Math and Science Academy
Year 5 Final Report

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MATH AND SCIENCE ACADEMY

YEAR 5 EVALUATION REPORT

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Abstract

This is an evaluation report for Year 5 of the Math and Science Academy (MSA), an initiative of the Northern New Mexico Council on Excellence in Education (NNMCEE). An overview of the project and its objectives is presented first, followed by a description of the research questions and methods used to carry out the evaluation. Next, findings from the Year 5 evaluation are described, including program impact on students, teachers, and administrators. The report concludes with recommendations for future years of MSA.

MSA Project Goals and Objectives

Recent reports based on a number of scales and indicators place K–12 public school performance in New Mexico among the poorest in the nation: students' test scores are rock bottom on the National Assessment of Educational Progress (NAEP), proficiency scores in language arts and math are low, high school drop-out rates continue to soar, schools are under-funded, and teachers are poorly prepared to meet their students' needs and the demands of teaching multiple subjects in multiple grades with insufficient knowledge and pedagogical skill.

To address these urgent needs and challenging circumstances, the Math and Science Academy (MSA) was developed to strengthen teaching quality and to increase student learning and achievement. MSA is a collaborative effort, developed jointly by the Northern New Mexico Council on Excellence in Education (NNMCEE), local school districts, the Northern Network for Rural Education, the University of California, and the Department of Energy's Los Alamos National Laboratory (LANL). It is a research-based model for continuous improvement, emphasizing professional collaboration and planning. The project uses the on-going formative assessment of project goals and ideals to review and revise project achievements and challenges.

Initially a middle school program, MSA was expanded during the fourth year of the project (2003–2004 school year) to include elementary schools, teachers and their students. Year 5 of the MSA project added additional participants: high, middle, and elementary school administrators, teachers, and students in 17 different schools from five different districts were members of the 2004–05 MSA program.

Project Overview

Teachers in Northern New Mexico face daunting obstacles in their efforts to provide quality learning experiences and a quality education for their students; inadequate funding, yearly changes in administration and school leadership, limited opportunities for professional development, insufficient planning time and collaboration with colleagues, unprepared students, generational poverty, and geographic isolation. To address these critical needs, the Math and Science Academy was developed in 1999 by a consortium of interested collaborators.

As a model for professional development, MSA has experienced numerous successes. On-going research and evaluation has documented the positive impact the program has had on strengthening teaching quality and increasing student learning. Teachers, administrators, and districts throughout Northern New Mexico have expressed interest and enthusiasm for the program based on its achievements, and as a result, the project has grown in size and scope. The initial MSA Year 1 cohort involved three schools in three districts with four teachers at each middle school site; two mentor teachers guided the project. Year 5 of the MSA project involved 17 schools in five districts, 72 teachers and 3 mentor teachers. As the project has grown, program goals have been refined and more clearly articulated, and MSA members (teachers and mentors) have become more savvy and sophisticated in understanding the ways in which to maximize project impact. Additionally, tools and structures have been developed to increase implementation of project goals to support students, teachers, administrators, and schools in their goal of improving teaching and learning in Northern New Mexico.

Evaluation and Design Issues

The first four years of the UCLA/CRESST evaluation of the MSA project were designed to describe how the program was implemented, to assess program effects and to generate recommendations for the improvement and enhancement of the project. Year 5 of the MSA evaluation paralleled some of the same research questions as Years 1 through 4 of the project, and added questions designed to gauge project impact as MSA expanded to elementary schools. Year 5 of the project examined the following research questions:

- What is the effect of MSA on teaching and learning?

- How is the MSA program evolving? How effective is the "scale-up" model for MSA? How does the cognitive coaching model function as a tool for professional development?

- How can the program be refined and sustained?

- How can the program to be refined to better support and enhance teacher professional development, administrative leadership, and student learning and achievement?

Additionally, Year 5 of the project worked to further develop a student database to monitor long term, intended effects of the project. Changes in the state assessment program have created numerous challenges to the development and use of such a database of information. Collection of longitudinal student achievement data is an on-going project challenge, as the assessments have changed throughout the course of the project, making year-to-year comparisons virtually impossible. As previous years of the project have shown, these student data provide critical information that helps us to better understand the long-term effects of teachers and school participation in a project such as MSA.

The evaluation uses multiple measures to understand and assess program implementation and effects. Surveys, interviews, and program documents are information sources on program implementation and impact. Formative evaluation is again a feature of the evaluation, based on our belief that feedback to program administrators and participants is critical to overall program success.

As in previous evaluations, Year 5 research incorporated results and findings from Years 1 through 4 of MSA. Years 1–3 were dedicated to facilitating development of the MSA model, while Year 4 focused on scale-up efforts and understanding how MSA worked in different settings with different teachers. The Year 5 evaluation focuses on how MSA has continued to evolve, and on documenting the ways in which the project expanded at the elementary school level. Additional data are presented on administrators and their role in the support and development of quality teaching and learning at the MSA sites.

Method

Multiple sources of information were used to understand project implementation and impact. Table 1 displays data sources for Year 5 of MSA.

Table 1

MSA Year 5: Data sources

Student Data	Surveys	Observations	Interviews
•CRTs	• Teachers	• Professional development sessions	• Teachers
- reading	• Administrators		• Project mentors
- math			• Administrators
- science			

Instruments. Surveys were administered at the conclusion of the 2004–05 academic year. Teachers and administrators had the option of responding electronically or in hard copy form. As in past years, teachers were queried on the ways in which participation in the Math and Science Academy influenced a variety of areas relating to project goals. Teachers responded to questions regarding their planning practices, the ways in which they support student learning, their knowledge and understanding of assessment strategies, knowledge and willingness to use a variety of instructional practices, ratings of program effectiveness, and the impact of cognitive coaching on their teaching. The survey asked both open-ended questions and questions that involved a 5-point rating scale. The administrator survey paralleled many of the same questions, but focused on MSA impact at the school level. A small sub-sample of MSA principals were interviewed about the program, and answered questions about project successes and barriers and general impressions regarding MSA impact on teachers and students.

Telephone interviews with MSA participants followed an established protocol, which contained probes on specific project goals. In some cases, participants responded via electronic communication to written probes. Copies of all instruments developed and used in the evaluation can be found in Appendices A and B.

Project Findings: Year 5

Findings from Year 5 of MSA are presented in the following sections. Demographic information on teacher participants is presented first, followed by general demographic information on students and schools. Results in the second section are organized around the research questions for Year 5 of MSA. The report concludes with additional information on project implementation and impact and recommendations for future years of MSA.

Participants

MSA teachers. Table 2 below displays demographic data for 54 Year 5 MSA teachers who completed surveys at the conclusion of the 2004–2005 school year. A total of 72 teachers were full participants (defined as participating in the majority of MSA requirements) in Year 5 of MSA. Teachers were from five districts, including two high schools, five middle schools and ten elementary schools, all located in Northern New Mexico. Survey data are available for 54 of 72 teachers who were program participants; data are absent from 18 teachers who left the project on or

before the conclusion of the 2004–2005 school year. As such, caution should be used in interpreting the survey results due to the incomplete data set.

MSA members who completed the survey included 43 female and 11 male teachers of primarily Hispanic, Latino/a, and/or Spanish American ethnicity (69%); the remaining 24% of MSA teachers were White (13 participants), and 4% were Native American (2 participants); the remaining 3% chose not to specify their ethnicity on the survey. MSA teachers had an average of 14.3 years of teaching, an increase over past years (range: 2–32 years); this year's cohort included no first-year teachers. Most teachers held elementary credentials (42 of 54, 80%), while others held a variety of credentials, including bilingual, single subject (biology), multiple subject (language arts, social studies, math, and science), special education and early childhood education. The majority of MSA teachers have Bachelor's degrees with teaching credentials and units beyond those degrees (41 of 54, 76%), and seven hold Bachelor's with a credential only. Four Year 5 MSA participant teachers have Master's degrees with additional course units of study.

Most teachers (over 55%) reported English as the primary language of instruction, with another 45% reporting the use of both English and Spanish during instruction. A number of MSA teachers (18 of 54, 32%) indicated previous experience in similar professional development programs, such as the University of New Mexico Math Academy, Math Star, Baldridge, Teach for America, American Indian Engineering Society (AIES), and a host of other projects.

MSA students. During the fifth year of MSA, approximately 2,760 students from 17 different schools participated in the project. They ranged in grades from kindergarten through tenth grade. At some schools, all teachers were MSA participants; every student was taught by an MSA teacher. Other sites involved grade level teams as MSA participants, meaning students had MSA teachers at a specific grade level. In some cases, a single teacher, at a specific grade level and content area, participated in the project.

Reflective of the general population in Northern New Mexico, student ethnicity was primarily Hispanic/Latino/a (63%), with roughly 17% Native American and 20% White and/or other ethnicities. These percentages varied significantly from school to school. More than 85% of the MSA student population qualified for a free/reduced lunch program (an indicator of poverty), while more than 56% of the total population was identified as English Language Learner (ELL).

Table 2

Year 5 MSA Teacher Demographic Information

Variable	Descriptor	N = 54
Sex	Male:	11
	Female:	44
Ethnicity	White:	13
	Hispanic/Latino/a Spanish American:	37
	Native American:	2
	Other:	0
Highest Degree Received	Bachelor's + Credential	7
	Bachelor's + Credential + Units Beyond:	39
	Master's + Units Beyond:	4
Teaching Credential*	General Elementary:	43
	General Secondary:	0
	Special Emergency:	7
	Multiple Subject:	2
	Single Subject:	15
	Bilingual:	
	Other: (Early Childhood, TESOL, Guidance, Special Ed., Science Endorsement):	18
Years of Experience	Average Number:	14.3
	Range of Years Teaching:	2 - 32
Previous participation in projects like MSA	Number of teachers: yes	18
Number of Years in Project**	1st Year MSA	18
	2nd Year MSA	20
	3rd Year MSA	6
	4th Year MSA	2
	5th Year MSA	5

Note. *Teachers may hold multiple credentials. **Total does not include all survey participants: some surveys were blank.

MSA mentors. MSA continues to be guided by three mentor teachers who are responsible for program development and implementation, as well as project management. Mentors participate in their own on-going professional development and education by attending and presenting at state and national conferences and seminars. As a group, they are well known, highly regarded, and valued for their strong content and pedagogical knowledge and commitment to students and teachers in Northern New Mexico. They hold multiple credentials, have extensive teaching experience, and expertise working with students, teachers, and administrators. Demographic data for the mentor teachers are displayed in Table 3 below.

Table 3

Year 5 MSA Mentor Demographic Information

Variable	Descriptor	N = 3
Sex	Male:	1
	Female:	2
Ethnicity	Hispanic/Latino/a	
	Spanish American:	2
	European - Asian:	1
Degrees Received	Bachelor's Degree:	3
	Teaching Credential:	3
	Master's Degree:	3
	Doctorate:	1
Teaching Credential*	General Elementary:	3
	General Secondary:	3
	Special Emergency:	
	Multiple Subject:	3
	Single Subject:	3
	Bilingual:	2
	Other:	3
Years of Teaching Experience	Average Number:	25
	Range of Years Teaching:	10 – 35

Note. *Teachers can hold multiple credentials.

During Year 5 of MSA, as in previous years of the project, mentors served as project directors and program planners, and worked to develop and implement the goals and direction of MSA. Mentors worked extensively with teachers to guide their thinking and practices and provide support to teachers as they implemented new strategies and approaches to teaching and collaboration. Each mentor observed a sub-sample of teachers at MSA sites, consisting of both returning teachers and teachers new to the project. The observations were based on a cognitive coaching model and included a pre-conference discussion of the lesson to be observed; the observation itself, during which time mentors compiled notes and used the classroom protocol developed in Year 2 of the project; and a subsequent debriefing session of the lesson. Mentors also developed an "MSA classroom protocol" as an informal measure to record the quality of the implementation of MSA project goals (see Appendix C).

MSA mentors were also involved in a number of community projects designed to have a long-term positive impact on the program during Year 5. These projects included the development of a Master's in Education program at Northern New Mexico University, and advisory work on New Mexico State Science standards and assessment development. Involvement in these projects was viewed as critical to the on-going and future success of MSA, but meant that mentors had more limited time and attention to devote to teachers and classroom observations.

Implementation of MSA Year 5 Project Goals

The following section presents data gathered to answer the four research questions previously stated, with specific examples of how and in what ways teachers implemented various elements of the project. The focus for MSA Year 5 was to further refine strategies for instructional excellence to increase student learning, continue to foster and support collaboration amongst and between teachers and schools, more systematically assess student learning, and explore how and in what ways the cognitive coaching model could be expanded to include more teachers in the process of reflecting on their instruction and refining it to better support and promote student learning. In the following sections, survey results are presented for Year 4 and Year 5 of MSA. There were 18 new MSA participants during Year 5, and as such, respondents vary in nature. It did seem worthwhile however, to make general comparisons for all MSA teachers in Years 4 and 5 of the project.

MSA Impact on Student Learning

Results presented in this section on MSA's impact on student learning include standardized achievement test scores (New Mexico introduced standards-based, criterion-referenced tests in March, 2005), and teacher and administrator survey data.

Teacher perspectives. Year 5 MSA teachers were asked to rate the project's impact on student learning and achievement. As in previous years, MSA teachers reported that they perceived student learning to be positively influenced by teacher participation in MSA. Table 4 below presents survey results of teacher perceptions of student learning. Overall, teachers reported positive increases in student learning and achievement tied to MSA objectives and concepts. Teachers positively rated various MSA approaches, such as the documentation of student progress, math strategies, and cooperative learning opportunities. Slight changes (both positive and negative) in teacher ratings occurred between 2004 and 2005, but these differences are not statistically significant.

Table 4

Student Learning and Achievement

		2004-05 N=54		2003-04 N=43	
	Please indicate your observations regarding student learning and achievement this year.	Mean	(SD)	Mean	(SD)
a)	I have observed changes in student learning and achievement this year.	4.0	(0.7)	3.8	(0.9)
b)	My participation in MSA had a positive impact on my students' learning and achievement this year.	4.5	(0.7)	4.7	(1.2)
c)	MSA helped increase student learning and achievement.	4.3	(0.8)	4.2	(0.6)
d)	Students learned more because of cooperative learning opportunities in my classroom.	4.1	(0.9)	4.1	(0.9)
e)	Students benefited from my keeping track of their progress in my classroom.	3.9	(0.9)	3.6	(1.2)
f)	Students benefited from use of math strategies in my classroom	4.2	(0.7)	NA	NA

Note. Scale: 1=disagree, 3= moderately agree, 5=strongly agree, NA=not applicable.

Teachers' open-ended responses regarding the ways in which MSA influenced student achievement and performance clustered around three general themes. First, teachers reported that classroom management techniques presented in MSA helped to create classrooms where learning was more likely to occur—when students better understood procedures, teachers could then focus on teaching rather than discipline and management issues. One teacher commented: "Having set rules and procedures and reviewing these at the beginning of the year helped immensely. The behavior was good so the learning *could* happen." Second, teachers indicated that the use of graphic organizers (an idea originally presented at the 2002 MSA Summer Institute) helped to support student learning, as did cooperative learning groups and structures. Finally, teachers observed an increase in complex thinking patterns for their students. Teachers noted that the development of curriculum maps during the Summer Institute allowed them to focus on student thinking and ideas, and probe student understanding more effectively, because they (teachers) had a clearer idea of what they wanted students to learn. The comments below highlight additional teacher observations of MSA's impact on student learning and achievement.

Teacher 27
My lower achievers in class specifically have shown great strides in learning this year. MSA has taught me how to assess my students and also find the gaps in their knowledge. This analysis has allowed me to close those gaps and has given the students confidence in what to study for their assessments, and what I am expecting them to know.

Teacher 45
Impact on and increases in student learning came from self-reflections, cooperative groups, and the use of graphic organizers. These tools helped students to gain a stronger-more lasting understanding of concepts. Technology was also quite beneficial.

Teacher 4
I have noticed an impact on student learning due to MSA because I went into depth with each lesson and had the students exercise more critical thinking skills. It made a difference.

Student Achievement

Standardized test results. Test scores reported in this section are from the 2004–05 school year for MSA schools. Data were provided to MSA by individual schools, while general information about school and district performance was

gathered from the New Mexico Public Education Department website (http://www.ped.state.nm.us/). Like all states, with the introduction of the "No Child Left Behind" federal legislation (No Child Left Behind Act of 2001), New Mexico schools were required to establish baseline proficiency levels in language arts and math for all students and make pre-determined steps, referred to as Adequate Yearly Progress (AYP), towards 100% proficiency level by 2014. Additionally, schools are required to report annually the percentage of students who score in the proficient range for reading and mathematics. All schools, and all identified sub-groups within a school, must demonstrate increases in the number of students reaching the "proficiency" level in both reading and mathematics, or risk serious repercussions and sanctions from federal funding sources.

Much has been written about this law and its effects on students, teachers, schools, and districts. Politics and funding issues aside, the goal is admirable, in particular its focus on improving student learning and achievement for *all* students. Many challenges remain, however, for understanding how and in what ways to design, implement, and analyze assessments and the data they produce to ensure that the assessments are consistent with learning goals, and that data and scores reflect the important technical qualities of reliability, validity, and fairness. Sound and unbiased interpretation of assessment data is critical if high-stakes decisions are to be made based on test results.

New Mexico approached the NCLB assessment task for accountability and instructional improvement by developing a new standards-based criterion referenced test for Grades 3–9 in mathematics, language arts, and science. These assessments were piloted between 2003–04, and subsequently revised based on piloting information. The 2004–05 school year was the first time the criterion-referenced, standards-based assessments were administered statewide. Table 5 below outlines information about the school configurations and AYP proficiency scores for New Mexico. There are numerous types of school clustering in New Mexico—in part due to geography, community needs, and funding sources— making calculations and interpretations of AYP more challenging.

Table 5

2005 New Mexico Percentage Proficient for AYP

School's Grade Configuration	Math Target	Reading Target
K–5	24.13	40.85
K–6	19.40	36.00
6–8	10.58	34.14
7–8	10.75	37.17
9–12	18.29	37.30
K–8	15.28	36.79
7–12	14.42	37.30
K–12	15.79	37.23

Note. Source: http://www.ped.state.nm.us/

Table 5 represents the proficiency percentages that are the starting points for schools to meet their AYP goals for 2005. The starting points shown in Table 5 were established using a procedure outlined by the NCLB Act for both reading and math. The following process was used:

1. Schools were ranked from lowest to highest based on previous assessment performance.

2. Starting with the lowest ranked school, enrollment for each school was added to the enrollment of the next highest performing school, until 20% of the statewide enrollment was reached. The percentage of proficient students for the school at which the 20% level was reached became the starting point for AYP.

As Table 5 illustrates, there is a noticeable decline in scores/proficiency percentages for middle schools. This finding is consistent with the developmental literature on student learning, where academic performance often declines during early adolescence. Indeed, MSA was developed in response to the on-going need for support and bolstering of middle-school students' learning and achievement.

In addition to establishing the proficiency percentages for AYP, cut scores for the new assessments were established based on scale scores. Because this is a standards-based assessment, the assessments themselves as well as many (but not all) of the items differ from grade level to grade level. It is therefore not possible to

compare a third grade math scale score of 600 to a fifth grade math scale score of 600, because the content standards for each grade vary. Some effort has been made to include items for vertical scaling, to allow for comparisons from year to year, but the test publisher has not released these items for analyses. Table 6 displays Grades 3–9 scale scores for math, reading, and science for New Mexico.

Table 6

Scale Scores and Proficiency Levels for NM Math, Reading, and Science

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 9
	SS Range	SS Range	SS Range	SS Range	SS Range	SS Range	SS Range
Mathematics							
Advanced (4)	660-999	678-999	696-999	714-999	732-999	751-999	770-999
Proficiency (3)	611-659	636-677	658-695	677-713	693-731	706-750	716-769
Nearing Proficiency (2)	556-610	584-635	609-657	629-676	646-692	658-705	667-715
Beginning Step (1)	278-555	287-583	314-608	335-628	354-645	367-657	383-66
No Score	—	—	—	—	—	—	—
Reading							
Advanced (4)	670-999	683-959	696-986	710-999	724-999	739-999	754-999
Proficient (3)	621-669	640-682	656-695	669-709	679-723	686-738	690-753
Nearing Proficiency (2)	592-620	600-639	609-655	620-668	632-678	646-685	661-689
Beginning Step(1)	297-591	297-591	302-608	319-619	335-631	330-645	337-660
No Score	—	—	—	—	—	—	—
Science							
Advanced (4)	670-999	687-999	704-999	719-999	734-999	747-999	760-999
Proficient (3)	599-669	627-686	651-703	669-718	683-733	691-746	695-759
Nearing Proficiency (2)	545-598	573-626	596-650	615-668	629-682	639-690	644-694
Beginning Step (1)	263-544	283-572	314-595	315-614	333-628	356-638	361-643
No Score	—	—	—	—	—	—	—

Some of the issues involved with CRTs and proficiency scores arise when a student scores right below (or above) the critical or cut value; that is, the score needed to achieve a specific level of proficiency. A one-point difference in a student score may cause a student to be labeled "proficient" or "not proficient" if s/he

scores at or near the threshold values. New Mexico has attempted to address this problem by creating a "confidence band" that includes both upper and lower limits for student scores.

Achievement results for the 2005 New Mexico Standards-Based assessment are categorized in four groups:

- **Advanced**: students at this level show expertise with skills in the New Mexico Content Standards.

- **Proficient**: students at this level show a solid though imperfect display of skills in the New Mexico Content Standards.

- **Nearing Proficiency**: students at this level show only a partial understanding of the knowledge and skills in the New Mexico Content Standards. Students may need additional instructional opportunities and academic commitment to achieve the Proficient level.

- **Beginning Step**: students at this level show a minimal understanding of skills included in the New Mexico Content Standards. Students need additional instructional opportunities and increased academic commitment to achieve the Proficient level.

In the following sections, 2 sets of information and analyses are presented: first, achievement scores for each of the 17 MSA schools are provided with proficiency percentages and AYP designations. Next, data are presented by grade level with scale scores and proficiency percentages. Where possible, comparisons are made between MSA schools at specific grade levels and "like grade levels," that is, grade levels at schools with similar populations and demographics. Comparisons between MSA schools were not conducted because of the unique characteristics of each site.

It is important to add a cautionary note here about the data provided in the following sections, and highlight a number of issues relative to sample size and the inferences it is possible to derive from the data, as well as other issues relating to data analyses and disaggregation. First, many MSA classes have fewer than 25 students. As mentioned previously, New Mexico set the sample size confidence band at 25 students. Data are presented for small classes, but caution should be used in interpreting those results. A small sample is more likely to be impacted by a single score than larger samples. Second, at the middle-school level, data are not disaggregated by content area teacher, so it is more difficult to understand the impact a teacher's participation in MSA may or may not have on students. Third,

some MSA schools have grade-level configurations that differ from the state's grade-level configurations, and a weighted average of multiple grades is not provided by the state. Finally, in some instances, a single teacher at a single grade participated in MSA. Scores are provided for that teacher, but not for the entire school.

MSA School Academic Performance: Whole School Proficiency Performance

Table 7 below provides information on performance proficiency percentages for all MSA schools for the 2004–2005 school year. The table displays information for schools by district and includes the grade levels included in the schools cluster. Where possible, specific grade levels and classes are identified by participation in MSA if an entire grade level did not participate in MSA. For example, in District 1, both elementary schools participated in MSA, but only one of the middle schools was part of the MSA program.

Using the cut scores and proficiency percentages for each MSA school, a tally of the number of MSA schools that reached AYP proficiency percentages was created. Those summary scores indicate that 11 of 16 MSA schools met their AYP (69%); 5 of the 16 (31%) schools failed to meet their AYP proficiency percentages. For MSA elementary schools (Grades K–5, K–6, 3–4, 5–6 configurations), 7 of 11 schools met the AYP goals (64%). Middle- and high-school level (Grades 6–8, 7–8, 8–9, and 9) proficiency percentages were lower: 2 of 5 (40%) MSA middle schools met their AYP goal. Data for all students at the high-school level were unavailable, and MSA teacher participation included ninth-grade teachers only. The proficiency rates for all schools in New Mexico are slightly lower than for MSA schools: of the states' 768 schools, 67% (519) made their annual AYP goal for 2004–05, but 33% of the schools (249) did not. On the state level, 55 of the 89 districts did not meet AYP (62%). These data provide a general overview of MSA schools vs. the state of New Mexico performance percentages.

As has been noted elsewhere in this report, the sample size for a specific school may influence scores and percentages in biased and unreliable ways. General proficiency levels for schools are one of many indicators that demonstrate a school's achievement and learning progress.

Table 7

MSA Schools Proficiency Percentages: 2004–05 Academic Year

District School Grade levels data reported	Number of Students (N)	Math Percentage of students at Proficient or above	Reading Percentage of students at Proficient or above	Science Percentage of students at Proficient or above	Met 2004–2005 AYP
District 1					
School A 3-5	(N=32)	25	53	68	Yes
School B 6-8	(N=66)	14	50	39	Yes
School C 3-5	(N=53)	43	60	66	Yes
Non-MSA School E 9th only	(N=37)	30	43	24	Yes
District 2					
School F 3-5	(N=132)	26	56	56	Yes
School G 6-8	(N=152)	05	38	15	No
School H Gr. 9 only MSA = math	(N=52)	15	19	25	Yes
District3					
School I 4th grade only	(N=120)	21	37	43	No
School J 5-6	(N=282)	16	45	32	No
District 4					
School M: (MSA = 1 3rd, 2 4th, 1 5th grade)	(N=70)	20	41	44	Yes
School N (MSA=1 3rd, 2 5th grade)	(N=62)	24	45	74	Yes
District 5					
School Q 46 (MSA: 1-4th, 2-5th, 2-6th grades)	(N=94)	14	34	17	No
School R 5-6 (2 MSA 5th, 2 MSA 6thgr)	(N=9476	8	30	32	Yes
School S (MSA: 2 5th grades)	(N=37)	05	45	29	Yes
School T Gr. 7 (MSA: 1 teacher)	(N=89)	07	27	08	No
School U Gr. 8, 9 (5/16 MSA Ts)	8th N= 86 9th N= 87 (N=173)	02 18 10	33 22 27	09 11 10	No

MSA Achievement Data: Grade Level, Scale Scores, and Proficiency Percentages

The data presented in Tables 8-14 provide grade level information about scale scores, and proficiency percentages for MSA classrooms and comparable non-MSA classrooms. In general, MSA scale scores and corresponding proficiency percentages were higher at elementary school level than at middle and high school scores and proficiency levels. Math scores were lower than reading scores for all grade levels. Science scores roughly correlated with reading scores, and tended to decrease in the upper grades. However, at some schools, science scores were the highest scores attained. Close analyses of the scores for all content areas reveals that for a number of schools and students, scores fell close to the "cut point;" a correct response to one additional question would have boosted students' scores to the next proficiency level. There were no statistically significant differences between scores for different ethnic groups or gender. Overall, ELL students did score lower (at a statistically significant level) than non-ELL students for all grade levels.

For Grades 3–6, there were some statistically significant differences between MSA scores and non-MSA scores. At the third-grade level, MSA schools scored higher in all three content areas than the non-MSA school at a statistically significant level (p<0.01). For fourth-grade classrooms, MSA students outperformed non-MSA students in all content areas. The differences were statistically significant at the p<0.05 level. For fifth-grade classes, MSA classrooms and schools scored higher in all content areas, but these differences were not statistically different. Sixth-grade MSA scores were slightly lower in all content areas than non-MSA scores, but not at a statistically significant level. At the seventh-grade level, non-MSA and MSA math, reading, and science scores were approximately the same. Eighth-grade scores were not statistically different for MSA and non-MSA students; comparison or non-MSA schools were approximately the same in math, reading, and science as in MSA classrooms. At the ninth-grade level, math, reading, and science scores for MSA and non-MSA schools were virtually identical.

Table 8

Grade Level Scale Scores and Proficiency Levels: Grade 3

School Name	Number of Students (N)	Mathematics		Reading		Science	
		Average scale score	Percentage of students at Proficient or above	Average scale score	Percentage of students at Proficient or above	Average scale score	Percentage of students at Proficient or above
School A	10	605	50	630	70	666	100
School C	17	596	35	623	59	628	82
School F	47	594	28	624	60	622	78
School M	19	605	47	610	37	623	84
School N	39	581	23	603	39	613	64
MSA Average SS	*153*	*596*		*618*		*630*	
Non-MSA Average SS School S	*64*	*515*	*14*	*600*	*21*	*597*	*44*

Table 9

Grade Level Scale Scores and Proficiency Levels: Grade 4

School name	Number of Students (N)	Mathematics		Reading		Science	
		Average scale score	Percentage of students at Proficient or above	Average scale score	Percentage of students at Proficient or above	Average scale score	Percentage of students at Proficient or above
School A	13	624	16	638	46	627	54
School C	16	640	50	653	75	631	69
School F	44	620	30	637	42	625	55
School I	120	611	21	627	37	616	43
School M	33	610	15	625	33	615	24
MSA Average SS	*226*	*621*		*636*		*623*	
Non-MSA Average SS School S	*56*	*608*	*31*	*624*	*30*	*613*	*36*

Table 10

Grade Level Scale Scores and Proficiency Levels: Grade 5

School name	Number of Students (N)	Mathematics		Reading		Science	
		Average scale score	Percentage of students at Proficient or above	Average scale score	Percentage of students at Proficient or above	Average scale score	Percentage of students at Proficient or above
School A	9	637	11	669	67	647	56
School C	20	642	45	652	50	650	50
School F	42	636	19	663	64	639	31
School J	149	627	11	653	48	638	35
School M (1 MSA T)	18	620	0	661	67	642	39
School Q (2 MSA Ts)	35	628	09	648	49	630	23
School R	42	636	09	651	41	645	44
School S	38	621	05	640	45	630	29
MSA Average SS	*351*	*631*		*655*		*640*	
Non-MSA School V	68	621		644		629	
Non-MSA School W	24	630		663		635	
Non-MSA Average SS	*92*	*626*		*654*		*632*	

Table 11

Grade Level Scale Scores and Proficiency Levels: Grade 6

School name	Number of Students (N)	Mathematics		Reading		Science	
		Average scale score	Percentage of students at Proficient or above	Average scale score	Percentage of students at Proficient or above	Average scale score	Percentage of students at Proficient or above
School B	22	645	18	654	45	662	50
School G	42	632	02	651	19	642	14
School J	133	654	20	663	44	649	28
School Q	38	652	21	653	32	643	16
School R	34	635	06	636	15	637	15
MSA Average SS	*269*	*644*		*651*		*647*	
School D	21	655	29	660	38	657	48
School O	212	643	13	660	41	647	27
Non-MSA Average SS	*233*	*649*		*660*		*652*	

Table 12

Grade Level Scale Scores and Proficiency Levels: Grade 7

School name	Number of Students (N)	Mathematics		Reading		Science	
		Average scale score	Percentage of students at Proficient or above	Average scale score	Percentage of students at Proficient or above	Average scale score	Percentage of students at Proficient or above
School B	24	667	17	680	58	670	38
School G	59	645	02	664	37	653	10
School T (1 MSA T)	89	655	07	658	27	644	08
MSA Average SS	*172*	*656*		*667*		*656*	
School K	164	663	14	678	57	662	26
School O	216	661	14	675	46	659	24
School T Non-MSA	172	639	02	651	19	638	06
Non-MSA Average SS	*380*	*654*		*668*		*653*	

Table 13

Grade Level Scale Scores and Proficiency Levels: Grade 8

School name	Number of Students (N)	Mathematics		Reading		Science	
		Average scale score	Percentage of students at Proficient or above	Average scale score	Percentage of students at Proficient or above	Average scale score	Percentage of students at Proficient or above
School B	20	674	05	672	45	666	30
School G	52	669	09	680	46	666	13
School U MSA	87	667	05	668	25	648	06
MSA Average SS	*159*	*670*		*673*		*660*	
School D	23	677	17	674	48	664	22
School K	165	677	16	684	54	676	28
School O	240	678	19	686	57	672	29
School U Non-MSA	165	653		659		638	
Non-MSA Average SS	*593*	*671*		*675*		*662*	

Table 14

Grade Level Scale Scores and Proficiency Levels: Grade 9

School name	Number of Students (N)	Mathematics		Reading		Science	
		Average scale score	Percentage of students at Proficient or above	Average scale score	Percentage of students at Proficient or above	Average scale score	Percentage of students at Proficient or above
School H	52	692	15	671	19	676	25
School U MSA	87	695	18	**		**	
MSA Average SS	*139*	*694*		*671*		*676*	
School E	37	693	30	681	43	676	24
School L	171	700	31	687	47	692	46
School U Non-MSA	200	676	07	661	22	660	11
Non-MSA Average SS	*408*	*690*		*676*		*676*	

Note. **Data not available for MSA teacher

One additional comparison to report is performance at School U for MSA and non-MSA students, shown in Table 15. Students in MSA classes outperformed non-MSA students at both the eighth- and ninth-grade levels in math at statistically significant levels, and in reading and science for eighth grade, also statistically significant. No reading or science data were available for comparison for ninth grade MSA versus non-MSA students.

Table 15

School U 8th and 9th Grade Performance

School name	Grade	Number of Students (N)	Mathematics		Reading		Science	
			Average scale score	Percentage of students at Proficient or above	Average scale score	Percentage of students at Proficient or above	Average scale score	Percentage of students at Proficient or above
School U MSA	8	87	667*	05	668*	25	648*	06
School U Non-MSA	8	165	653*	06	659*	23	638*	05
School U MSA	9	87	695*	18	**	**	**	**
School U Non-MSA	9	200	676*	07	661	22	660	11

Note. *Statistically significant difference at the $p<.05$ level. **No disaggregated data available for students in this content area

These results provide evidence of some areas of project success, and highlight other areas where the project can be strengthened. MSA appears to have a strong impact on elementary school teachers and their students, while its impact is more diffuse at the middle- and high-school levels. This may be partially explained by project structure: MSA elementary school teachers work with the same students throughout the day, and can implement the approaches and strategies MSA promotes with greater attention and fidelity. Program organization and participation at middle and high schools is less focused and more diffuse. Students may work with an MSA math teacher, but have non-MSA teachers for the remainder of their day. Project impact is more difficult to gauge in these situations. Nevertheless, in most instances, MSA schools performed at least as well as comparison schools, and in some cases out-performed non-MSA schools, a significant accomplishment for sites that are perpetually underperforming.

Program Evolution

Figure 1 shows the MSA model for professional development. This model incorporates different components, critical features of quality teaching and learning,

and emphasizes the multiple areas in which MSA strives to support teachers and develop and strengthen their capacity to teach effectively. The areas of focus during Year 5 of MSA included: planning, collaboration, instruction, assessment, technology, and classroom management. Each of these areas, its goal, implementation and success is described below.
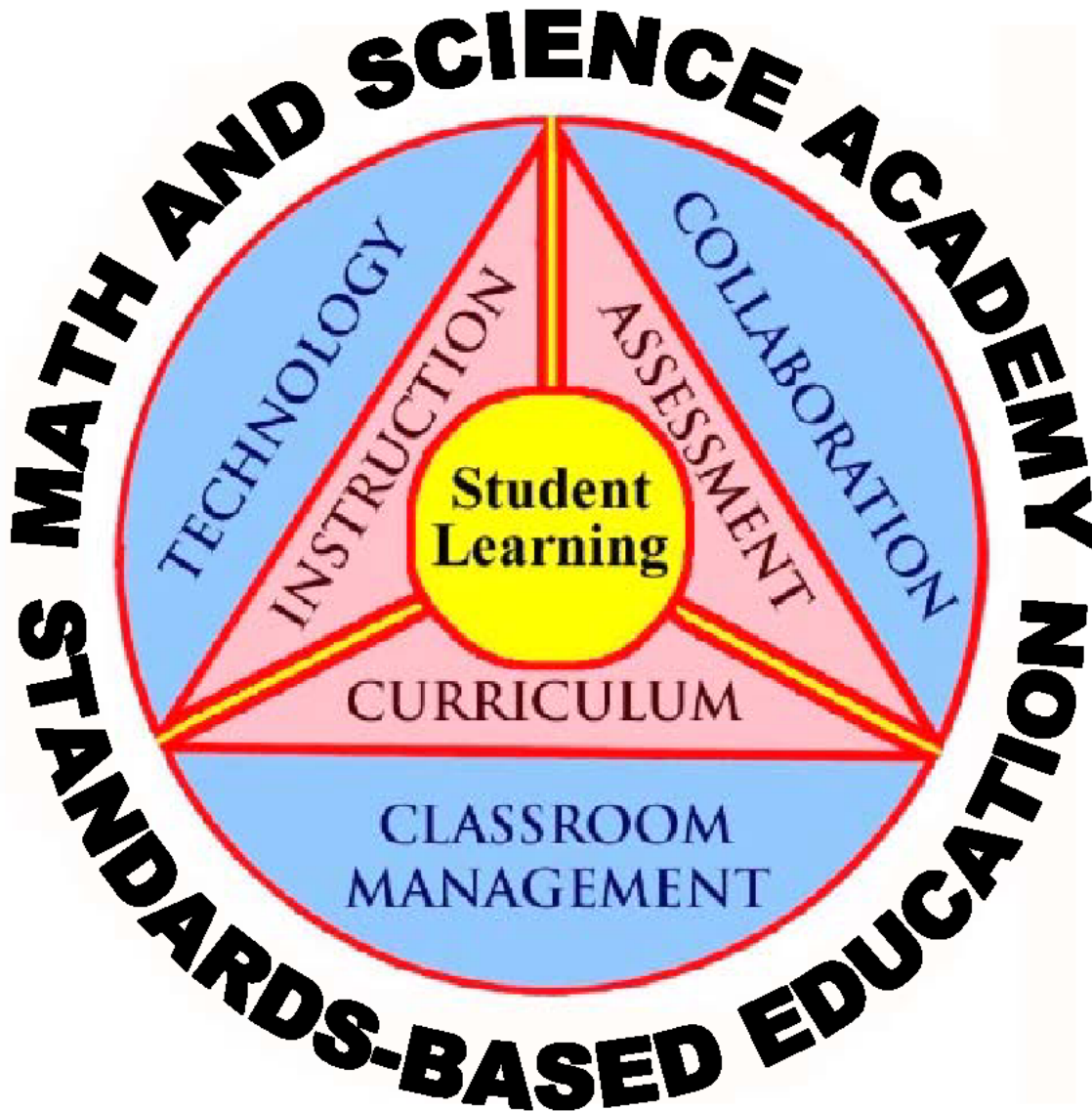

Figure 1. MSA model for quality professional development.[1]

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[1] Graphic created for MSA by Phillip Brown, 2005.

Planning. MSA views systematic planning, in combination with the identification and establishment of clear learning goals aligned with state content standards, as essential to quality teaching and learning. During the 2005 Summer Institute, MSA teachers had the opportunity to plan collaboratively, within and across grades, schools, and districts, to establish learning goals and key concepts for their classes and content areas. As in previous years, teachers used tools and structures introduced by MSA mentors and others to develop this set of "key concepts" as a mechanism for focusing student learning during the year.

Survey results indicate that teachers viewed the planning process as important and integral to promoting and supporting student learning. Modest increases in some of the items relating to program planning for the 2005 teacher survey are evident, but none of the changes in scores are statistically significant. Ratings for items e, f, and g below vary significantly from teacher to teacher, as indicated by the greater standard deviation than other items. Analyses of responses reveals that some teachers do not plan collaboratively with colleagues due to a number of factors. In some cases, the MSA teacher is the only teacher for a particular grade level and or subject at his/her site. In other cases, not all teachers at a particular site participate in MSA, making advance program planning a challenge. Table 16 below presents results from the survey. On a separate item, teachers reported that their instructional planning, articulation, and collaboration with their colleagues had changed "a great deal" (4.5 on a 5-point scale) as a result of their participation in MSA.

Table 16

Program Planning: Curriculum and Articulation

Please respond to the following based on your implementation of MSA ideas.	2004-05 N = 54		2004-05 N = 43	
	Mean	SD	Mean	SD
a) I develop year-long and short-term goals for my students.	4.3	0.6	3.9	0.9
b) I select content to meet the learning goals of my students.	4.4	0.6	4.5	0.6
c) I design and adapt curricula to meet the needs of my students.	4.4	0.6	4.3	0.7
d) I use instructional strategies that develop and promote student understanding.	4.5	0.5	4.3	0.8
e) I work with my colleagues within disciplines to set goals and standards for learning and achievement.	3.8	1.0	3.8	1.2
f) I work with my colleagues across disciplines (content areas) to set goals and standards for learning and achievement.	3.7	1.0	3.7	0.9
g) I developed goals for "data not guesswork" and used them to guide instruction.	3.6	1.2	3.4	1.2

Note. Scale: 1=never, 3= sometimes, 5=always, NA=not applicable.

One first-year MSA teacher, a veteran of 13 years, wrote about her experience with collaboration and planning, and the impact instructional planning and articulation of goals and expectations had on teaching and learning at her school.

Teacher 16

I completed curriculum maps for the entire school year in all subject areas. These plans were distributed to students, parents, administrators, and colleagues. Our staff meets every other week to collaborate on solutions for problems that arise. The third grade math teacher and I talk about where I want students to be and we did some planning together. The science teacher and I collaborated on teaching the measurement unit. The entire staff

developed a handbook of school rules and consequences. We are all as consistent as possible. Before MSA, we all hid in our rooms with our own little agendas. Now all decisions that affect the student body are made jointly.

Collaboration. Three general types of professional collaboration are promoted and supported by MSA. The first approach is *within school collaboration*, where teachers at the same school meet to collaborate, plan lessons, discuss student work, and establish guidelines for student learning and performance. These meetings occur before, during, and after school. During the 2004–2005 school year, many MSA sites dedicated at least a portion of their common planning time to project goals and objectives, while other sites worked on MSA exclusively during common planning time. A second type of collaboration supported by MSA is *across school collaboration*, where teachers at the same grade level and/or content area plan collectively, develop curriculum maps, and devise/revise common assessments during MSA Summer Institutes and MSA meetings throughout the school year. The third type of collaboration is *general MSA project collaboration*, where teams and teachers participate in joint learning experiences and opportunities throughout the academic year and at the MSA Summer Institute. Each of these collaborations provides teachers with different kinds of opportunities for professional growth and interaction, with the ultimate goal of increasing student learning.

Survey data indicate that MSA teachers view increased professional collaboration as contributing to stronger teaching and learning at their sites. More regular collaboration with peers served to deepen teachers' understandings of how to implement MSA tools, strategies, and ideas more effectively in their classrooms; to strengthen teachers' sense of belonging to the MSA team at their sites; and to build on their sense of membership in the MSA professional community. Comments below from teachers illustrate the general findings about the effects of collaboration on teachers during Year 5 of MSA, and highlight teachers' observations about the benefits and challenges of collaborative planning.

Teacher 7

My instructional planning, articulation, as well as collaboration with my colleagues have changed and have been increased to more participation. MSA has helped me to explain in offering and taking advice and methods of teaching.

Teacher 4
Collaboration is essential for a strong program and for evaluating student progress.

Teacher 12
Now that we are part of the MSA program we get a chance to not only plan, but to collaborate on grade level instruction. We get together and map out our curriculum in order to become more successful leaders.

Teacher 52
My MSA colleagues and I collaborate daily as opposed to almost never before MSA. Our instructional planning has become focused. We have learned how to use our NM Standards and Benchmarks, and to communicate the learning goals with our students and ourselves.

Teacher 26
I've always tried to collaborate with my grade level teachers, but sharing MSA ideas has made it more fun and interesting. Time is a big issue. We try to meet as often as possible, but sometimes it just doesn't happen.

Instruction. Systematic planning and on-going collaboration are the critical components of quality instruction. Similar to many professional development programs, MSA views strengthening and deepening pedagogical skills as critical to supporting and increasing student learning. Different, however, than many other professional development projects, MSA provides teachers the tools, structures, and experiences with which to strengthen and expand their pedagogy, and builds in multiple opportunities for teacher reflection on the quality and level of implementation of these tools and structures in their classrooms.

With the addition of teachers, schools, and classrooms to the project during Year 5, it became necessary for program mentors to clearly establish and identify elements of quality teaching in MSA classrooms. The model uses research-based approaches to instruction, embedded in strong theoretical and developmental perspectives as a way to frame and support standards-based teaching. This approach differs from other, more traditional professional development approaches to strengthening teachers' instructional practices, which often provide teachers with a set program or curriculum, and/or a collection of colorful, fun and easy-to-use activities. MSA strives to change the way teachers think about quality instruction, and in so doing, strengthens the approaches teachers use with their students.

As the Math and Science Academy has evolved as a program, so too have project members' ideas and understandings of what quality, standards-based instruction means and looks like in the classroom. Graphic organizers, a visual representation of student ideas, continue to be an important instructional strategy, as do flexible, cooperative learning groups, an emphasis on higher-order thinking skills, and the use of technology to support research and access to quality materials and information. These instructional approaches represent a step away from more traditional teacher-directed activities and classrooms, and emphasize student involvement and collaboration as critical elements in the learning process.

Survey results indicate that, across districts, schools, grade levels, and content areas, from kindergarten to ninth grade, in math, science, social studies, and language arts, teachers reported a positive experience when new instructional tools were introduced and used in their classrooms. Teachers also reported increases in student learning and student effort as a result of the use of the tools and strategies. More than 80% of Year 5 MSA teachers reported changes in the design and management of student learning opportunities in their classrooms due to MSA participation.

In additional to new instructional strategies, MSA also presented teachers with new ideas on how to use instructional materials in different ways to support student learning. Table 17 below displays information on the nature and types of instructional materials and resources that MSA teachers reported using during the 2004–05 school year.

Table 17

Instructional Materials and Resources

Please respond to the following based on your implementation of MSA ideas.	2004-05 N = 54	
	Mean	SD
a) I structure learning time to allow students to engage in projects and/or investigations.	4.0	0.7
b) I create a setting for student work that is flexible and supportive of student learning.	4.3	0.7
c) I ensure a safe learning environment.	4.8	0.5
d) I make available **tools & materials** to students to support learning.	4.5	0.7
e) I make available **print resources** to students to support learning.	4.5	0.6
f) I make available **technological resources** to students to support learning.	4.1	0.8
g) I use graphic organizers to support learning.	4.6	0.8
h) I engage student in designing their learning assignments.	4.1	0.8

Note. Scale: 1=never, 3= sometimes, 5=always, NA=Not applicable.

During Year 5 of MSA, teachers reported moderate to strong use of the instructional tools and resources made available and recommended by MSA. In open-ended responses, teachers indicated that they used the resources MSA advocates as critical supports for student learning. Teachers reported success in using graphic organizers to help students "show what they know" in a variety of ways, technology to access current information and generate presentations, posted agendas to organize and guide classroom work and norms, as well as introducing manipulatives and other instructional resources to support student learning. Additional comments from teachers about changes in their instructional approaches as a result of MSA participation include the following ideas:

Teacher 15
Three important instructional designs: (1) Cooperative Learning Group: MSA has opened my eyes to informal cooperative learning which is a highly structured interaction that is for shorter periods of time but yet insures all students interact with the material. (2) Classroom daily agendas are important because the ability to plan will help students become better

learners. (3) Teaching planning behaviors, including goal-setting, identifying the procedures in the task, identifying the parts of a task and assigning time to the task helps the students become better learners.

Teacher 41
The Agenda board is a lifesaver not just for me but also more importantly for the students. They "expect" to know what's happening for the day. When the kids are absent, I don't have to take time to show them what they missed. All they have to do is flip back to the day(s) they missed and copy the work. If I'm not in the room the kids come to class and start their days. The discipline is minimal or non-existent.

Teacher 4
I used to just teach from the book with no manipulative, resources, or technology. Since joining the MSA I always give the students time with technology, to use different manipulatives and show me what they have learned by using graphic organizers.

Teacher 10
I frequently create a learning community that promotes multicultural awareness, gender sensitivity and appreciation of diversity. I frequently engage students in individual and cooperative learning activities. I encourage students to respect themselves and others. A lot of time planning the classroom environment (desk arrangement, furniture setup, etc.) also happens.

Assessment. Another integral feature of the MSA model for quality teaching and learning is well-planned, well-implemented assessments and the use of the data generated by those assessments. MSA teachers are becoming progressively more savvy about the need and importance of "knowing what students know" before, during, and after instruction. Careful analyses of student work can guide teachers in their quest to provide quality feedback to students about their performance. Recent research in the area of assessment reveals the multi-layered challenges teachers face in striving to strengthen their assessment practices. Access to quality assessments linked to specific curriculum is one issue, time and resources to score and interpret student performance is a second challenge, while figuring out appropriate "what next" instructional steps can prove equally daunting to teachers. Through a variety of different learning opportunities, MSA is working with teachers to support their development and understanding of the role that assessment plays in fostering and improving student learning.

Teacher ratings of the frequency with which they use specific strategies to assess student learning are displayed below in Table 18.

Table 18

Assessing student learning

Please indicate your observations regarding student learning and achievement this year.	2004-05 N = 54		2003-04 N = 43	
	Mean	SD	Mean	SD
a) I systematically gather data on my students and their learning in my classes.	3.9	0.7	3.5	1.0
b) I analyze assessment data on a regular and timely basis to inform and guide my teaching.	3.9	0.7	3.6	1.0
c) I guide my students in self-assessment.	3.6	0.8	3.2	0.9
d) I use student data, observations of teaching, and interactions with colleagues to reflect on and improve my teaching practices.	3.8	0.9	3.6	0.8
e) I provide students with information on how their work will be assessed.	4.1	0.8	3.9	0.9
f) I provide students with examples and models of what represents "good work".	4.0	0.8	3.7	0.8
g) I use a wide variety of assessments to help me understand students' ideas and learning.	3.9	0.7	3.7	0.8

Note. Scale: 1=never, 3=sometimes, 5=always, NA=not applicable.

There is a modest (but statistically insignificant) increase in frequency ratings of assessment strategy use by teachers during Year 5 of MSA from the previous year. Open-ended responses indicate that teachers are more comfortable using rubrics, are providing exemplars of good work with greater frequency, and are reviewing students more often—both formally and informally. In general, teachers are using assessment data more frequently as a resource for understanding what students learned and didn't learn. Teachers reported "a great deal of change" (4.3 on a 5-point scale) in their assessment practices based on MSA participation. Below are comments from teachers about their evolving assessment practices.

Teacher 12

I consistently monitor student understanding on an ongoing basis and adjust teaching when necessary. I use multiple assessments congruent with instructional goals both in content and in process. I use student products as a source of assessment and instructional decisions. I communicate clear expectations for learning and behavior to students and parents. I prepare tests that reflect the academic content studied. I try my best to provide prompt and meaningful feedback to students about performance and progress.

Teacher 17

There is a greater variety of assessments in my classroom. I even worked on an end of the school year portfolio to prepare me for the oncoming year. Rubrics are used more frequently and projects as well as presentations are part of assessment. Students self assess and assess their peers.

Teacher 41

Before MSA, I rarely ever took the time to assess my students. I seemed to only focus on covering the standards regardless of how much understanding took place. Now assessment always plays an important role in my classroom. And now I know why.

Teacher 28

MSA has shown me how to properly assess students and how to find gaps in student knowledge and how to correct that thinking. Before I would teach the curriculum and test, and now I find the questions the students should know before I teach, I use the standards to find these questions. From there I make up my assessment, and then teach my curriculum, so the students always know what to expect.

Many MSA teachers echoed the sentiment and self-analyses reflected in the response below from Teacher 38. Teachers are interested and eager to use assessments and assessment data more regularly, but they continue to perceive an on-going need to develop their knowledge of assessment strategies.

Teacher 38

This (assessment) is still an area of weakness for me. I have begun some Data Not Guesswork (DNG) practices to gather data on student learning but I still haven't used them to the extent that I would like to. I have started practicing student self-assessment but still need to do more of it, more reflecting, etc. I need to work more on using rubrics and other sources for student self-assessment, and then using all of it to guide my teaching not just as an

informal teacher assessment. I hope to learn from MSA about this important area.

Classroom management. Extensive classroom work and observations at MSA sites by mentors indicated the critical need for teachers to be introduced to and sharpen classroom management skills, to permit teachers to focus time and efforts on promoting and supporting student learning. A number of research-based approaches to classroom management are a trademark of MSA; in particular, the work of Wong and Wong (1998). These approaches stress the importance of routines and protocols established and learned early in the school year, and reinforced frequently, to allow all students the opportunity to develop their ideas and understandings, and to learn effectively. MSA presents routines, norms, and protocols to teachers as tools to help students understand the rules and expectations in a classroom, and allow the teacher to focus on teaching, rather than discipline.

MSA teachers, including accomplished veteran teachers, were enthusiastic about these classroom management techniques, and reported great success in learning and implementing classroom management strategies from the resources provided by MSA. Comments from teachers' experiences about MSA classroom management techniques are below.

Teacher 20
I enjoyed Harry Wong's videos involving classroom management, rules, procedures, etc. It is always beneficial to learn and refresh on new/old techniques. Learning never ceases, even for a veteran teacher like me!

Teacher 5
I implemented strategies that deal with classroom management. One strategy that works is "question of the day" and using portfolios at the beginning of class. My students were able to focus and attend to their learning much more because I had rules in place.

Teacher 37
Classroom management was a big issue for me in past years. I was apprehensive about trying new approaches, like cooperative learning. But with MSA the students participated in activates that were engaging and fun. I always use MSA strategies in teaching to remember that students need to do the work, not just listen and repeat.

Cognitive Coaching: Development and Implementation

Early in the development and evolution of MSA, mentors realized the importance of observing teachers in action to understand how and in what ways MSA project goals were (and were not) being implemented. Classroom observation protocols and interview questions were developed to reflect project goals and objectives. Rather than framing the observation and interviews as punitive measures, mentors and teachers worked to find a way in which they could engage in a meaningful discussion about teaching and learning in classrooms. An approach to instructional growth and reform, known as "cognitive coaching" (Costa & Garmston, 1998) was introduced, and has become a cornerstone of the MSA program. Cognitive coaching theory holds that teacher change and development is most likely to occur in the context of guided reflection, is continual, on-going, and used to modify and improve teaching. MSA mentors have appropriated the cognitive coaching protocol from the cognitive model, and revised it over the past 4 years to more closely reflect MSA goals and objectives. Mentors attribute much of the MSA project success to the careful and thoughtful interactions that result from the coaching experience.

The cognitive coaching approach is intensive and time-consuming for both participants. The process involves a pre-observation conference about the lesson, observation of the lesson itself, and a post-observation debrief, generally totaling more than 7 hours. Clearly, with more teachers, in more districts, and the long distances between communities in Northern New Mexico, one of the numerous challenges the project faced in Year 5 was how to maintain the focus and intensity of the cognitive coaching sessions, and remain true to the process while working with 72 teachers in 17 schools in 5 districts.

To accomplish the scale-up implementation and expansion for Year 5 of MSA, fourth- and fifth-year MSA teachers, principals, administrators, and MSA mentors all served as cognitive coaches, carrying out the observations and reflections with teachers. At some sites, veteran MSA members were the primary coaches; at other sites, the principal and/or other administrators served as the cognitive coach. At still another site, MSA mentors began the school year as mentors at new sites, and then gradually turned over responsibility for the coaching to other veteran teachers. Mentors coached in first-year participant classrooms, as well conducting observations in veteran MSA classrooms.

In addition to utilizing varied personnel to serve as cognitive coaches during Year 5 of MSA, the program also experimented with a number of different structures for the cognitive coaching model itself. In some situations, the pre-instructional visit was conducted on the phone or via e-mail; in other instances, each observation period was extended, but the total number of coaching sessions was reduced from six to four during the school year. Still another approach was to have teachers use the cognitive coaching protocol as a self-reflective tool. The impact of these varying approaches to cognitive coaching will be further explored in future evaluations.

Table 19 below displays a summary of the cognitive coaching model used for MSA Year 5.

Table 19

Summary of Cognitive Coaching MSA Year 5

Cognitive Coaching Experiences	Primary coach	Teacher reports of benefits of cognitive coaching	Teacher reports of drawbacks of cognitive coaching	Cognitive coaching impact on student learning	Cognitive coaching impact on teaching
4.5 experiences	Mentor: 23	Feedback invaluable	Time	Enhances student learning	Built-in reflection of practice
Range: 0 – 15	Teacher: 7	Building standards and consensus for "good work"	Limited extensive conversations	Students see teachers as learners	Sharing of ideas happens more readily
3 teachers reported no cognitive coaching experience.	Principal: 2	Q & A directly applicable	Interruptions	Tighter focus on learning goal	Learned to formally close a lesson
One teacher reported 15 varied coaching experiences.	Other: 5 (friend, Network Circuit Rider, instructor)	Plethora of new, different, interesting ideas	Administrative constraints	Students more aware of what they need to know	More aware of patterns (grouping, conversational, questioning) in teacher interactions
			Follow-up distant	Opportunity for Ss to learn from outside "expert"	Teaching more focused and directed to student learning
					Build better relationships with other teachers

Cognitive Coaching Impact on Teachers

Teacher's open-ended responses revealed a wide range of experiences, and responses to the cognitive coaching experience. Most teachers rated the experience very positively, and cited numerous examples of the benefits they gleaned from the cognitive coaching process. A few teachers found the experience intimidating, while

some were frustrated by time constraints and administrative challenges that forced them to shorten the coaching sessions. In general however, teachers were overwhelmingly positive about the benefits of working with a coach to guide them in reflecting upon and learning from the opportunities to think deeply about instructional decisions, and how and in what ways learning was orchestrated in their classroom.

The following comments from teachers illustrate participants' reactions and ideas about the cognitive coaching process.

Teacher 29
The cognitive coaching kept me on track. Many times we participate in great classes and we use two ideas. The cognitive coaching forced me to be creative and stay motivated. It's great to have this type of support. My mentor was always full of great ideas and she made me feel like a great teacher.

Teacher 40
MSA coaching experiences were great. At first I didn't know what to expect. But I wasn't at all intimidated by my coach. He was very calm, positive and always willing to help teach a lesson when ever I needed help. He has an extensive science background. My MSA coach always made me think about my teaching. "Why was I teaching a certain subject matter? Why did I teach in cooperative learning groups vs. individual assignments? Why did I use certain vocabulary?" These thoughts and others came to my mind even after he was gone (from the classroom). I learned a lot about myself, teaching and being coached by my MSA mentor.

Teacher 39
The coaching experience was one of the most beneficial experiences that I have experienced as an educator. It was non-threatening and very intrinsic. I felt it has further enhanced my skills as an effective educator…making sure that my students learned what I wanted them to learn and reflecting if they had not grasped the concept.

Program Effectiveness

To gauge program effectiveness, teachers were asked to rate MSA's overall effectiveness in a number of areas. In general, teachers, students, administrators, and mentors were positive about Year 5 of MSA. These survey results are displayed in Table 20 below.

Table 20

MSA Program Effectiveness

How effective was MSA in the following areas?	Overall 2004-05 N = 54	
	Mean	SD
a) Familiarizing you with standards-based instruction	4.5	0.7
b) Developing your knowledge of state frameworks for content areas	4.4	0.7
c) Helping you develop interdisciplinary curriculum units	4.5	0.7
d) Providing demonstration lessons that were meaningful and relevant to you and your students	4.4	0.7
e) Sharing assessment strategies	4.2	0.8
f) Helping you to develop rubrics to support instruction	3.9	0.9
g) Informing/involving the community about MSA goals and objectives	4.1	0.9
h) Helping you understand how to use technology effectively	4.3	0.8
i) Assisting you in implementing cooperative learning activities	4.3	0.8

Note. Scale-1=Not Effective; 3=Somewhat Effective; 5=Highly Effective.

Ratings of MSA program effectiveness were generally positive (Highly Effective). In open-ended responses, teachers referenced project effectiveness and its impact on their knowledge of state standards and benchmarks most frequently. Teachers also mentioned cooperative learning strategy information as particularly effective, although many noted that they incorporated a few but not all, of the cooperative learning strategies advocated by MSA. As in previous years, program effectiveness in the area of assessment, particularly with respect to rubric development, was rated slightly lower. Teacher comments about MSAs effectiveness are below.

Teacher 15
I now know my math standards inside and out!! I plan on becoming as familiar with English this summer and I will focus on social studies the following year. I'm talking "indepthly" familiar. Not just vaguely familiar like I am now. I have always used rubrics, but now I have a wider variety of them, and I explain them before I collect the assignment. Many cooperative

strategies were taught, but I have only been able to implement a few. My goal this summer is to become familiar with more of the strategies and implement at least one a week in two subject areas.

Teacher 9

MSA has been an effective, rewarding and beneficial experience. More than anything, it has enhanced my ability to willingly try new ideas.

Teacher 22

MSA has opened many doorways for me and has assisted me with professional growth.

MSA Teachers Self-Assessment

MSA teachers were also asked to rate their own knowledge and skills as a result of their participation in MSA. Survey questions reflect project goals and objectives. Results are shown below in Table 21. Teacher ratings of their knowledge of content area and standards were strong, as was their rating of content standard knowledge. Teacher confidence in teaching their content area was also strong, as were ratings of their knowledge of mathematics content. Teachers rated lower their knowledge of strategies for teaching math effectively, technology skills, cooperative learning strategies, knowledge of assessment and implementation of varied assessments approaches. As would be anticipated, first year MSA self-assessment ratings were generally lower than those provided by more veteran MSA members. Teacher self-assessment ratings will hopefully show increases in knowledge as teachers gain more experience and confidence with the ideas and approaches to teaching in MSA.

Table 21

MSA Teacher Self-Assessment

Please rate yourself along the following dimensions as a result of your participation in MSA.	2004-05 N = 54		2003-04 N = 43	
	Mean	SD	Mean	SD
a) Knowledge/ understanding of your **content area** (math, science, language arts, or social studies)	4.2	0.6	4.3	0.7
b) Knowledge/understanding of your **content standards** (math, science, language arts, or social studies)	4.3	0.7	4.1	0.6
c) Confidence in teaching content area	4.6	0.6	4.3	0.7
d) Knowledge of mathematics content	4.2	0.7	NA	NA
e) Knowledge of strategies for teaching mathematics effectively	3.9	0.8	NA	NA
f) Knowledge of a wide variety of instructional techniques	4.0	0.6	4.2	0.7
g) Technology skills	3.8	0.9	3.8	1.0
h) Knowledge and implementation of cooperative learning strategies (i.e., jigsaw, small groups)	4.0	0.6	3.9	0.9
i) Knowledge of various assessment strategies	3.9	0.6	3.7	0.8
j) Implementation of various assessment strategies	3.9	0.6	3.6	0.8
k) Understanding learning theory	3.7	0.7	NA	NA

Note. Scale: 1=weak, 3= moderately strong, 5=very strong, NA=not applicable.

Teacher comments about the ways in which MSA impacted their knowledge are found below.

Teacher 45
I feel like I am getting more comfortable implementing MSA strategies in my classroom. I still need to feel a little more comfortable using technology in my classroom.

Teacher 40
I know that I have done a much better job in teaching my math, but I also know I can become even stronger and do better. Thanks MSA!

Teacher 22
My knowledge in these areas has increased dramatically.

Teacher 20
My content knowledge and implementing of different learning/teaching and assessment strategies has increased through MSA.

Conclusion

Year 5 of the Math and Science Academy was a year of growth in many aspects and dimensions. The program grew in scope and number of participants; mentors grew in their capacity and understanding of how and in what ways to plan and articulate a quality professional development program; administrators grew in their understandings of how to better support teachers and staff at their sites; teachers grew in their skill and understanding of how to teach more effectively to support student learning; and students grew in their achievement levels in language arts, math, and science. The MSA model for professional development continues to evolve by providing what research reveals is essential for quality reform to be sustained and to grow; the context, the expectation, and the opportunities for teachers to learn what they need to know and practice those skills in a reflective, continually improving manner.

Recommendations

The recommendations that follow are based on project goals for Year 5, teacher comments, observations, and interviews with program participants. The recommendations are organized around project goals, with additional recommendations focused on project logistics.

Planning

The opportunity to plan collaboratively helps teachers to engage in both long- and short-term planning, and to establish well-articulated learning goals. Teachers may also benefit from revisiting their plans to better understand what did and did not work. Reviewing student work with other teachers, in the context of revisiting and revising instructional plans, may serve to further strengthen teachers' planning skills. On-going, systematic opportunities to plan and evaluate the quality of those plans is critical to the success of MSA. Teachers benefit from guidance in these planning meetings and interactions, and from understanding and using timelines for the planning sessions.

Collaboration

All three types of professional collaboration described in this report (within school, across schools, and all MSA) benefit teachers' sense of belonging to an important project, as well as helping to strengthen the notion of an MSA "team" at individual sites. Continued guidance, implementation of structures, and expectations for planning meetings are important for teachers. Leadership skills, developed through collaboration during after-school meetings and planning sessions, may benefit from the introduction of a focused set of principles.

Classroom Management

Teachers, both novice and veteran, see the impact that clear guidelines and expectations for performance and conduct in classrooms have on the learning culture in their classrooms. As illustrated in the report, teachers benefit from guided, specific approaches to managing their classrooms. This year, steps have been made towards strengthening teachers' capacity to successfully implement classroom management strategies. As teachers become more familiar with various approaches to classroom management, it is important to continue to communicate successes and challenges, and to refine classroom management strategies to fit a variety of learning contexts.

Instructional Strategies

Continued work and focus on understanding how and in what ways specific instructional strategies work should remain a focus for MSA. With the inclusion of more elementary school teachers in the project, additional work and focus on mathematics content and instructional strategies may be necessary. One possible consideration is to provide follow-up sessions to those presented at the Summer Institute as a means of gauging teachers' levels of understanding of specific instructional strategies. Teachers may also benefit from focused work on developing instructional strategies that are connected to assessment results. For example, analyses of MSA achievement scores revealed that middle-school students scored lower on the constructed response/open-ended portion of the assessment than on the multiple choice items. Teaching specific instructional strategies to address students' experience with and capacity to solve open-ended problems is critical to strengthening student performance on constructed response assessments.

Assessment

Assessment continues to be an area in which teachers and administrators request more information, strategies, and assistance with developing, using, and interpreting assessments. Survey results clearly indicate assessment as a perceived area of weakness, one that many teachers understand to be an important component to improving their teaching. One possibility to help build teachers' assessment capacity would be to introduce an MSA protocol for looking at student work and/or to incorporate this tool, or a similar one, to after-school meetings and all-MSA meetings. Another possibility would be to provide more in-depth assessment training for mentors, administrators, and teachers.

Cognitive Coaching Model

During Year 5 of MSA, the protocol for cognitive coaching continued to develop. As the project develops, it is critical to continue to refine the cognitive coaching model to ensure that it is reflective of project goals and objectives. Additional training sessions for the coaches may also be productive to help clarify for newer coaches what the coaching process entails, and how to best work with teachers to develop thinking about student learning and their teaching.

MSA Project Logistics

As MSA has grown, the logistics involved with planning Summer Institutes, meetings, and on-going scheduling have become more stream-lined. Mentors may consider developing protocols or formalizing the sessions they present to teachers to ease time load and ensure fidelity of the "product." The weekly web-based information provided by MSA mentors is a resource for teachers. Another possibility would be to consider web-based mini sessions or discussion groups for topics of interest or challenges that arise throughout the school year.

Implications

During Year 5 of MSA, teachers and mentors continued to refine and develop project goals and objectives. As in previous years, project "success" was most dramatic in classrooms where teachers most fully implemented project goals and strategies. MSA teachers continue to make important strides towards refining their

teaching practices and implementing the instructional strategies, methods, and tools to support student learning and achievement.

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Appendix A

UCLA CENTER FOR THE STUDY OF EVALUATION
MATH AND SCIENCE ACADEMY (MSA)
TEACHER SURVEY 2004 - 2005

Please indicate your responses by checking, circling or filling in the blanks.

1. Sex: [ ]M   [ ]F

2. Ethnicity   [ ] White   [ ] Latino/a, Hispanic   [ ] Native American
[ ] African American   [ ] Asian   [ ] Other_____

Academic/Professional Background

3. What is the highest degree you have received?
        [ ] Bachelor's + Teaching credential   [ ] Master's + units beyond
        [ ] Bachelor's + credential + units beyond   [ ] Doctorate
        [ ] Master's   [ ] Other (specify)_____

4. Please indicate which teaching credentials you have and specify the content area of specialization.
   (Circle **ALL** that apply.)
        [ ] General Elementary   [ ] Single Subjects
        [ ] General Secondary   [ ] Bilingual
        [ ] Special Emergency   [ ] Other_____
        [ ] Multiple Subject

5.   a. How many years of teaching experience do you have? _____ years

      b. How many years have you been a part of MSA? ___1 year _2 years

        _____3 years _4 years _5 years ___*other (describe)

6. How many years have you taught bilingual/LEP/bicultural students (including this year)?
        _____ years

7.   Have you participated in other reform projects like MSA?   [ ] Yes   [ ] No
If yes, please describe:

8. Please describe your course load for the 2004-05 school year:

     a. Grade/s: _____

     b. Subject (if applicable): science_____   math_____

              language arts_____   social studies_____

 9. Language(s) of instruction:

     1. Mostly Spanish _____   2. Both English and Spanish _____

     3. Mostly English _____   4. Other _____

Planning an Effective Program: Curriculum and Articulation

10. Please respond to the following statements based on your implementation of MSA ideas:

		Never		Some-times		Always	N/A
a)	I develop yearlong and short-term goals for my students.	1	2	3	4	5	N/A
b)	I choose content to meet the learning goals of my students.	1	2	3	4	5	N/A
c)	I use curricula to meet the needs of my students.	1	2	3	4	5	N/A
d)	I use instructional strategies that support student understanding.	1	2	3	4	5	N/A
e)	I work with my colleagues in my content area/grade level to set goals and standards for student learning.	1	2	3	4	5	N/A
f)	I work with my colleagues across content areas to set goals and standards for student learning.	1	2	3	4	5	N/A
g)	I developed goals for "data not guesswork" performance and used them to guide instruction.	1	2	3	4	5	N/A
h)	Other: describe below	1	2	3	4	5	N/A

11. To what extent has your instructional planning, articulation and collaboration with your colleagues

changed as a result of your participation in MSA?

Not at All		Somewhat		A Great Deal	N/A
1	2	3	4	5	

Please explain.

Guiding and Facilitating Learning

12. Please respond to the following statements based on your implementation of MSA ideas:

		Never		Some-times		Always	N/A
a)	I focus on and support understanding as I interact with my students.	1	2	3	4	5	N/A
b)	I support student discussion of ideas in small and large groups.	1	2	3	4	5	N/A
c)	I model and provide guidelines for positive ways to share ideas and information.	1	2	3	4	5	N/A
d)	I require students to take responsibility for their learning and to work collaboratively.	1	2	3	4	5	N/A
e)	I recognize and respond to student diversity.	1	2	3	4	5	N/A
f)	I expect all students to participate fully in learning.	1	2	3	4	5	N/A
g)	I use lessons that encourage the development of student thinking.	1	2	3	4	5	N/A
h)	I model and emphasize metacognitive skills.	1	2	3	4	5	N/A
g)	Other: describe below	1	2	3	4	5	N/A

13. To what extent have your approaches to guiding and facilitating student learning changed as a result of

your participation in MSA?

Not at All		Somewhat		A Great Deal	N/A
1	2	3	4	5	

Please explain.

Assessing Student Learning

14. Please respond to the following statements based on your implementation of MSA ideas:

		Never		Some-times		Always	N/A
a)	I systematically gather data on student learning in my classes.	1	2	3	4	5	N/A
b)	I analyze assessment data on a regular and timely basis to guide my teaching.	1	2	3	4	5	N/A
c)	I guide my students in self-assessment.	1	2	3	4	5	N/A
d)	I use student data, observations of my teaching, and interactions with colleagues to reflect on and improve my teaching practices.	1	2	3	4	5	N/A
e)	I provide students with information on how their work will be assessed.	1	2	3	4	5	N/A
f)	I provide students with examples and models of what represents "good work".	1	2	3	4	5	N/A
g)	I use a wide variety of assessments to help me understand students' ideas and learning.	1	2	3	4	5	N/A
h)	Other: describe below	1	2	3	4	5	N/A

15. To what extent have your assessment practices for teaching and learning changed as a result of your participation in MSA?

Not at All		Somewhat		A Great Deal	N/A
1	2	3	4	5	

Please explain.

Instructional Materials and Resources

16. Please respond to the following statements based on your implementation of MSA ideas:

		Never		Sometimes		A Great Deal	N/A
a)	I structure learning time to allow students to engage in projects and/or investigations.	1	2	3	4	5	N/A
b)	I create a setting for student work that is supportive of student learning.	1	2	3	4	5	N/A
c)	I ensure a safe learning environment.	1	2	3	4	5	N/A
d)	I make **tools & materials** available to students to support learning.	1	2	3	4	5	N/A
e)	I make **print resources** available to students to support learning.	1	2	3	4	5	N/A
f)	I make **technological resources** available to students to support learning.	1	2	3	4	5	N/A
h)	I use graphic organizers to support learning.	1	2	3	4	5	N/A
g)	**Other: describe below**	1	2	3	4	5	N/A

17. To what extent has your design and management of students' learning environment changed as a result

of your participation in MSA?

Not at All		Somewhat		A Great Deal	N/A
1	2	3	4	5	

Please explain.

Building Communities of Learners

18. Please respond to the following statements based on your implementation of MSA ideas:

		Never		Some- times		Always	N/A
a)	I display and encourage respect for the ideas, skills and experiences of my students.	1	2	3	4	5	N/A
b)	I give students a voice in decisions about the content and context of their work.	1	2	3	4	5	N/A
c)	I require students to take responsibility for the learning of all members of their group/class.	1	2	3	4	5	N/A
d)	I support collaboration among my students.	1	2	3	4	5	N/A
e)	I structure and facilitate ongoing formal and informal discussions based on a shared understanding of the rules of classroom discourse.	1	2	3	4	5	N/A
f)	I model and emphasize the skills, attitudes, and values of student collaboration.	1	2	3	4	5	N/A
g)	Other: describe	1	2	3	4	5	N/A

19. To what extent have your ideas and practices relating to the development of learning communities with

your students changed as a result of your participation in MSA?

Not at All		Somewhat		A Great Deal	N/A
1	2	3	4	5	

Please explain.

School & MSA Community

20. Please respond to the following statements based on your implementation of MSA ideas:

		Never		**Some-times**		**Always**	**N/A**
a)	I participate in planning and developing the school program (EPSS or school improvement plan) for my content area/grade level.	1	2	3	4	5	N/A
b)	I have a voice in making decisions regarding the allocation of time and other resources at my school.	1	2	3	4	5	N/A
c)	I plan and implement professional growth and development strategies for myself.	1	2	3	4	5	N/A
d)	I communicate with the parents in our community about MSA goals and student progress towards those goals.	1	2	3	4	5	N/A
e)	I meet with my MSA colleagues to discuss student work, teaching and learning on a regular basis.	1	2	3	4	5	N/A
f)	Other: describe below	1	2	3	4	5	N/A

21. To what extent have you changed your involvement and participation in the ongoing planning and

development of the school learning plan as a result of your participation in MSA?

Not at All		Somewhat		A Great Deal
1	2	3	4	5

Please explain.

MSA Program Effectiveness

22. How effective was MSA in the following areas:

		Not Effective		Some-what Effective		Highly Effective	N/A
a)	Familiarizing you with standards-based instruction	1	2	3	4	5	N/A
b)	Developing your knowledge of state frameworks for content areas	1	2	3	4	5	N/A
c)	Helping you develop learning goals	1	2	3	4	5	N/A
d)	Sharing assessment strategies	1	2	3	4	5	N/A
e)	Helping you to understand how to use rubrics to guide instruction	1	2	3	4	5	N/A
f)	Informing/involving the community about MSA goals and objectives	1	2	3	4	5	N/A
g)	Helping you understand how to use technology effectively	1	2	3	4	5	N/A
h)	Assisting you in implementing cooperative learning activities	1	2	3	4	5	N/A
i)	Helping you understand learning theory as it relates to student learning	1	2	3	4	5	N/A
j)	Other: describe below	1	2	3	4	5	N/A

Comments:

MSA Impact: Self-Assessment

23. Please rate yourself along the following dimensions as a result of your participation in MSA. If you teach more than one content area, please use the comment area below to indicate your self-assessments of **Question 23a** and **Question 23b.**

		Weak		Moderately strong		Very strong	N/A
a)	Knowledge/understanding of your **content area** (math, science, language arts, or social studies)	1	2	3	4	5	N/A
b)	Knowledge/understanding of your **content standards** (math, science, language arts, or social studies)	1	2	3	4	5	N/A
c)	Confidence in teaching content area	1	2	3	4	5	N/A
d)	Knowledge of mathematics content	1	2	3	4	5	N/A
e)	Knowledge of strategies for teaching mathematics effectively	1	2	3	4	5	N/A
f)	Knowledge of a wide variety of instructional techniques	1	2	3	4	5	N/A
g)	Technology skills	1	2	3	4	5	N/A
h)	Knowledge and implementation of cooperative learning strategies (i.e., jigsaw, small groups)	1	2	3	4	5	N/A
i)	Knowledge of assessment strategies	1	2	3	4	5	N/A
j)	Implementation of various assessment strategies	1	2	3	4	5	N/A
k)	Understanding of learning theory	1	2	3	4	5	N/A
l)	Other: describe	1	2	3	4	5	N/A

Comments:

Student Learning and Achievement

24. Please indicate your observations regarding student learning and achievement this year.

		Disagree		Moderately strong		Strongly Agree	N/A
a)	I have observed changes in student learning and achievement this year.	1	2	3	4	5	N/A
b)	My participation in MSA had a positive impact on my students' learning and achievement this year.	1	2	3	4	5	N/A
c)	MSA ideas helped increase student learning and achievement.	1	2	3	4	5	N/A
d)	Students learned more because of cooperative learning opportunities in my classroom.	1	2	3	4	5	N/A
e)	Students benefited from keeping track of their learning progress in my classroom.	1	2	3	4	5	N/A
f)	Students benefited from use of math strategies in my classroom. Please describe below.	1	2	3	4	5	N/A
g)	Other: describe below.	1	2	3	4	5	N/A

25. Please explain and provide specific examples from MSA impact (or not) on student learning.

26. MSA Coaching Experiences (please use back of paper if necessary).

   a.   **Number of "coaching experiences" participated in this year:**

   b.   **Primary "coach" (please indicate the role or position, i.e., MSA mentor, other teacher, principal, etc., rather than a specific name)**

   c.   **Benefits of the coaching experience/s**

   d.   **Drawbacks of the coaching experience/s**

   e.   **Impact (if any) of coaching experiences on student learning**

   f.   **Impact (if any) of coaching experiences on your teaching**

27. MSA Communication

a. Did you respond to the biweekly informational e-mail messages?

Never		Sometimes		Almost Always
1	2	3	4	5

b. How useful was the information sent to you as a professional?

Not at all useful		Somewhat useful		Highly useful
1	2	3	4	5

Please provide more information on your responses to Question 27:

28. For Site Leaders**: describe your experience working with your team members this year. How (if at all) did your leadership role impact your experience with MSA, your teaching and your relationship with your colleagues?**

29. After School MSA Meetings:

Below, please briefly describe your experiences this year with after-school MSA meetings at your site.

    a.   Schedule

    b.   Organization

    c.   Benefits

    d.   Drawbacks

    e.   Other

    f.   How can after school meetings be more effective?

30. List three successes in the implementation of MSA at your school site. Please provide details and examples.

1)

2)

3)

31. List three barriers to the implementation of MSA at your school site. Please provide details and examples

1)

2)

3)

32. How could MSA be improved?

Thank you for completing this survey.

Appendix B

UCLA CENTER FOR THE STUDY OF EVALUATION
MATH AND SCIENCE ACADEMY (MSA)
ADMINISTRATOR SURVEY 2004 - 2005

Please indicate your responses by checking, circling or filling in the blanks.

1. Sex: [ ] M [ ] F

2. Ethnicity [ ] White [ ] Latino/a, Hispanic [ ] Native American
[ ] African American [ ] Asian [ ] Other_____

Academic/Professional Background

3. What is the highest degree you have received?
[ ] Bachelor's + Teaching credential [ ] Master's + units beyond
[ ] Bachelor's + credential + units beyond [ ] Doctorate
[ ] Master's [ ] Other (specify)_____

4. Please indicate which teaching credentials you have and specify the content area of specialization. (Circle **ALL** that apply.)
[ ] General Elementary [ ] Single Subjects
[ ] General Secondary [ ] Bilingual
[ ] Special Emergency [ ] Administrative
[ ] Multiple Subject [ ] Other _____

5. a. How many years of teaching experience do you have? _____ years

b. How many years have you served as principal? _____ years

c. How many years have you been a part of MSA?_____1 year _____2 years

_____3 years _____4 years _____other (please explain)

6. Have you participated in other reform projects like MSA? [ ] Yes [ ] No
If yes, please describe:

7. How many teachers at your site were involved with MSA this year? Please specify number, grade level/s and content area if applicable.

Instructional Planning and Collaboration

8. To what extent have you observed changes at your site in teachers' instructional planning, articulation of curriculum and professional collaboration between teachers as a result of their participation in MSA?

Not at All		Somewhat		A Great Deal
1	2	3	4	5

Please explain.

Guiding and Facilitating Learning

9. To what extent have you observed changes at your site in teachers' approaches to guiding and facilitating student learning changed as a result of their participation in MSA?

Not at All		Somewhat		A Great Deal
1	2	3	4	5

Please explain.

Assessing Student Learning

10. To what extent have you observed changes at your site in teachers' approaches assessment practices for teaching and learning as a result of their participation in MSA?

Not at All		Somewhat		A Great Deal
1	2	3	4	5

Please explain.

Instructional Materials and Resources

11. To what extent have you observed changes at your site in teachers' design and management of student learning environments as a result of their participation in MSA?

Not at All		Somewhat		A Great Deal
1	2	3	4	5

Please explain.

Building Communities of Learners

12. To what extent have you observed changes at your site in the development of learning communities with students as a result of your sites participation in MSA?

Not at All		Somewhat		A Great Deal
1	2	3	4	5

Please explain.

School & MSA Community

13. To what extent have you observed changes at your site in teachers' approaches to ongoing planning and development of the school-learning plan as a result of their participation in MSA?

Not at All		Somewhat		A Great Deal
1	2	3	4	5

Please explain.

MSA Program Effectiveness

14. How effective was MSA in the following areas:

		Not Effective		Some-what Effective		Highly Effective	N/A
a)	Familiarizing you with standards-based instruction	1	2	3	4	5	N/A
b)	Developing your knowledge of state frameworks for content areas	1	2	3	4	5	N/A
c)	Sharing assessment strategies	1	2	3	4	5	N/A
d)	Informing/involving the community about MSA goals and objectives	1	2	3	4	5	N/A
e)	Helping teachers to develop rubrics to support instruction	1	2	3	4	5	N/A
f)	Helping teachers understand how to use technology effectively	1	2	3	4	5	N/A
g)	Assisting teachers in implementing cooperative learning activities	1	2	3	4	5	N/A
h)	Helping teachers understand learning theory as it relates to student learning	1	2	3	4	5	N/A
i)	Other: please describe	1	2	3	4	5	N/A

Comments:

MSA Impact: Self-Assessment

15. Please rate yourself along the following dimensions as a result of your participation in MSA.

		Weak		Moderately strong		Very strong	N/A
a)	Knowledge/understanding of **content areas** (math, science, language arts, or social studies)	1	2	3	4	5	N/A
b)	Knowledge/understanding of **content standards** (math, science, language arts, or social studies)	1	2	3	4	5	N/A
c)	Knowledge of a wide variety of instructional techniques	1	2	3	4	5	N/A
d)	Knowledge of mathematics content	1	2	3	4	5	N/A
e)	Knowledge of strategies for teaching mathematics effectively	1	2	3	4	5	N/A
f)	Technology skills	1	2	3	4	5	N/A
g)	Knowledge of cooperative learning strategies (i.e., jigsaw, small groups)	1	2	3	4	5	N/A
h)	Knowledge of assessment strategies	1	2	3	4	5	N/A

Comments:

Student Learning and Achievement

17. Please indicate your observations regarding student learning and achievement this year at your site.

		Disagree		**Moderately strong**		**Strongly Agree**	**N/A**
a)	I have observed changes in student learning and achievement this year.	1	2	3	4	5	N/A
b)	My site's participation in MSA had a positive impact on students' learning and achievement this year.	1	2	3	4	5	N/A
c)	MSA ideas helped increase student learning and achievement.	1	2	3	4	5	N/A
d)	Students learned more because of cooperative learning opportunities in classrooms.	1	2	3	4	5	N/A

Please explain and provide specific examples.

After School Meetings:

18. Below, please briefly describe your experiences this year with after-school MSA meetings at your site.

   a.   Schedule

   b.   Organization

   c.   Benefits

   d.   Drawbacks

   e.   Other

   How can after school meetings be more effective?

19. List three successes in the implementation of MSA at your school site. Please provide details and examples.

1)

2)

3)

20. List three barriers to the implementation of MSA at your school site. Please provide details and examples

1)

2)

3)

21. How could MSA be improved?

Thank you for completing this survey.

Appendix C

MSA Classroom Protocol

Informal Observation Checklist 2004-2005

Teacher:	Date:	Time in: Time out:	Observer:

Work setting:	Observed	Comments
Talley lesson interruptions:		
Talley non-academic prompts:		
Work setting:	**Observed**	**Comments**
Agenda on board (what students will **learn** and do today) (6C)		
Bell ringer-type of assignment (e.g. released item) (5A)		
Learning strategies (e.g. Graphic organizer, pre/post, mental models, ICFLP) (2D, 4B)		
Achievement charts/student folders (5C)		
Standards:		
Written and posted (1A)		
Addressed during lesson (1A)		
Learning goals clear (3A, B, C, D)		
Assessment strategies addressed (students know how they will show achievement of learning goals: rubrics, portfolios, performance, product, test, quiz, graphic organizer, etc.) (3C, 5D)		
Student behavior:		
Students on task (participating appropriately) (6C)		
Mutual respect is evident (6C, 7G)		
Students practice routines (6B)		
Student generated questions		
Teacher behavior:		
Teacher generated questions (7E)		
Responds to students in a timely and appropriate manner (6A, 6G, 7A, 7B, 7C, 7G, 7I)		

Learning Visit Questions (modified)

Lauren Resnick - University of Pittsburgh

Teacher:	Date:	Time:	Observer:

Student 1

1. What are you learning?

2. Why do you need to know this?

3. What have you learned previously that helped you?

4. How do you know your work is good?

5. How will you show your teacher that you learned this?

6. If you want to make it better, what do you need to do?

Student 2

1. What are you learning?

2. Why do you need to know this?

3. What have you learned previously that helped you?

4. How do you know your work is good?

5. How will you show your teacher that you learned this?

6. If you want to make it better, what do you need to do?

Numbers in parenthesis correspond to the NMSDE Teacher Evaluation instrument.