Program¹

eMINTS is designed to transform the instructional process by supporting elementary teachers, in grades three through five, as they develop student-centered, inquiry-based instructional practices using a wide range of multimedia and computer technology. Teachers and students explore interactive learning experiences that require them to use critical-thinking skills and group problem-solving techniques. Significant professional development sessions along with in-classroom coaching and mentoring are key change agents in this project.

Each eMINTS teacher participates in over 250 hours of ongoing professional development during a two-year period. The professional development sessions are supplemented by instructional specialists who coach and support eMINTS teachers in their classrooms. Each eMINTS classroom is equipped with a teacher computer and laptop, a scanner, a color printer, a digital camera, an interactive whiteboard (a SMART Board™), a high lumen projector and one computer for every two students. Student computers are outfitted with a standard suite of productivity software. All eMINTS computers are connected to the MOREnet high-speed Internet backbone.

The Report

This report presents quantitative results from schools participating in the second cohort of the eMINTS program. Thirty-nine schools in 36 districts participated in the FY01 cohort. These districts began their participation in the program in the autumn of 2000. The results presented below are based on Missouri Assessment Program (MAP) tests taken by students in the spring of 2002.

The MAP tests are standards-based assessments administered statewide in grades three through five, grades seven through nine and grades ten and eleven. The assessment includes constructed response items and performance events in addition to multiple-choice items. The MAP tests in the elementary grades are administered in pairs: tests in Communication Arts and Science in the third grade and Mathematics and Social Studies in the fourth grade.²

Differences Between the First and Second eMINTS Cohorts

Between the beginning of the eMINTS Program in 1999 and the end of the second cohort's participation in 2002 many details about the program changed. Three of these changes are relevant to the current analysis:

- 1) the establishment of a formal selection process for participating schools;
- 2) a change in the definition of an "eMINTS teacher"; and
- 3) a substantial change in the deployment of evaluation resources.

¹ Information about the eMINTS Program is available at <http://emints.more.net>.

² Information on the Missouri Assessment Program is available at <http://www.dese.state.mo.us/divimprove/assess/>

Each of these changes is described below. A more comprehensive analysis of the differences between the first and second cohort of schools is presented in Appendix A.

Changes in School Selection

The first difference is the development of a formal application and selection process for the FY01 schools. In the first cohort, school districts were selected by the recommendation of a set of "technology leaders" throughout Missouri. These districts were selected based on an assessment of their leadership, fiscal and technology resources. In the second cohort, districts were asked to submit applications to the Department of Elementary and Secondary Education (DESE). This process resulted in the selection of a broader cross-section of Missouri districts in the second cohort than was seen in the first. The differences between the two cohorts of schools are discussed in Appendix A.

Changes in the Definition of an "eMINTS Teacher"

eMINTS teachers participated in two years of professional development focused on the instructional use of multimedia technology in student-centered classrooms. In the first cohort of schools all of the "eMINTS" teachers had completed the full two years by the spring administration of the MAP test. In the second cohort, 75 of the 102 teachers participating in the professional development program had completed it by the 2002 administration of the MAP test. These teachers are referred to in the results below as the "eMINTS teachers." Between the years of the first cohort (1999-2001) and the second (2000-2002) many different variations in the basic eMINTS model arose. These variations included the schools participating in the eMINTS Expansion program, as well as two whole-school implementations, where all of the teachers in the upper elementary grades received eMINTS training.

But the largest group was replacement teachers. These were teachers who were hired by their districts to teach in eMINTS classrooms at the beginning of the 2001-2002 school year. By the 2002 administration of the MAP, 27 replacement teachers in FY01 schools had not completed the full two-year professional development program. These teachers, and the students in their classes, were not included in the analysis below. Several tables showing the MAP score differences for this group of teachers are presented in Appendix B.

Table 1
Basic Statistics for eMINTS Schools, FY01

	Grade 3				
	Number of Classes	Communication Arts Number of Students	Average Class Size	Science Number of Students	Average Class Size
eMINTS	32	616	19.3	616	19.3
non-eMINTS	56	1133	20.2	1132	20.2
Total	88	1749	19.9	1748	19.9

	Grade 4				
	Number of Classes	Mathematics Number of Students	Average Class Size	Social Studies Number of Students	Average Class Size
eMINTS	43	866	20.1	866	20.1
non-eMINTS	68	1448	21.3	1448	21.3
Total	111	2314	20.8	2314	20.8

The basic descriptive statistics for teachers and students included in the analysis are presented in Table 1. These teachers and students come from a population of 39 schools in 36 districts. There are a total of 88 third grade classes and 111 fourth grade classes represented in the 2002 eMINTS dataset. In each grade approximately 40 percent of all students were enrolled in eMINTS classes.

Changes in the Evaluation Plan

The third difference between the first and second cohorts was in the evaluation activities in which each cohort participated. The schools and teachers participating in the first cohort of the eMINTS Program participated in a comprehensive evaluation program. During their two years in the program teachers and principals received site visits (including classroom observations) from the evaluation team, participated in interviews, focus groups and surveys. The products of these activities form the core of the eMINTS evaluation report series.

The schools and districts participating in the second cohort of the program did not experience the same level of scrutiny. Resource constraints prohibited extensive school visits and interviews. This required changes in the types of data collected from the participating schools. For example, instead of directly observing classroom activities, the evaluation team collected data on instructional practices from a limited number of observations completed by the program's Cluster Instructional Specialists. The implication of this change is discussed later in this report.

Plan of the Analysis

The analytical focus of this report is on student MAP test performance among students in two large groups of classrooms, eMINTS classes versus non-eMINTS classes. The performance of students enrolled in the eMINTS classrooms is compared with the performance of students not in the eMINTS classroom, but enrolled in the same grade and school. This strategy controls for school characteristics by drawing both the “experimental” group (i.e., the students enrolled in the eMINTS classes) and the “control” group (i.e., the students not enrolled in the eMINTS classes)

from the common environment of the participating schools. Comparing the performance of students in eMINTS classes to the performance of students not in eMINTS classes allows for the assessment of the general impact of the program.

The analysis also considers the performance differences associated with different types of instructional practices observed among the eMINTS teachers. The classification of instructional practices in eMINTS classrooms is based on the observations and judgments of the program's cluster instructional specialists using a rubric that summarizes the application of the inquiry-based instructional practices emphasized by the eMINTS program.

Two Perspectives on MAP Scores

This report analyzes total scores on four MAP tests administered in the third and fourth grade. Students are tested in Communication Arts and Science in the third grade and in Mathematics and Social Studies in the fourth grade. Students are not tested on the same subjects in consecutive years.

In this report MAP scores are reported in two ways:

- 1) Using the percentage distribution of the five-category Achievement Level scale, and
- 2) Using the raw MAP score.

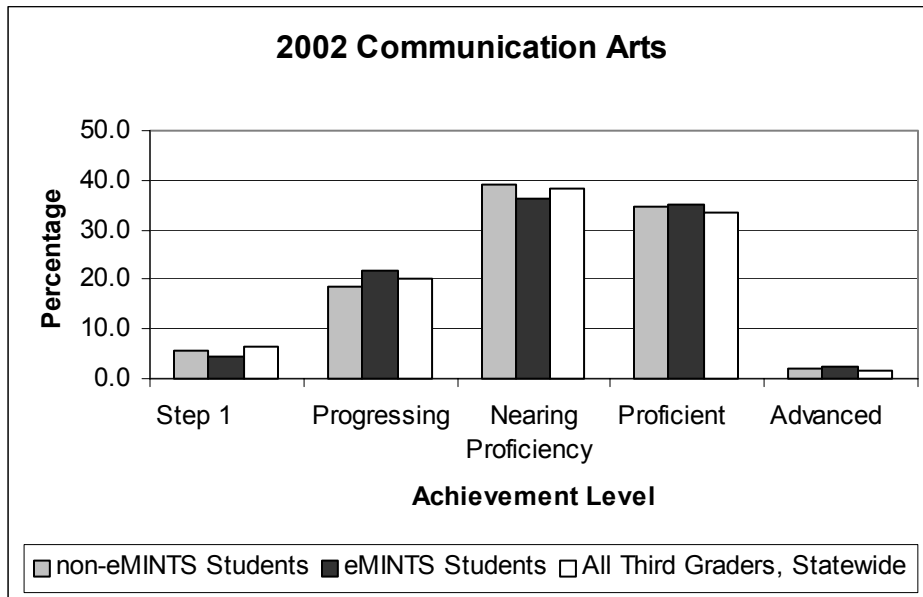
The first measure is the conventional measure used to assess the performance of school buildings. The raw score allows for the quantitative characterization of individual students and their differences.

MAP Achievement Levels

Individual student performance on the various MAP tests is typically expressed in terms of a five-category achievement level scale. This scale, "Step 1," "Progressing," "Nearing Proficiency," "Proficient" and "Advanced," provides a general gauge of performance. For buildings the overall percentage distribution of these five achievement levels is used as an aggregate measure of school performance. The analysis below compares all eMINTS classes to the non-eMINTS classes in all participating schools.

The differences in this distribution are presented in Figures 1 to 4. There are no statistically significant difference in the two third grade tests, Communication Arts and Science. However, eMINTS students scored significantly higher than non-eMINTS students on each of the fourth grade tests, Mathematics and Social Studies. On both tests administered in the fourth grade, the percentage of eMINTS students scoring in the Advanced category is higher than the percentage of all fourth grade students statewide scoring in the Advanced category.

Figure 1
MAP Achievement Level Results, Third Grade Communication Arts



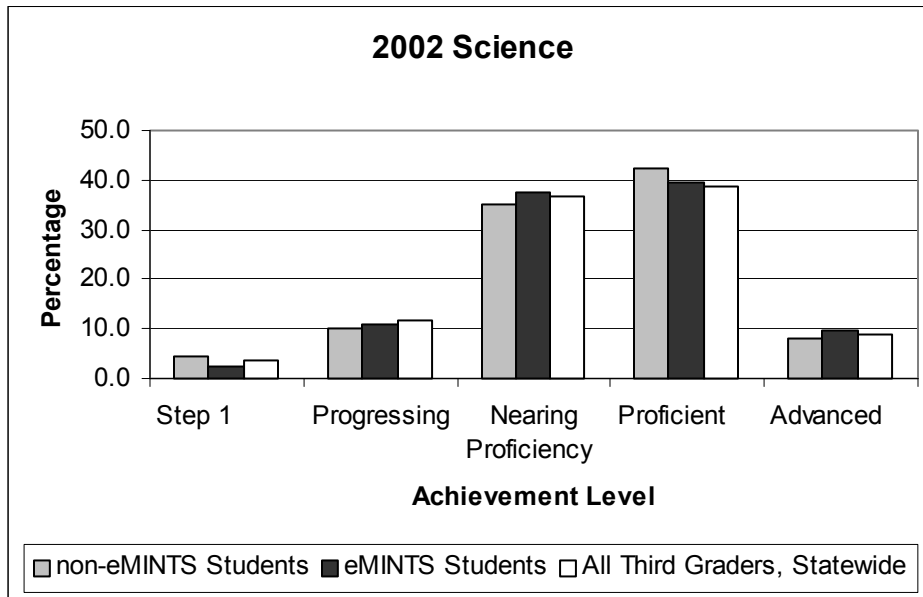
MAP Achievement Level	non-eMINTS Students	eMINTS Students	All Third Graders, Statewide
Step 1	5.6	4.5	6.3
Progressing	18.7	21.6	20.0
Nearing Proficiency	39.1	36.4	38.4
Proficient	34.5	35.1	33.6
Advanced	2.0	2.4	1.8
Total	100.0	100.0	100.0
Total Number of Students	1133	616	67213
P-Value	0.4451		

Results for Communication Arts

There are no significant differences between eMINTS and non-eMINTS students on the Communication Arts test. The difference between eMINTS and non-eMINTS students in the “Proficient” category is 0.6 points and the difference in the “Advanced” category is 0.4 points (see Figure 1).

The distribution of students in eMINTS classes is similar to the distribution of third grade students statewide. The percentage of eMINTS students scoring in the "Proficient" category is 1.5 percentage points higher than the statewide percentage.

Figure 2
MAP Achievement Level Results, Third Grade Science



Percent Distribution of MAP Achievement Levels

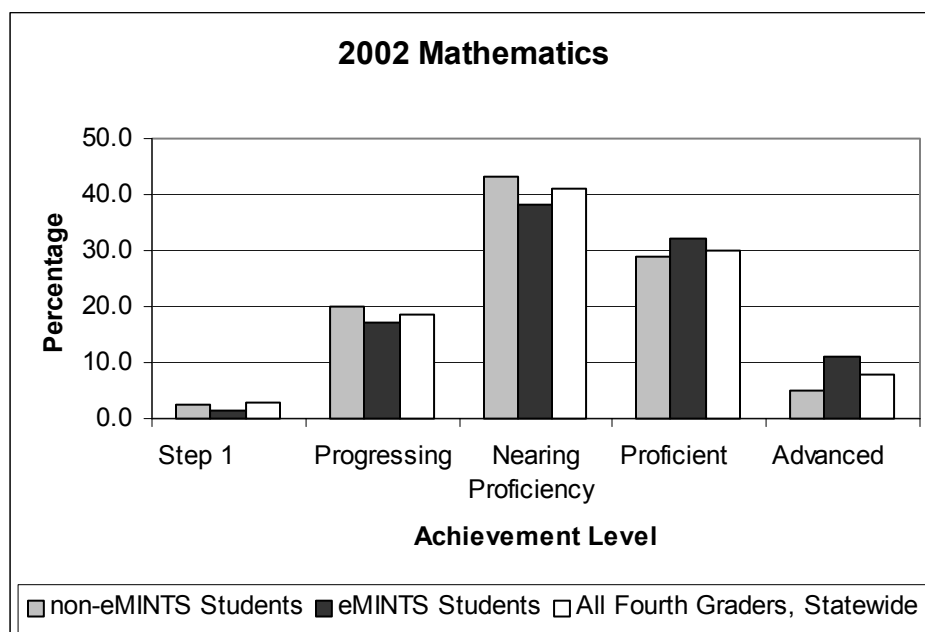
MAP Achievement Level	non-eMINTS Students	eMINTS Students	All Third Graders, Statewide
Step 1	4.5	2.4	3.8
Progressing	10.1	11.0	11.7
Nearing Proficiency	34.9	37.3	36.8
Proficient	42.3	39.6	38.7
Advanced	8.2	9.6	9.0
Total	100.0	100.0	100.0
Total Number of Students	1132	616	67213
P-Value	0.1302		

The differences seen in the FY01 schools do not suggest that there is a net positive effect on the Communication Arts test associated with enrollment in an eMINTS classroom. On the other hand, eMINTS enrollment does not appear to have a negative effect on student performance.

Results for Science

There are no significant differences between eMINTS and non-eMINTS students on the Science test. The eMINTS versus non-eMINTS differences are less than three percentage points for any given category. The percentage of eMINTS students in the "Advanced" category is 1.4 points higher than non-eMINTS students (see Figure 2).

Figure 3
MAP Achievement Level Results, Fourth Grade Mathematics



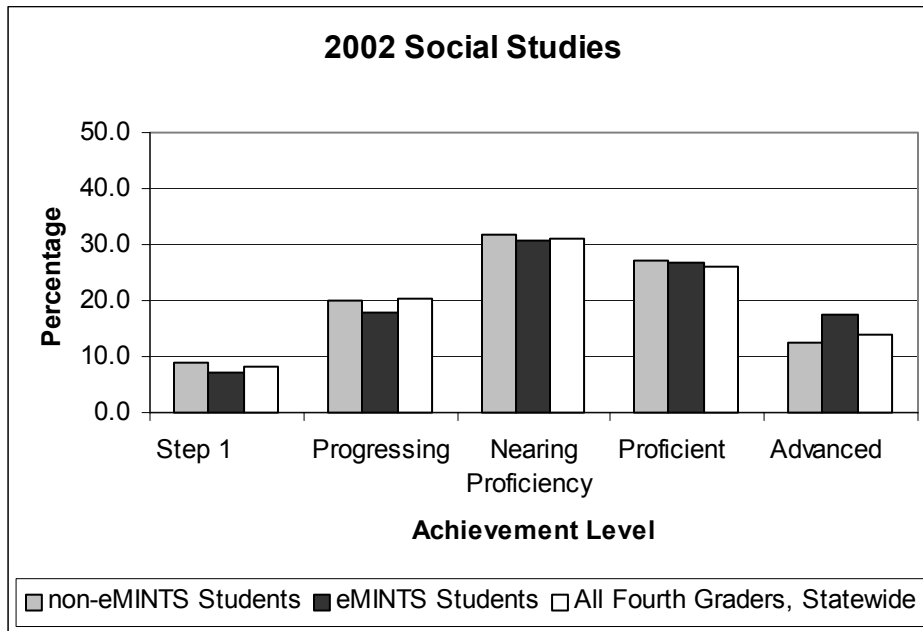
Percent Distribution of MAP Achievement Levels

MAP Achievement Level	non-eMINTS Students	eMINTS Students	All Fourth Graders, Statewide
Step 1	2.5	1.4	2.7
Progressing	20.2	17.1	18.4
Nearing Proficiency	43.4	38.3	41.3
Proficient	28.9	32.1	29.9
Advanced	5.0	11.1	7.7
Total	100.0	100.0	100.0
Total Number of Students	866	1448	71021
P-Value	<0.0001		

The proportion of eMINTS students in the two highest categories of the MAP performance level is slightly higher than that of all third graders. Like the difference between eMINTS and non-eMINTS students, these differences are slight, 0.9 percentage points in the "Proficient" category and 0.6 points in the "Advanced" category. One notable difference between eMINTS and non-eMINTS students is seen in the "Step 1" category, 2.4 percent of the eMINTS students were in this category, compared to 4.5 percent of the non-eMINTS students.

As with Communication Arts test, eMINTS enrollment does not appear to have a net positive or negative effect on the performance of third graders on the Science test.

Figure 4
MAP Achievement Level Results, Fourth Grade Social Studies



Percent Distribution of MAP Achievement Levels

MAP Achievement Level	non-eMINTS Students	eMINTS Students	All Fourth Graders, Statewide
Step 1	8.9	7.2	8.3
Progressing	19.9	17.8	20.5
Nearing Proficiency	31.6	30.6	31.1
Proficient	27.2	26.9	26.2
Advanced	12.4	17.6	13.9
Total	100.0	100.0	100.0
Total Number of Students	1452	864	70904
P-Value	0.0088		

Results for Mathematics

Unlike the results for Communication Arts and Science tests, there are statistically significant differences on the Mathematics test. The difference between eMINTS and non-eMINTS students is 3.2 points on the "Proficient" category and 6.1 points on the "Advanced" category (see Figure 3).

eMINTS students scored higher than all fourth graders, statewide as well. The percentage of eMINTS students in the "Proficient" category is 2.2 points higher and the percentage of eMINTS student in the "Advanced" category is 3.4 points higher than the percentage of all fourth grade students, statewide.

Results for Social Studies

The differences between eMINTS and non-eMINTS students on the Social Studies test are also significant. The largest difference is in the "Advanced" category. The percentage of eMINTS students in this category was 5.2 points higher than non-eMINTS students.

There is a similar difference between eMINTS students and all fourth grade students statewide. The percentage of eMINTS students in the "Advanced" category is 3.7 points higher than the percentage of fourth grade students statewide.

Summary of Differences in MAP Achievement Levels

The analysis of MAP achievement levels from the FY01 schools shows statistically significant differences on the two fourth grade tests, Mathematics and Social Studies. The differences on the third grade tests, Communication Arts and Science, were not significant. This is a departure from the results seen for the FY00 schools. The MAP achievement levels results in FY00 schools showed significant differences on all four tests.

The Impact of eMINTS Enrollment on Raw MAP Scores

Analysis of raw MAP scores allows for consideration of the role individual classroom and student characteristics have on test performance. This analysis presented looks at three general sets of predictors:

- 1) The overall impact of being enrolled in the eMINTS classrooms on student performance;
- 2) The impact of enrollment in the eMINTS classrooms on the performance of three groups of students: students with Individual Education Plans (IEPs), students receiving Title I remedial services and students eligible for the free and reduced lunch program; and
- 3) The general impact of three varieties of instructional practices on student performance for eMINTS students.

The Overall Impact of eMINTS

Tables 2 and 3 present results from the analysis of raw MAP scores. As with the analysis of MAP achievement levels, there are significant differences for the two fourth grade tests, but no significant differences on the third grade tests. Students in eMINTS classes scored higher than non-eMINTS students on the Mathematics and Social Studies test. The difference in the mean values associated with enrollment in an eMINTS classroom is 4.20 points for the Social Studies test and 9.84 points for the Mathematics test. Fourth graders in the eMINTS classrooms also scored substantially higher than all fourth grade students, statewide. eMINTS students scored an average of 6.21 points higher on the Mathematics test and an average of 3.57 points higher than all students statewide on the Social Studies test.

Table 2
Mean Differences in MAP Scores by eMINTS Enrollment,
Third Grade

Communication Arts

	Number of Classes	Number of Students	Mean	Standard Deviation	P-Value	Cohen's D	Effect Size Variance	Difference in Means vs. All vs. non- eMINTS Classes	Third Graders, Statewide
eMINTS Classes	32	616	642.85	32.15	0.8003	0.0127	0.0025	0.41	1.02
non-eMINTS Classes	56	1133	642.44	32.71					0.60
All Classes in eMINTS Schools	88	1749	642.59	32.51					0.75
All Third Grade Students, Statewide		67213	641.84	32.33					

Science

	Number of Classes	Number of Students	Mean	Standard Deviation	P-Value	Cohen's D	Effect Size Variance	Difference in Means vs. All vs. non- eMINTS Classes	Third Graders, Statewide
eMINTS Classes	32	616	638.46	35.27	0.7130	0.0187	0.0025	0.67	1.50
non-eMINTS Classes	56	1132	637.79	37.00					0.83
All Classes in eMINTS Schools	88	1748	638.03	36.39					1.07
All Third Grade Students, Statewide		67213	636.96	35.02					

Table 3
Mean Differences in MAP Scores by eMINTS Enrollment,
Fourth Grade

Mathematics

	Number of Classes	Number of Students	Mean	Standard Deviation	P-Value	Cohen's D	Effect Size Variance	Difference in Means vs. All vs. non- eMINTS Classes	Fourth Graders, Statewide
eMINTS Classes	43	866	647.60	39.73	<0.0001	0.2581	0.0019	9.84	6.21
non-eMINTS Classes	68	1448	637.76	35.32					-3.64
All Classes in eMINTS Schools	111	2314	641.44	37.33					0.05
All Fourth Grade Students, Statewide		71021	641.39	38.75					

Social Studies

	Number of Classes	Number of Students	Mean	Standard Deviation	P-Value	Cohen's D	Effect Size Variance	Difference in Means vs. All vs. non- eMINTS Classes	Fourth Graders, Statewide
eMINTS Classes	43	864	656.76	25.91	0.0001	0.1656	0.0019	4.20	3.57
non-eMINTS Classes	68	1452	652.56	24.36					-0.63
All Classes in eMINTS Schools	111	2316	654.13	25.03					0.94
All Fourth Grade Students, Statewide		70904	653.19	25.26					

The Impact of eMINTS for Special Education Students, Title I Students and Free and Reduced Lunch Students

This section considers differences associated with enrollment in the eMINTS classroom for students identified as receiving special education services (defined as those with an individual education plan or IEP), students receiving Title I remedial services and students eligible for the free and reduced lunch (FRL) program. Eligibility for the free and reduced lunch program is the accepted proxy measure for family poverty status.

When teachers from the first eMINTS cohort described the impact of the classroom environment on students, many described great improvement in the work and behavior of students in a variety of special statuses, i.e., special education students, students receiving additional academic support and students with lower social economic status.³ This improvement was seen in the MAP scores of several of these groups of students. In particular, fourth grade Title I students enrolled

³ See the *Teacher Perceptions of Student Change in FY00 eMINTS Classrooms* report on the eMINTS website <http://emints.more.net/evaluation>.

in the eMINTS classrooms scored much higher on Mathematics and Social Studies tests than did Title I students not in the eMINTS classrooms. This section repeats the analysis for students in special statuses in the FY01 schools.

Information about students with IEPs and students receiving Title I services was collected from the student identification codes on the MAP forms. Information about student eligibility for the FRL program was taken from student records collected from individual student information systems.

Tables 4 and 5 present the joint distribution of IEP status, participation in the Title I program and eligibility for the FRL program. The most common status is eligibility of the FRL program. About 43 percent of all third grade students and 45 percent of all fourth grade students in the FY01 eMINTS schools were classified as eligible for this program. These percentages are slightly lower than those seen in the FY00 schools (see Appendix A).

The second largest category was students enrolled in the Title I program. About 40 percent of the students in each grade of the FY01 eMINTS schools were designated as receiving Title I services. In contrast, about 30 percent of FY00 third graders and 20 percent of FY00 fourth graders were designated as receiving Title I services.

Special education students were the smallest groups in each year. About 13 percent of third graders and 14 percent of fourth graders were classified as having IEPs. About 15 percent of FY00 students in each grade were classified as having IEPs.

Table 4
Percentage Distribution of Special Student Statuses
Grade 3

Communication Arts

	non-eMINTS Students	eMINTS Students	All Students	Number of Students
IEP Students	63.5	36.5	12.5	219
Title I Students	62.4	37.6	39.1	684
Free/Reduced Lunch Students	63.6	36.4	43.1	753

Among IEP Students

Title I Students	61.5	38.5	35.6	78
Free/Reduced Lunch Students	62.0	38.0	58.9	129

Among Title I Students

Free/Reduced Lunch Students	57.1	42.9	49.1	336
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Science

	non-eMINTS Students	eMINTS Students	All Students	Number of Students
IEP Students	63.2	36.8	12.6	220
Title I Students	62.3	37.7	38.1	666
Free/Reduced Lunch Students	63.5	36.5	43.1	754

Among IEP Students

Title I Students	61.3	38.7	34.1	75
Free/Reduced Lunch Students	60.9	39.1	58.2	128

Among Title I Students

Free/Reduced Lunch Students	56.7	43.3	49.3	328
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Between 30 and 40 percent of students in each special status were enrolled in an eMINTS classroom. In most cases, this percentage is higher than that seen in the FY00 schools.

Table 5
Percentage Distribution of Special Student Statuses
Grade 4

<u>Mathematics</u>	non-eMINTS Students	eMINTS Students	All Students	Number of Students
IEP Students	65.2	34.8	14.4	333
Title I Students	59.8	40.2	36.0	834
Free/Reduced Lunch Students	63.7	36.4	44.5	1029
<u>Among IEP Students</u>				
Title I Students	62.5	37.5	36.0	120
Free/Reduced Lunch Students	66.8	33.2	62.5	208
<u>Among Title I Students</u>				
Free/Reduced Lunch Students	60.2	39.8	50.4	420
<u>Social Studies</u>				
	non-eMINTS Students	eMINTS Students	All Students	Number of Students
IEP Students	65.2	34.9	14.3	330
Title I Students	59.8	40.2	35.7	826
Free/Reduced Lunch Students	63.9	36.1	44.7	1034
<u>Among IEP Students</u>				
Title I Students	63.4	36.6	33.9	112
Free/Reduced Lunch Students	66.8	33.2	63.0	208
<u>Among Title I Students</u>				
Free/Reduced Lunch Students	59.9	40.1	50.7	419

Results for Third Grade

The results for the two third grade tests are presented in Tables 6 and 7. First, there are no statistically significant differences in the third grade. Nevertheless, some of the differences are larger than the overall eMINTS-non-eMINTS difference. For example, eMINTS students with IEPs scored 1.30 points higher than non-eMINTS IEP students on the Communication Arts test while the overall eMINTS-non-eMINTS difference was 0.41 points (see Table 6). eMINTS students with IEPs also scored 5.22 points higher than non-eMINTS IEP students on the Science test, compared to an eMINTS-non-eMINTS difference of 0.67 points for all students (see Table 7).

Table 6
MAP Score Differences for Students in Special Statuses,
Third Grade Communication Arts

	Number of Students	Mean	Standard Deviation	P-Value	Effect Size Cohen's D	Variance	Difference in Means
<u>IEP Students</u>							
eMINTS Students	80	619.41	37.98	0.8195	0.0331	0.0199	1.30
Non-eMINTS Students	139	618.11	42.18				
All IEP Students	219	618.58	40.61				
<u>Title I Students</u>							
eMINTS Students	257	638.35	29.59	0.8151	0.0186	0.0063	-0.55
Non-eMINTS Students	427	638.90	29.94				
All Title I Students	684	638.69	29.79				
<u>FRL-Eligible Students</u>							
eMINTS Students	274	633.16	27.65	0.9088	0.0089	0.0058	-0.25
Non-eMINTS Students	479	633.42	29.65				
All FRL-Eligible Students	753	633.32	28.92				
<u>Overall eMINTS-Non-eMINTS Difference</u>							0.41

Third-grade eMINTS students in the other two statuses, Title I students and FRL eligible students, each scored lower on average than their non-eMINTS peers. These differences are not statistically significant and the differences are relatively small, less than six-tenths of a point on the Communication Arts test and less than three points on the Science test.

Table 7
MAP Score Differences for Students in Special Statuses,
Third Grade Science

	Number of Students	Mean	Standard Deviation	P-Value	<i>Effect Size</i>		<i>Difference in Means</i>
					Cohen's D	Variance	
<u>IEP Students</u>							
eMINTS Students	81	620.80	46.05	0.4563	0.1083	0.0197	5.22
Non-eMINTS Students	139	615.58	52.21				
All IEP Students	220	617.50	49.99				
<u>Title I Students</u>							
eMINTS Students	251	632.75	33.49	0.2790	0.0867	0.0064	-2.89
Non-eMINTS Students	415	635.65	33.33				
All Title I Students	666	634.56	33.39				
<u>FRL-Eligible Students</u>							
eMINTS Students	275	626.88	31.32	0.5353	0.0470	0.0057	-1.55
Non-eMINTS Students	479	628.43	35.70				
All FRL-Eligible Students	754	627.86	34.16				
<u>Overall eMINTS-Non-eMINTS Difference</u>							<u>0.67</u>

Results for Fourth Grade

The results for the two fourth grade tests are presented in Tables 8 and 9. Here, the only statistically significant differences are for students eligible for the FRL program. FRL-eligible students in eMINTS classrooms scored an average of 9.24 points higher than other FRL-eligible students on the Mathematics test and an average of 3.92 points higher on the Social Studies test. In each case, the magnitude of the difference is similar to that of the overall differences between eMINTS-non-eMINTS students.

Table 8
MAP Score Differences for Students in Special Statuses,
Fourth Grade Mathematics

	Number of Students	Mean	Standard Deviation	P-Value	<i>Effect Size</i>		<i>Difference in Means</i>
					Cohen's D	Variance	
<u>IEP Students</u>							
eMINTS Students	116	620.12	40.16	0.9953	0.0007	0.0133	-0.03
Non-eMINTS Students	217	620.15	39.03				
All IEP Students	333	620.14	39.37				
<u>Title I Students</u>							
eMINTS Students	335	638.18	33.87	0.4492	0.0535	0.0050	1.80
Non-eMINTS Students	499	636.38	33.62				
All Title I Students	834	637.10	33.72				
<u>Free/Reduced Lunch Students</u>							
eMINTS Students	374	639.74	37.33	<0.0001	0.2538	0.0042	9.24
Non-eMINTS Students	655	630.50	34.83				
All Free/Reduced Lunch Students	1029	633.86	36.01				
Overall eMINTS-Non-eMINTS Difference							9.84

On each fourth grade test eMINTS students receiving Title I services scored between one and two points higher than non-eMINTS Title I students. IEP students in the eMINTS classrooms scored lower than non-eMINTS students, 0.03 points on the Mathematics test and 5.03 points lower on the Social Studies test. None of these differences was statistically significant.

Table 9
MAP Score Differences for Students in Special Statuses,
Fourth Grade Social Studies

	Number of Students	Mean	Standard Deviation	P-Value	<i>Effect Size</i>		<i>Difference in Means</i>
					Cohen's D	Variance	
<u>IEP Students</u>							
eMINTS Students	115	637.12	29.01	0.1041	0.1815	0.0135	-5.03
Non-eMINTS Students	215	642.15	25.42				
All IEP Students	330	640.40	26.79				
<u>Title I Students</u>							
eMINTS Students	332	651.67	25.49	0.4938	0.0483	0.0050	1.21
Non-eMINTS Students	494	650.46	24.58				
All Title I Students	826	650.95	24.94				
<u>Free/Reduced Lunch Students</u>							
eMINTS Students	373	650.77	26.36	0.0172	0.1521	0.0042	3.92
Non-eMINTS Students	661	646.86	24.76				
All Free/Reduced Lunch Students	1034	648.27	25.41				
Overall eMINTS-Non-eMINTS Difference							4.20

Summary

The results of this analysis of eMINTS enrollment among students in special statuses show fewer significant performance differences for students in the FY01 cohort of eMINTS schools than for students in the FY00 cohort. The major difference is seen in the fourth grade, where low income students enrolled in eMINTS classrooms scored higher than low income students not in these classrooms. For both of the fourth grade tests, the difference was similar to the overall eMINTS-non-eMINTS difference.

Different groups of eMINTS students scored marginally better than their non-eMINTS peers, e.g., IEP students on the third grade tests, Title I students on the fourth grade tests. While these differences are not statistically significant, they do account for as much as ten percent of the differences among students in different statuses.

Compared to the results seen in the FY00 cohort, these results suggest that the impact of eMINTS enrollment for students in special statuses may be dependent on other factors, such as instructional practices.

Instructional Practices and MAP Performance

The most visible aspect of the eMINTS Program is the classroom technology: the computers, the interactive whiteboard and the projector. However, most of the time and effort spent creating eMINTS classrooms focuses on instructional practices. eMINTS teachers participate in over 250 hours of professional development beyond their standard contract. This professional development is designed to develop an inquiry-based, multidisciplinary, student-centered classroom environment.

The ongoing work of the eMINTS professional development program and the eMINTS evaluation focuses on the assessment of teacher instructional practice. During the evaluation of the FY00 cohort of eMINTS schools instructional practices were assessed through direct observation, using the eMINTS lesson typology.⁴ The program's Cluster Instructional Specialists (CIS) assessed the instructional practices of the teachers in the FY01 cohort using a summary rubric called the "Hallmarks of an eMINTS Effective Classroom."

This rubric rated instructional practices in terms of teachers' overall application of inquiry-based and constructivist teaching practices in eight domains. The domains and scoring are presented in Appendix C. Individual CIS rated the instructional practices of teachers with whom they worked at the conclusion of their professional development experience. These ratings were based on CIS observations and interactions with teachers during the conduct of the eMINTS professional development program.

The Hallmarks rubric differs from the eMINTS Lesson Typology in several ways. First, the eMINTS Lesson Typology is based on a single classroom observation, while the Hallmarks rubric is a summary of instructional practices completed by CIS, in this instance, at the conclusion of the eMINTS Professional Development program. The Hallmarks rubric is a summary of teaching practices observed over time rather than the classification of a single lesson. A second difference is in the complexity of the measurement. The Lesson Typology is essentially a checklist of observed activities while the Hallmarks ask the CIS to provide a more comprehensive assessment of instructional practices. CIS are asked to assess teachers' "typical" activities in a given domain. Finally, while the Hallmarks is a more comprehensive rubric, it is also a more subjective one. The Hallmarks rubric asks the CIS to apply their informed judgment of both specific inquiry-based activities and the consistency of a teacher's application of these activities in their lessons. In contrast, the Lesson Typology is based on observable instances of practice. Both the Lesson Typology and Hallmarks rubric are attempts at summarizing instructional activities, but they each provide a different perspective on the application of inquiry-based instructional practice.

⁴ See *A General Typology of eMINTS Lessons* on the eMINTS website <http://emints.more.net/evaluation>

Table 10
Basic Statistics, eMINTS Hallmarks Rubric

Domain	Number of Teachers	Mean	Standard Deviation	Minimum	Maximum
Curriculum	75	2.47	0.88	0	4
Classroom Technology Richness	75	2.41	1.05	0	4
Community of Learners	75	2.39	1.22	0	4
Teacher-facilitated Learning	75	2.37	1.02	0	4
Professional Collaboration	75	2.23	0.88	0	4
Unique Teaching Pedagogy and Learning Strategies	75	2.17	1.11	0	4
Student-centered Learning	75	2.12	1.19	0	4
Assessment of Student Performance	75	2.05	0.94	0	4
Total Hallmark Score	75	18.21	7.16	1	32

Category	<i>Low</i> <i>Range</i>	<i>High</i> <i>Range</i>	Number of Teachers			
			Grade 3	Grade 4	Total	Percentage
Proficient	<i>26</i>	<i>32</i>	5	8	13	17.3
Transitional	<i>18</i>	<i>25</i>	15	18	35	46.0
Experimental	<i>10</i>	<i>17</i>	8	10	18	24.0
Emerging	<i>1</i>	<i>9</i>	4	7	11	14.7
All Teachers			32	43	75	100.0

The scores on each domain of the rubric ranged between 0 (for a teacher whose practices are in the "Emerging" level) and 4 (for a teacher whose practices are at the "Advanced" level). This created an overall score with a possible range of 0 to 32 points. None of the teachers were rated as having teaching practices that were "Emerging" (i.e., received a score of 0) on all of the domains of the scale, although at least one teacher was rated as having "Experimental" teaching practices (and received a score of 1) in one domain but "Emerging" in all of the others. The total score was then collapsed into four categories, identifying "Emerging," "Experimental," "Transitional" and "Proficient" instructional practices for eMINTS teachers. The basic statistics for the total scale and each domain are presented in Table 10.

The summary categories, "Emerging" to "Proficient" are used in the analysis below. These categories are roughly distinguished by the frequency with which the instructional practices were observed to include inquiry-based activities. As seen in Appendix C, the teaching practices of teachers using "Emerging" instructional strategies seldom demonstrated these techniques, while the practices of teachers using "Proficient" instructional strategies consistently demonstrated them.

Table 11
MAP Score by eMINTS Hallmarks Category
Third Grade Communication Arts

Category	Number of Teachers	Number of Students	Mean	Standard Deviation
Proficient	5	105	656.47	32.84
Transitional	15	268	643.28	28.47
Experimental	8	162	639.81	29.38
Emerging	4	81	629.88	40.83
Total	32	616	642.85	32.15

Effect Size

P-Value	R-Square	Eta Squared
<0.0001	0.0545	0.9455

Mean Differences (**Bold Cells** p<0.05)*

	Proficient	Transitional	Experimental	Emerging
Proficient	0.00			
Transitional	13.19	0.00		
Experimental	16.66	3.47	0.00	
Emerging	26.59	13.40	9.93	0.00

*Tukey HSD

The analysis of Table 10 shows that the instructional practices of the largest group of FY01 eMINTS teachers fell in the "Transitional" category, indicating that their teaching practices demonstrated the inquiry-based instructional strategies endorsed by the eMINTS Program in most instances.

Results for Communication Arts

Table 11 shows the mean MAP scores on the Communication Arts test by levels of the Hallmarks categories. These differences are statistically significant and remarkable in their size. Students in classrooms with teachers whose instructional practices were rated as "Proficient" on the Hallmarks scale scored an average of at least 13.18 points higher than other eMINTS students. In addition, there is evidence to suggest that virtually any application of inquiry-based instructional techniques translates into a substantial increase in MAP scores, as seen by the nearly ten point difference between students in classes with eMINTS teachers whose instructional practices were rated "Experimental" and those in classes with eMINTS teachers whose instructional practices were "Emerging."

Table 12
MAP Score by eMINTS Hallmarks Category
Third Grade Science

Category	Number of Teachers	Number of Students	Mean	Standard Deviation
Proficient	5	106	652.25	31.35
Transitional	15	268	638.08	33.44
Experimental	8	161	640.27	29.89
Emerging	4	81	618.06	45.52
Total	32	616	638.46	35.27

Effect Size

P-Value	R-Square	Eta Squared
<0.0001	0.0712	0.9288

Mean Differences (**Bold Cells** p<0.05)*

	Proficient	Transitional	Experimental	Emerging
Proficient	0.00			
Transitional	14.17	0.00		
Experimental	11.98	-2.19	0.00	
Emerging	34.19	20.02	22.21	0.00

*Tukey HSD

Looking at the mean differences, it appears that the four categories of instructional practice can be reduced to three. The students of teachers whose instructional practices classified as "Proficient" stand out as with the highest average Communication Arts scores. The differences between teachers with "Transitional" and "Experimental" instructional practices are not significant, suggesting that the difference between "occasional" and "frequent" application of inquiry-based practices does not produce an incremental performance increase. The group with the lowest average scores is students in classes where the instructional practices were classified as "Emerging." What is clear is that not applying inquiry-based practices in an eMINTS environment results in a net score deficit compared to other students whose eMINTS teachers used inquiry-based instructional strategies.

Results for Science

Table 12 shows the mean MAP scores on the Science test by levels of the Hallmarks categories. As with the Communication Arts test, the differences are statistically significant. In addition, the differences are larger than those seen in Communication Arts. Students in classrooms with teachers whose instructional practices were rated as "Proficient" on the Hallmarks scale scored an average of at least 14.17 points higher than other eMINTS students. Compared to students with teachers whose instructional practices were "Emerging," student with teachers whose instructional practices were rated "Proficient" scored an average of 34.19 points higher. In addition, there is evidence to suggest that virtually any application of inquiry-based instructional techniques translates into a substantial increase in MAP scores, as seen by the 22.21 point

difference between students in classes with eMINTS teachers whose use of instructional practices was "Experimental" and those in classes with eMINTS teachers using "Emerging" instructional practices.

As with Communication Arts, it appears that students with teachers using "Proficient" instructional practices scored higher than students with teachers who used other types of instruction. It also appears that the difference between teachers with "Transitional" and "Experimental" instructional practices is not significant.

Table 13
MAP Score by eMINTS Hallmarks Category
Fourth Grade Mathematics

Category	Number of Teachers	Number of Students	Mean	Standard Deviation
Proficient	8	156	662.71	43.88
Transitional	18	359	648.62	39.44
Experimental	10	195	638.66	34.62
Emerging	7	156	641.29	37.65
Total	43	866	647.60	39.73

P-Value	<i>Effect Size</i>	
	R-Squared	Eta Squared
<0.0001	0.0423	0.9577

Mean Differences (**Bold** Cells p<0.05)*

	Proficient	Transitional	Experimental	Emerging
Proficient	0.00			
Transitional	14.08	0.00		
Experimental	24.04	9.96	0.00	
Emerging	21.41	7.33	-2.63	0.00

*Tukey HSD

Results for Mathematics

Table 13 presents the results for the Mathematics test. As with the third grade tests, there are significant differences between the Hallmark categories. Students in classes categorized by "Proficient" instructional practices scored, on average, twenty-one points higher than students of teachers using "Emerging" instructional practices and twenty-four points higher than students with teachers using "Experimental".

The grouping of the categories is different from the third grade tests. The third grade teachers fell into three groups: "Proficient," "Transitional" and "Experimental" and "Emerging." The results from the Mathematics test suggest there are statistically significant differences between the two types of practices: teachers who use "Proficient" practices and all other types of practice. This classification is complicated by the difference between teachers using "Transitional" practices and teachers using "Experimental" practices which is significant, while the difference between teachers using "Transitional" practices and teachers using "Emerging" practices is not.

Table 14
MAP Score by eMINTS Hallmarks Category
Fourth Grade Social Studies

Category	Number of Teachers	Number of Students	Mean	Standard Deviation
Proficient	8	156	667.81	26.70
Transitional	18	357	657.73	24.36
Experimental	10	194	651.31	24.86
Emerging	7	157	650.31	26.15
Total	43	864	656.76	25.91

P-Value	<i>Effect Size</i>	
	R-Squared	Eta Squared
<0.0001	0.0547	0.9453

Mean Differences (**Bold** Cells p<0.05)

	Proficient	Transitional	Experimental	Emerging
Proficient	0.00			
Transitional	10.09	0.00		
Experimental	16.50	6.42	0.00	
Emerging	17.51	7.42	1.00	0.00

*Tukey HSD

Results for Social Studies

Table 14 presents the results for the Social Studies test. These results are similar to the Mathematics test. On average, students whose teachers used "Proficient" practices scored almost eighteen points higher than students whose teachers used "Emerging" practices. Here, there are significant differences among three groups of students, students whose teachers used "Proficient" practices, students whose teachers used "Transitional" practices and students whose teachers used "Experimental" or "Emerging" practices.

Summary

The analysis of MAP score differences by levels of the Hallmarks rubric shows the effects of inquiry-based, student-centered instructional practices in technology-rich classrooms. Statistically significant differences between the Hallmarks categories are seen on all four tests. In every case, students with teachers whose instructional practice was "Proficient," teaching practices that consistently demonstrated the integration of inquiry-based practices into instruction and made use of the available technology, scored higher than students teachers used other types of instruction. These results clearly support the goals of the eMINTS Professional Development program.

These results also demonstrate, for the second year, that higher MAP scores are associated with the application of inquiry-based instructional practices within the context of a technology-rich classroom environment. In the FY00 cohort, eMINTS students in classrooms where teachers were observed conducting a "student-centered facilitated" lesson scored higher on each MAP test than did students in other eMINTS classrooms. These differences were statistically significant on the fourth grade tests, but there were performance improvements on the third grade tests as well. In the FY01 cohort, there were statistically significant differences on each test, students of "Proficient" instructional practices scored higher than students of eMINTS teachers using other types of instruction.

The results in Tables 11 through 14 show some important differences by the overall application of inquiry-based instructional practices. In the third grade, there are significant differences among instructional practices of three groups of teachers, "Proficient" versus "Transitional" and "Experimental" differences versus "Emerging" practices. The situation is more complicated among the fourth grade tests. On the Mathematics test, students whose teachers used "Proficient" practices scored significantly higher than students whose teachers used other types of instruction. On the Social Studies test, the differences are associated with any consistent application of these instructional practices.

These results, along with the results from the 2001 MAP test, show positive and consistent score differences associated with inquiry-based instruction in a technology-rich classroom.

Conclusions

The results of this analysis show three things:

1. Fourth grade students enrolled in eMINTS classrooms scored significantly higher on the MAP tests than students not enrolled in eMINTS classrooms;
2. Fourth grade students eligible for the free and reduced lunch program and enrolled in eMINTS classrooms scored higher than fourth grade students eligible for the free and reduced lunch program but not enrolled in eMINTS classrooms; and
3. Students with eMINTS teachers who consistently apply inquiry-based instructional practices score higher than students with eMINTS teachers who do not apply these practices. This last difference is seen on each third and fourth grade MAP test.

These results are less consistently positive than the results seen in the first cohort of eMINTS schools. Among the first cohort of schools, eMINTS students scored higher than non-eMINTS

students on each MAP test. In addition, eMINTS students in special statuses, in particular, students receiving Title I services, scored higher than non-eMINTS students in the same statuses. The only truly consistent finding relates to the differences associated with instructional practices. Among the first cohort there were statistically significant differences associated with instructional practices on the fourth grade tests.

The results of this analysis show the consistent role of inquiry-based instructional practices in supporting student performance. In both cohorts, students of teachers who consistently apply the inquiry-based instructional practices emphasized by the eMINTS professional development program scored higher on the MAP tests than did the students whose teachers used other instructional practices.

It is important to pay attention to the implications of these findings for instructional practice. First, as seen above there is direct positive relationship between teacher adoption of student centered instructional practices in eMINTS settings and increased student performance. This relationship is strong and significant in both years of MAP data analyzed by the eMINTS evaluation team. In 2001 this relationship was documented in the 2001 analysis using qualitative observations by evaluation staff. The relationship was found to be significant again in the 2002 analysis. The 2002 relationship is based on data gathered by CIS using the Hallmarks. Among other things, this finding demonstrates the construct validity of the Hallmarks and their application by CIS. The Hallmarks measured essentially the same outcomes as the previous qualitative observations. The Hallmark ordinal categories are directly related to increased student achievement.

Second, the report documents the positive impact of applying inquiry-based instructional methods in a technology-rich environment. It is notable that these differences are seen when as few as 17 percent of eMINTS teachers' instructional practices were classified as "Proficient" on the Hallmarks scale. Indeed, as Tables 11 through 14 show, the mean differences in student performance between eMINTS teachers using "Proficient" instructional practices and teachers using instructional practices at the other Hallmark levels is between 18 and 34 points. Had the eMINTS professional development program helped transform the instructional practices of the majority of eMINTS teachers the impact on student performance would have extraordinary. Thus, the report shows that the potential gains to students of more fully implementing eMINTS instructional practices are powerful. Estimates of the impact of such a transformation suggest that significantly positive results would have been seen on all MAP tests, rather than just in the fourth grade.

These results suggest the powerful role that the combination of instructional practices and multimedia technology has on student performance. While there were fewer statistically significant differences in some aspects of the program, these results in general substantiate the positive trends associated with eMINTS enrollments reported in the policy brief "Analysis of 2001 MAP Results for eMINTS Students," published in January 2002.

Appendix A
Differences Between the First and Second Cohorts of eMINTS Schools

As described in the report, the selection process for eMINTS schools changed between the first and second cohorts. Schools in the second cohort were selected through a more competitive process managed by DESE. This appendix outlines some key differences between the first cohort of eMINTS schools (the “FY00” cohort) and the second (the “FY01” schools) using DESE Core Data from the 2001-2002 school year. This appendix presents data from four variables: school size, school location, the school’s percentage of minority students and the school’s percentage of students eligible for the FRL program. An additional table compares the percentage distribution of students in special statuses (Special Education, Title I and FRL program eligibility) enrolled in the schools and the eMINTS classrooms.

School Size Distribution

Table A.1 presents the distribution of school size for the two eMINTS cohorts. In FY00, seventy percent of the schools were medium-sized, that is, had an enrollment between 251 and 500 students. In FY01 the schools are more evenly distributed among small schools, medium-sided schools and large schools. This dispersion of school sizes is seen in the second panel of the table. Here, the mean size of the FY01 schools is smaller than the mean for the FY00 schools, but the standard deviation for the FY01 schools is about 1.5 times larger than the standard deviation of the FY00 schools.

Table A.1
Distribution of School Size by eMINTS School Cohort

Percentage Distribution			
	FY00 Schools	FY01 Schools	All eMINTS Schools
1-250	10.6	33.3	20.9
251-500	70.2	33.3	53.5
501 +	19.1	33.3	25.6
Total	100.0	100.0	100.0
P-Value	0.0021		

Number of Students, Summary Statistics					
School Type	Number of Schools	Mean	Standard Deviation	Minimum	Maximum
FY00 Schools	47	417.68	141.29	125	978
FY01 Schools	39	398.59	213.93	98	869
All eMINTS Schools	86	409.02	177.07	98	978
P-Value	0.6346				

School Location

Table A.2 shows the percentage distribution of school urban and rural location by eMINTS cohort. The differences between the two cohorts are not statistically significant, although it appears that the percentage of schools in large and small towns is slightly higher in the FY01 cohort.

**Table A.2
School Location by eMINTS School Cohort**

Percentage Distribution

	FY00 Schools	FY01 Schools	All eMINTS Schools
Urban School	8.5	7.9	8.2
Suburban School	23.4	18.4	21.2
Large/Small Town School	59.6	68.4	63.5
Rural School	8.5	5.3	7.1
Total	100.0	100.0	100.0
P-Value	0.8426		

Percent Minority Students

Table A.3 shows the distribution of minority students by eMINTS cohort. The differences between the two cohorts are not statistically significant.

**Table A.3
Percent Minority Students by eMINTS School Cohort**

Percentage Distribution

	FY00 Schools	FY01 Schools	All eMINTS Schools
Less Than 1%	19.1	12.8	16.3
1% to 9.9%	48.9	59.0	53.5
10% to 24.9%	19.1	15.4	17.4
25% or More	12.8	12.8	12.8
Total	100.0	100.0	100.0
P-Value	0.7773		

Percentage of Minority Students, Summary Statistics

School Type	Number of Schools	Standard			
		Mean	Deviation	Minimum	Maximum
FY00 Schools	47	10.58	17.08	0.00	98.75
FY01 Schools	39	11.20	19.11	0.00	100.00
All eMINTS Schools	86	10.86	17.92	0.00	100.00
P-Value	0.8734				

Student Free and Reduced Lunch (FRL) Eligibility

Table A.4 shows the distribution of student FRL-Eligibility by eMINTS cohort. The differences between the two cohorts are statistically significant. Generally, the percentage of students eligible for the Free and Reduced Lunch program is higher among the FY01 cohort of schools.

Table A.4
Distribution of FRL-Eligible Students by eMINTS School Cohort
Percentage Distribution

	FY00 Schools		FY01 Schools		All eMINTS Schools
Less Than 25%	19.1		7.7		14.0
25% to 49%	44.7		33.3		39.5
50% or More	36.2		59.0		46.5
Total	100.0		100.0		100.0
P-Value	0.0788				
Percentage of FRL-Eligible Students, Summary Statistics					
School Type	Number of Schools	Mean	Standard Deviation	Minimum	Maximum
FY00 Schools	47	43.41	18.13	3.16	79.29
FY01 Schools	39	51.52	18.45	4.33	93.53
All eMINTS Schools	86	47.09	18.61	3.16	93.53
P-Value	0.0435				

Distribution of Students in Special Statuses by eMINTS Classes

Table A.5 compares the percentage of students in special statuses enrolled in the eMINTS classrooms. In the third grade the percentages of IEP students, Title I students and Free and Reduced Lunch eligible students were higher in FY01 than in FY00. In the fourth grade, the percentage of IEP students and Free and Reduced Lunch eligible students was higher in FY01 than in FY00.

Table A.5
Percentage Distribution of Students in Special Statuses by eMINTS Enrollment and eMINTS School Cohort

	eMINTS Students		All Students	
	FY00	FY01	FY00	FY01
<u>Communication Arts</u>				
IEP Students	23.1	36.5	14.7	12.5
Title I Students	31.2	37.6	29.0	39.1
FRL-Eligible Students	23.0	36.4	45.8	43.1
<u>Science</u>				
IEP Students	19.9	36.8	14.7	12.6
Title I Students	31.1	37.7	28.5	38.1
FRL-Eligible Students	22.7	36.5	46.0	43.1
<u>Mathematics</u>				
IEP Students	30.8	34.8	14.9	14.4
Title I Students	43.8	40.2	21.5	36.0
FRL-Eligible Students	31.8	36.4	37.4	44.5
<u>Social Studies</u>				
IEP Students	30.6	34.9	15.5	14.3
Title I Students	42.0	40.2	20.6	35.7
FRL-Eligible Students	31.6	36.1	37.3	44.7

At the school level, the percentage of students with IEPs is lower in FY00 than in FY01. This suggests that a broader cross-section of special education students were enrolled in the eMINTS classrooms in FY01, compared to FY00. Detailed information about special education students is available from the FY01 MAP student identification record. A future analysis will disaggregate MAP scores by type of disability and amount of time a student was enrolled in the eMINTS classrooms.

Appendix B
Differences by eMINTS Program Year

As discussed in the main body of this report, the definition of an "eMINTS teacher" changed between the first and second cohorts of the program. During the second cohort of the program, an eMINTS teacher was defined as a teacher who had completed the two-year professional development program prior to the administration of the 2002 MAP test. According to this criterion, 75 of the 102 teachers participating in the eMINTS professional development program during the 2001-2002 school year were classified as eMINTS teachers for the analysis presented above and 27 teachers were excluded from the analysis. These teachers were excluded from the analysis because they are part of the Expansion program and did not receive their student computers until the winter semester of the school year. They will not complete the eMINTS professional development program until the end of the 2002-2003 school year.

As mentioned above, these 27 first-year eMINTS teachers were either replacements or were new teachers added as part of the eMINTS expansion program. Thirteen of these teachers taught third grade and 14 taught fourth grade. This appendix presents MAP score totals for all 102 teachers. These 27 teachers were 26.5 percent of all eMINTS teachers participating in the FY01 cohort. The decision to exclude so many teachers from the analysis raises a question of bias. Fortunately, the analysis below shows that this decision did not bias the overall results presented in the main report.

Table B.1
Mean MAP Score by eMINTS Teacher Type
Third Grade

eMINTS Teacher Type	Number of Teachers	Number of Students	Mean	Standard Deviation	P-Value
<u>Communication Arts</u>					
Non-eMINTS Teacher	56	1133	642.44	32.71	0.4033
First-Year eMINTS Teacher	13	271	645.35	28.71	
Second-Year eMINTS Teacher	32	616	642.85	32.15	
All Teachers	101	2020	642.71	32.17	
<u>Science</u>					
Non-eMINTS Teacher	56	1132	637.79	37.00	0.8424
First-Year eMINTS Teacher	13	271	639.07	30.52	
Second-Year eMINTS Teacher	32	616	638.46	35.27	
All Teachers	101	2019	637.78	35.94	

Results for Third Grade

Table B.1 presents results for the third grade students. The 13 first-year eMINTS teachers taught a total of 271 students. Although the mean score for the students in these classes was slightly higher than the scores for both the non-eMINTS teachers and the second-year eMINTS teachers, these differences were not statistically significant. Consequently, the exclusion of these teachers would not have impacted the third grade results in any way.

Table B.2
Mean MAP Score by eMINTS Teacher Type
Fourth Grade

eMINTS Teacher Type	Number of Teachers	Number of Students	Mean	Standard Deviation	P-Value
<u>Mathematics</u>					
Non-eMINTS Teacher	68	1448	637.76	35.32	<0.0001
First-Year eMINTS Teacher	14	312	639.86	33.64	
Second-Year eMINTS Teacher	43	866	647.60	39.73	
All Teachers	125	2626	640.00	38.25	
<u>Social Studies</u>					
Non-eMINTS Teacher	68	1452	652.56	24.36	0.0002
First-Year eMINTS Teacher	14	312	652.45	22.58	
Second-Year eMINTS Teacher	43	864	656.76	25.91	
All Teachers	125	2628	653.01	25.97	

Results for Fourth Grade

Table B.2 presents the results for fourth grade students. The 14 first-year eMINTS teachers taught 312 students. Unlike the third grade results, the differences among the three teacher types are statistically significant. But as seen in Table B.2, the scores for students with first-year eMINTS teachers are very similar to those of students with non-eMINTS teachers. This suggests that the scores for first-year eMINTS teachers are identical to those of non-eMINTS teachers, a situation one would expect given that first-year eMINTS teachers were beginning their professional development experiences during the 2001-2002 schools year.

The statistical differences seen in Table B.2 are more properly characterized as differences between second-year eMINTS and the combination of non-eMINTS teachers and first-year eMINTS teachers. Consequently, the exclusion of the first-year eMINTS teachers from the analysis does not bias the results.

Appendix C
Hallmarks of an Effective eMINTS Classroom
(10/5/01)

An effective eMINTS classroom is characterized by observable attributes that result in improved student performance, increased parent involvement and enriched instructional effectiveness.

	EMERGING	EXPERIMENTAL	TRANSITIONAL	PROFICIENT	ADVANCED
Teacher-facilitated Learning	Teacher prefers conventional teaching methods such as round robin text reading and use of worksheets or packets. Knowledge transmitted from teacher to students	Teacher experiments with cooperative groups Students sometimes work in pairs or small groups on teacher-directed assignments.	Teacher uses project-based activities with increasing frequency. Students are in cooperative work groups at least half of each day with some student-initiated talk and participation in planning.	Teacher engages in long-term, complex inquiry-based learning activities with high levels of student input into planning everyday. Cooperative group work is the norm.	Teacher works among and learns with students in collaborative ways Students and teacher plan inquiry-based units grounded in real-world problems and work collaboratively to reach solutions.
Types Student-centered Learning	Students are receivers of knowledge/information. Teacher feels pressured to keep up with prescribed schedules. Class displays are teacher created or commercial.	Teacher takes student needs into account when planning class schedule and room arrangements. Student work products featured in some class displays.	Teacher gets student input on planning class schedule and learning activities. Decisions about room arrangement include student input.	Teacher and students plan class schedule, rules and consequences and room arrangement together with significant displays of student work.	Learning activities, room arrangement and classroom routines designed by teacher and students to accommodate student learning with student work products featured in all classroom displays
Unique Teaching Pedagogy and Learning Strategies	Questions typically elicit concrete linear responses (one right answer); students typically work independently on teacher-designed or commercially prepared materials.	Teacher attempts 1 or 2 types of questions* in selected subject areas, some cooperative grouping and is willing to plan and attempt a long-term unit with assistance.	Teacher consciously uses 3 types of questions*, students are grouped cooperatively 50% of time. Plans and teaches long-term units with one or more disciplines.	Teacher consistently uses most types of questions*, cooperative grouping and has many long-term, inter-disciplinary units with some extension beyond classroom.	Teacher constantly uses all types of open-ended questions requiring higher order thinking, flexible cooperative grouping, peer mentoring and authentic long-term interdisciplinary units extending beyond classroom.

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Community of Learners	Norms are established by teacher based on belief that children must be controlled for learning to occur. Teacher assumes responsibility for enforcing classroom rules. Students are workers and teacher is manager or boss who must constantly remind and direct students to complete work.	Norms are established by teacher based on belief that children require discipline for instruction to be effective. Teacher and students are exploring meaning of community. Some students are engaged in learning but others require frequent re-direction. Some risk-taking occurs.	Clear norms and expectations established by teacher and students based on belief that children can learn. Teacher and students are trying to form a community. Many students are engaged in learning, only a few require frequent re-direction. Risk-taking is permitted.	Clear norms and expectations established by teacher and students based on belief that all children can learn. Teacher and students have formed a community with nearly all students engaged in learning, only 1 or 2 require frequent re-direction. Risk-taking is encouraged.	Norms and expectations are clear, support academic work and student-to-student collaboration. They are based on belief that all children can and will learn. Teacher and students have formed a community: all students are active, engaged learners who take responsibility for own and each other's learning, risk-taking is encouraged in a safe and secure environment.
Technology Richness	Limited use of multi-media technologies by teacher and students with minimal fluency in mostly conventional teaching situations.	Occasional use of two or more multi-media technologies by teacher and students in instruction that is sometimes interdisciplinary.	Three or more multi-media technologies used where appropriate for several short time blocks each day with increasing fluency by teacher and students in instruction that is becoming interdisciplinary.	Wide variety of multi-media technologies used with high levels of fluency daily by teacher and students where appropriate in interdisciplinary instruction.	Full complement of multi-media technologies (including video-conferencing or Internet2 projects) used fluently and seamlessly by students and teacher in the learning process on a daily basis where appropriate in interdisciplinary instruction.

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Curriculum	Teacher believes that rote memorization of facts will move students towards achievement of standards-based curriculum goals. Curriculum goals are known by the teacher.	Teacher relies on outside definition of curriculum scope and sequence, often text-based. Awareness that there is a relationship between content knowledge and processes. Teacher shares some curriculum goals with students.	Teacher combines standards-based scope and sequence with text-based curriculum and has an initial understanding of how content knowledge and processes are related. Curriculum goals are often discussed with students and parents.	Scope and sequence is standards-based with focus on acquisition of content knowledge through processes. Teacher can articulate relationship between learning units and standards. Curriculum goals are always shared and discussed with students and parents	Scope and sequence is standards-based with heavy emphasis on acquisition of content knowledge through processes. Teacher and students can articulate relationship between learning units and standards. Curriculum goals are shared and discussed with students and parents and their input is solicited.
Assessment of Student Performance	Teacher prefers conventional methods of assessment including teacher or commercially prepared lesson/unit tests. Daily or weekly grades are based on teacher-developed numerical scales. Minimal use of other forms of assessment or record keeping. .	Teacher is researching scoring guides and rubrics, has used one or more that have been adapted from other sources with beginning awareness of what constitutes formative and summative assessments. Teacher tries to communicate expectations to students and parents.	Teacher develops scoring guides and rubrics with input from students for some instructional units, some are formative and some are summative and are becoming authentic. Teacher communicates expectations to students and parents.	Scoring guides and rubrics are developed by teacher and students for most instructional units, include formative and summative measures, are authentic and based on expectations that have been communicated to students and parents in multiple formats.	Scoring guides and rubrics are developed by teacher and students for all instructional units, include formative and summative measures, are authentic and based on expectations that have been communicated to students and parents ahead of time in multiple formats

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Professional Collaboration	Teacher attends required professional development sessions and faculty meetings.	Teacher participates in required professional development and structured sharing sessions. Occasional student teacher placements accepted. Reads professional journal articles when provided. Serves on at least one building level committee.	Teacher willing to engage in professional sharing and collaboration when asked. Accepts limited pre-service teacher observations or student teachers. Reads professional journals and attends professional conferences. Serves on building or district committee.	Teacher makes self available for professional sharing and collaboration with colleagues, pre-service teachers and others. Teacher writes articles for professional journals and has submitted conference presentation proposals. Serves on multiple building or district committees.	Teacher seeks out professional sharing, collaboration and mentoring with colleagues, pre-service teachers and other educators in a continual quest for ways to improve teaching and learning. Teacher has published articles in professional journals and is requested as a presenter at professional conferences. Serves on and chairs multiple building, district or state-level committees.