

**The El Paso Mathematics and Science Partnership
Annual Report
October 2005 – May 2006**

I. INTRODUCTION

As the El Paso Mathematics and Science Partnership completes Year Four of our five year plan, emphasis has been placed on (1) solidifying the key MSP programs, in both K-12 and postsecondary; (2) building the sustainability of MSP work for the long term; and (3) continuing to strengthen our research and evaluation work so that it provides clear evidence of the impact of our MSP work. The report that follows provides detailed information about our progress with regard to each of these points, as well as the full array of activities encompassed in our MSP program.

RETURN FOR INVESTMENT

Among the most important achievements of El Paso MSP over the past year are the following:

- High school graduation rates for El Paso MSP districts, that have risen for the fourth consecutive year and that are the highest among Texas urban school districts;
- Significant improvement in TAKS mathematics and science performance among all major groups of students;
- Continuing increases in the proportion of secondary students enrolled in college preparatory mathematics and science courses;
- Creation of an intensive effort to address student readiness for the college mathematics placement test that has resulted, at the pilot stage, in the preparation of large numbers of students for the test and thousands of students tested in high school;
- Continuing increases in the numbers of UTEP and EPCC faculty members and administrators prioritizing and engaged in K-16 math/science improvement efforts;
- Concentrated efforts at UTEP to align mathematics and science curricula, K-16, that have brought together teachers and faculty across the community; and,
- Evidence of institutionalization of MSP goals and priorities at UTEP, EPCC, and across K-12 school districts.

II. OVERVIEW OF YEAR FOUR IMPLEMENTATION: Activities and Findings

In Year Four, El Paso MSP addressed all of the key elements in our strategic plan with a special focus on the following: 1) increasing and strengthening STEM faculty engagement, 2) integrating and connecting MSP activities, 3) deepening the culture of evidence through the MSP research studies, and 4) utilizing the leadership of El Paso MSP partners to improve student readiness for college mathematics. This section of the report reflects the progress made in these areas and in all of the other activities outlined in the Year Four Implementation Plan; explains changes that occurred and the reasons for those changes; discusses some of the challenges encountered; and, shares some of the lessons learned.

II.1 Key Element One: Increasing and Sustaining the Quantity and Quality of PreK-12 Mathematics and Science Teachers

Objective 1.1: Develop and enhance Master of Arts in teaching mathematics and science programs.

MAT Program in Mathematics:

The second MSP-MAT Mathematics cohort, Cohort II, completed its course of study in Spring 2006. The graduating class was comprised of 6 teachers, including one who had dropped from Cohort I due to

personal reasons. Another Cohort II member will graduate in July 2006 upon completion of a summer course. A third, who cut back on course load due to illness, plans to graduate with Cohort III, in May 2007. The 25-member Cohort III will enter its second year of course work beginning in Summer I with STAT 3330 Probability, and Summer II with MATH 5360 Geometry and Calculus.

The MAT Cohort program has grown in popularity and the Mathematics Department Chair envisions continuing the program as designed. Recruitment for a non-MSP-funded Cohort IV took place during the academic year. Three cohort applicants successfully completed Calculus I in the Fall 2005 semester and four took Calculus II in the Spring 2006 semester. A total of seven applications were accepted for Cohort IV, of which 5 have enrolled in MATH 5370 Logic and Proof during Summer I, and MATH 5360 Introduction into Mathematics Education in Summer II. MSP funding supported cohort members for the calculus leveling classes and the summer courses. All Summer MAT Math courses are offered at El Paso Community College's Valle Verde and Transmountain campuses. The pre-MAT courses, Calculus I & II, were also offered at EPCC during the Fall 2005 and Spring 2006 semesters.

MAT Program in Science:

Fourteen MAT Science (Physical Science) Cohort members completed their coursework in July 2005 and graduated. A fifteenth member temporarily quit classes for health reasons. She is, however, planning on completing her coursework and graduating within the year.

Twenty-one students were accepted into the Master of Arts in Teaching Life/Earth Science cohort. Of those, 17 registered for classes and 15 attended. (The middle school teachers in this cohort outnumber the high school teachers by 2:1. This might be attributed to the fact that MSP developers are working in the middle schools and assist the College of Science in recruiting teachers for the MAT programs.) By August, the Life/Earth Cohort will have completed half of its required coursework. In addition, nine of the cohort members are taking a supplementary biology course, BIOL 5301: Natural History of the Chihuahuan Desert. These teachers will have enough graduate credit hours in biology to qualify for teaching dual-credit high school biology courses on completion of the program.

Additionally, the first MAT Physical Science program was so successful that the Departments of Physics and Chemistry recruited 10 students for a partial MSP-funded MAT Physical Science cohort. The students participating will receive stipends, but each department's budget will cover the cost of faculty salaries. The cohort began in Fall 2005 and will be half way through their program at the end of Summer 2006.

The UT System process for approval of the MAT in Science continues to move forward. In early spring, our proposal was returned from the System offices with a number of specific requests for changes. These include: a) the naming of a program director; 2) demonstration of alignment of the course work with the Texas standards (TEKS); 3) alteration of the proposed curriculum so as to assure that degree candidates will be able to qualify as "Master Science Teachers" in Texas; and, 4) redesign of the course sequencing so it can be taken over three years rather than two. A committee comprised of faculty from the Colleges of Science and Education is currently working on this revision with two other goals in mind: 1) to assure that future MAT degree recipients are qualified to teach at least one subject area for dual-credit; and, 2) to develop a track designed for recent B.S. graduates that would lead to certification and to content strengthening in one additional field of science. In the meantime, graduates from the program are receiving the M.S. in Interdisciplinary Studies degree.

Objective 1.2: Create the MSP Scholars to support twenty in-service teachers each year to complete an MAT/M or MAT/S.

MSP scholars in the two science and two mathematics cohorts were awarded stipends for tuition in the fall and spring semesters as well as the summer term. Thirty-two MATM and MATS cohort members received \$700 each in the Spring 2006 semester. Four received \$350 because they were enrolled in only

one course, and four pre-MAT Mathematics scholars received a \$633.50 tuition reimbursement for their spring 2006 Calculus II course held at EPCC's Valle Verde campus. In Summer 2006, both Science Cohorts and Mathematics Cohorts III and Cohort IV will receive \$1000 stipends for tuition assistance. All MSP Scholars who enrolled in MAT Math and Science courses at EPCC and UTEP were awarded tuition assistance stipends.

**Objective 1.3: Create the NSF Scholars Program for Alternative Certification Professionals (ACP).
Objective 1.5: Create an induction program to keep new math and science teachers in the profession.**

The two general purposes of the ACP Scholars Program and the Induction Program are: 1) to develop a support program for new math and science teachers that increases their likelihood of staying in the profession during the period of the first five years of teaching when there is high attrition; and 2) develop a support program that would not only keep new teachers in the profession but encourage them to continue their studies at the master's degree level. This is accomplished through a series of Saturday seminars, over the course of two years, focused on building a professional community of new teachers and providing them with professional development. The first year of seminars deals with action research as a method of encouraging teachers to become "reflective practitioners." The second year of seminars consists of a program on gender equitable teaching practices, *Teaching Gender Equity in Math & Science* (TGEMS), funded as a GSE supplement to MSP. (A separate report has been generated for this supplemental program.) Both NSF Scholars and MSP Induction Program participants take part in both years of seminars.

NSF Scholars Program for Alternative Certification Professionals (ACP)

In Year Four, two cohorts of middle and high school math/science teachers participated in the NSF Scholars Program for Alternative Certification Professionals (ACP): ACP Cohort II completed their second and final year of the two-year program, while ACP Cohort III completed their first year of the program.

ACP Cohort II ($n = 10$) included 7 math and 3 science teachers; 7 high school and 2 middle school teachers, and 1 who teaches both; 3 women and 7 men; and, 7 Latinos, 2 White non-Latinos, and 1 Asian. Among ACP Cohort II participants, 6 have completed or are enrolled in a master's degree program (2 M.Ed., 1 M.A.T., 2 M.S., 1 M.B.A.). Immediately prior to the start of Year Four, one teacher left the program because she discontinued teaching to work at home. All other teachers in ACP Cohort II who completed the program will continue teaching in the fall.

ACP Cohort III ($n = 13$) included 6 math and 2 science teachers, and 5 who teach both; 2 high school and 11 middle school teachers; 6 women and 7 men; and, 10 Latinos and 3 White non-Latinos. Among ACP Cohort 3 participants, 10 have completed or are enrolled in a master's degree program (5 M.Ed., 3 M.A.T., 2 M.S.). Prior to the second semester of Year Four, one teacher left the program for personal reasons, but continues to teach middle school. All other teachers in ACP Cohort III will begin the second year of the program and continue teaching in the fall.

Additionally, following the Year Three report, we tracked those teachers in ACP Cohort I who had completed the entire program ($n = 6$). All teachers remain in the teaching profession, including one teacher who relocated to a different city.

MSP Induction Program

In Year Four, two cohorts participated in the MSP Induction Program for beginning middle and high school math/science teachers: Induction Cohort II completed their second and final year of the 2-year program, while Induction Cohort III completed their first year of the program.

Induction Cohort II ($n = 15$) included 9 math and 6 science teachers; 4 high school and 11 middle school teachers; 9 women and 6 men; and, 8 Latinos, 1 White Non-Latino, and 6 Asians. Among Induction Cohort 2 participants, 7 have completed or are enrolled in a master's degree program (3 M.Ed., 2 M.A.T., 2 M.A.). All 15 completed the program and will continue teaching in the fall.

Induction Cohort III ($n = 9$) included 6 math and 3 science teachers; 2 high school and 7 middle school teachers; 8 women and 1 man; and, 6 Latinos, 1 White non-Latino, 1 Asian, and one individual of another ethnicity. Among Induction Cohort III participants, 4 have completed or are enrolled in a master's degree program (3 M.Ed., 1 M.A.). Prior to the second semester of Year Four, one teacher left the program for personal reasons, but continues to teach middle school. All other teachers in Induction Cohort III will begin the second year of the program and continue teaching in the fall.

Both ACP and Induction participants recently completed an evaluation survey to rate and describe their experiences during the current year of each program. Analysis of the data across cohorts will be conducted in and after Year Five when Cohort III will complete their final year in the program and no new cohorts will be recruited.

Following the Year Three report, we also tracked those teachers in Induction Cohort I who had completed the entire program ($n = 9$). All teachers remain in the teaching profession, including one teacher who relocated to a different city.

With regard to two general goals of the ACP Scholars Program and the Induction Program (decrease attrition of new math and science teachers and encourage continued professional development through enrollment in Master's degree programs), the teacher participants have been exemplary. Of the 62 teachers who have completed or are still enrolled in the 2-year program, 59, or 95% are still engaged in teaching. And of the 62 teachers, 42 or 68% have completed or are enrolled in Master's degree programs. These data are summarized below:

	ACP	Induction	Total	Left Teaching	Enrolled/Completed MA
Cohort I	6	9	15	0	15
Cohort II	10	15	25	1	13
Cohort III	13	9	22	2	14
TOTAL	29	33	62	3	42

Objective 1.4: Recruit undergraduate engineering students into secondary math/science teaching.

Activity was completed in Year Three and was deleted for Years Four and Five with approval from our program officer, Dr. Joan Prival.

Objective 1.6: Build a solid mathematics and science focus in high school magnet programs.

The work with high school magnet programs that focus on mathematics and/or science is complete, and a catalogue with data about available programs is currently being updated and reviewed. Some of the work related to helping students in the programs prepare for entrance to teacher education at UTEP, migrated to the College of Education under the coordination of Swanya Pitts, herself a former Director of a high school magnet program, the Socratic Institute. In addition, the College of Education has recently received a large grant focused on the recruitment of students from local high schools to teacher preparation programs.

Since several aspects of the original magnet school objective have migrated to the College of Education, we have phased out this work as a distinct objective of the Center for Research on Educational Reform, and we recommend that it be discontinued as an objective in Year 5 of MSP.

In addition, with the Year 3 additions to the Center's work related to the research projects (Objective V.4), the Coordinator associated with the magnet school effort, Lori Rosales Curry, has been increasingly called on to assist with those new projects, as well as supporting the efforts with the Induction seminars (Objective 1.3 and 1.5), and the Action Research Grants for Teachers (Objective V.3). We recommend that the coordinator continue to work on these projects in Year 5 on a one-half time basis.

Objective 1.7: Build a cadre of mathematics and science staff developers

In Year Four, twenty-one MSP staff developers successfully made the transition from high school to middle school. MSP district directors and El Paso Collaborative leaders met with all middle school principals and district leaders to discuss the goals of MSP as well as the purpose, roles and responsibilities of MSP staff developers on their campuses. To assist in the transition to middle school, staff developers were engaged in a 30 hour series of "think tank" seminars designed to promote a consistent use and understanding of key MSP coaching tools. The "think tanks" provided staff developers three significant learning opportunities: 1) investigation of resources and standards for middle grade mathematics and science courses and their alignment to the MSP Curriculum Frameworks; 2) analysis of state student achievement data to assess trends and identify critical academic needs of middle school students; and, 3) in-depth discussion of the Professional Teaching Model (PTM) lesson design process and of the MSP Teaching and Learning Protocol to guide and advance their work with teachers. As a result of these seminars, three, 3-hour modules were collaboratively developed by the staff developers who then presented them to all middle school faculties at the beginning of the academic year. Staff developers used the modules as an introduction to their work in the schools and to build a purposeful awareness of MSP goals and activities. During the course of the year, staff developers spent not less than three days per week with individual teachers or departments providing professional development to improve the quality of teaching and impact classroom practice.

To facilitate their experiences in the schools and classrooms, the bi-monthly professional development for staff developers was moved to different middle schools so that the campuses functioned as lab sites. At each meeting, one math and one science staff developer was given the opportunity to design, teach, and receive instructional coaching feedback from colleagues. These bi-monthly meetings provided immediate opportunities to practice the skills of instructional coaching on lesson design, implementation, and assessment analysis. The sessions also allowed time for extended conversation on the use of the MSP classroom observation protocol as a tool for examination of content and cognitive demand of mathematics and science lessons. In total, staff developers received 50 hours of coaching training plus 8 additional hours of coaching in group settings. This process is the same model of reflective practice that staff developers use with campus teachers

Over 120 middle school math and science teachers, region wide, participated in content-based institutes led by staff developers. The overarching focus of the institutes was to increase content knowledge and improve student learning. Teachers engaged in an exploration and study of proportionality in mathematics and science systems. In the spring, 145 middle school math teachers launched into a study on pedagogical content knowledge and student misconceptions. Teachers took the survey of Content Knowledge for Teaching Mathematics (CKTM), designed by Drs. Deborah Ball and Heather Hill, to assess their mathematical knowledge and pedagogy. Henry May, a researcher from the Center for Policy Research in Education (CPRE), administered the survey, and, Phil Daro, a national mathematics consultant, worked with teachers to "unpack" the experience, identify potential misconceptions that might be problematic for students, and explore challenges teachers face in teaching middle school mathematics. In the summer, twenty-hour institutes, one in math and one in science, were held. They were designed to extend teachers' content knowledge and to increase their understanding of student misconceptions. During the institutes, teachers also formulated strategies and approaches to address the misconceptions.

In addition to the work in middle schools, MSP leaders continued to maintain close ties with math and science high school department chairs. As a result of the two years that staff developers spent in the high schools, department chairs are now serving more as instructional resources instead of department managers. Twenty-three department chairs continued to work closely with MSP by attending workshops designed specifically for them. MSP district directors continued to maintain close contact and provided leadership support to high school chairs. A good example of what was started by staff developers and now sustained by the department chairs is their use of student achievement data as points of discussion about instructional practice. Another indicator of MSP's impact is the fact that one of the largest urban high schools redesigned the responsibilities of department chairs to mirror responsibilities of staff developers so that instructional support for classroom teachers would be uninterrupted.

Finally, staff developers participated in the first of six sessions using pedagogical content knowledge tools of practice developed in collaboration with El Paso MSP, CPRE and national math and science content experts. The tools (research reviews) will guide Year Five work of MSP by providing staff developers with a series of 8-10 tools, each designed around a core mathematics or science concept. The tools, which serve as a resource for conversation and study of the content, will allow staff developers and teachers to assess and treat common student misconceptions by understanding how to apply the most current research and identifying effective strategies they can use with their students. The discussion and "unpacking" of the math and science tools will be under the guidance of UTEP and EPCC core math and science faculty. It is expected that the tools will enhance the content knowledge of the staff developers and support them in their work with the middle school teachers. The staff developers will use the tools to enrich and support communities of practice at the campus level by engaging teachers in conversation and analysis of student work during grade level and department meetings.

Objective 1.8: Build a cadre of outstanding math and science teachers through National Board Certification.

Year Four was another year of mixed results for National Board certification activities. On the one hand, only a few teachers were recruited to enroll in the National Board certification process, in spite of a concerted and comprehensive effort by Deborah Svedman, the half-time Project Coordinator. On the positive side, significant progress was made in bringing awareness of the National Board Certification process to the El Paso area. Ms. Svedman, herself an accomplished high school mathematics teacher who is National Board certified, focused her efforts on providing information to senior school district officials, principals, and teachers about the advantages of National Board Certification. She made several presentations, held support workshops for teacher candidates, and published articles in local school publications. She also spoke to school board presidents and superintendents. We see this increased awareness as a necessary first step in moving school districts to provide salary incentives to teachers who are successful in becoming National Board certified teachers. To date, one of the smaller school districts in El Paso (Canutillo ISD) has added an incentive for NB certified teachers.

At the teacher level, Svedman worked with six candidates beginning the year-long process of assessment for certification. One has been certified, and another who completed the process is awaiting her scores. A third candidate completed the process, but was unsuccessful, and three others dropped out without completing the process.

As noted in the Year Three annual report, the obstacles in El Paso for greater success among teachers in National Board certification remain substantial. The primary obstacles for El Paso are the lack of information about the National Board and the benefits of going through the certification process, in addition to the lack of incentives for teachers to complete the year long assessment process. States and school districts in the U.S. that have been successful in increasing the number of Board certified teachers, almost always provide attractive incentives for teachers who become certified, primary of which have

been significant and permanent pay increases. El Paso school districts have none of these, nor does Texas as a state.

In addition to providing all secondary teachers in the largest school districts with information about the National Board, Svedman has provided local superintendents and school board presidents with information. She has met with several of them personally, and she has provided workshops to them and their staffs. She has also made a case that school district incentives for teachers to complete the certification process have worked in many districts and states. (There are now more than 45,000 certified teachers in the U.S.) Many school officials have shown much interest, but have not yet moved ahead on recommending pay incentives for teachers in their districts. Only one of the smaller districts, Canutillo ISD, has instituted a one thousand dollar pay incentive for teachers who become certified.

Because we feel that we have made significant headway in increasing the awareness of the benefits of National Board certification among local school teachers and school district officials, we will focus our efforts in Year Five on this informational campaign aimed at getting school districts to make policy changes that lead to providing incentives for teachers who successfully complete the NB certification process. Ms. Svedman will continue to provide workshops and informational sessions for teachers and school district officials who can have influence in changing the policy on incentives for teachers.

Objective 1.9: Increase and enhance the involvement of STEM faculty as active partners in El Paso MSP

Action steps initiated last year to involve more STEM faculty more actively in El Paso MSP continued this year. Associate Dean, Kate Miller, continues to have oversight responsibility for MSP activities in the College of Science. Dr. Miller is working closely with Dean Michael Eastman, Associate Dean Nancy Marcus, and the rest of the college staff, to develop a broader culture of valuing partnership with K-12 teachers and schools among science faculty members. Throughout the year, at both College of Science chair and faculty meetings, Dr. Eastman has continued to place a strong emphasis on the importance of undergraduate recruitment into science and mathematics and on how that need must translate into greater faculty interaction with El Paso schools and teachers. For example Dr. Miller gave a presentation on K-20 Math and Science Education Opportunities at a college of science faculty meeting in February. In meetings and on an individual basis, both Dr. Eastman and Dr. Miller have also articulated strong support for the validity and importance of the scholarship of teaching and learning as an avenue of research for faculty members in the college. They are strongly encouraging faculty members, hired as a result of MSP, to take a leadership role in publishing the results of their MSP-related research and in engaging their discipline colleagues in related research activities.

We have found that the implementation of the MAT degrees is an effective means for enhancing the involvement of STEM faculty as active MSP partners. For example, over the course of the physical science MAT program, the chemistry department has evolved strong support for and interest in its success. Three discipline faculty members who have taught in the program are now strong advocates for it and are among those pushing to recruit a second cohort. We are seeing a similar level of interest developing on the part of the four discipline faculty members who taught the life/earth science cohort this past year.

Bi-weekly Mathematics Teaching and Learning Brown Bag Lunch seminars, coordinated by mathematics lecturer Ana Medina-Rusch, were well attended by math faculty as well as faculty from other science disciplines. Average attendance at each seminar was 15 people, an increase of more than 50% from last year. With MSP support, the geology department invited a National Association for Geology Teachers (NAGT) distinguished lecturer to speak at its weekly seminar in the fall.

While a number of faculty members are clearly engaged in teaching the MAT programs, another measure of faculty involvement in teacher training is the percent of UTEP science and math faculty who teach courses required of pre-service teachers. Most of these courses have content designed specifically for pre-service teachers, thanks in part to curriculum reform undertaken under UTEP's CETP initiative, PETE, and through MSP. During the 2005-2006 academic year, 67% of Biology, 50% of Chemistry, 64% of Geology, 86% of Physics, and 87% of Mathematics faculty taught such courses.

This year, we also made a concerted effort to gain a deeper understanding of the breadth and variety of college faculty participation in K-12 activities. Anecdotally we know that science and math faculty members regularly interact with K-12 teachers and students in a range of ways such as presentations in schools and at UTEP, acting as judges in science fairs, and service learning activities. As in previous years, each department submitted spreadsheets that summarize these types of activities. We estimate that these spreadsheets document 80 to 90% of faculty activity in the K-12 area. College of Science faculty engaged in hundreds of hours of community outreach, donating their time to promote science knowledge and education. Activities included helping to write, develop, and grade a citywide MSP Algebra II assessment test, writing radio scripts on the Chihuahuan Desert for the Centennial Museum and KTEP, participation in the Alamo Elementary School Career and Job Expo, and presentations on careers in geological sciences for the Mother-Daughter program. Other activities included media interviews about global climate change/hurricanes, and climate change issues in the Arctic, natural hazards of the El Paso region, and a public lecture titled "Deserts and Dust". Many more faculty members acted as science fair judges and others acted as science fair project advisors. Among other activities, department chairs in Geological Science and Physics, respectively, helped local Boy Scouts earn their Geology Merit Badge, and participated in tutoring students in preparation for AP and IB physics exams.

Finally, during MSP Year Four significant progress was made toward changing UTEP's Tenure and Promotion policies to support the engagement of STEM faculty in K-12 math/science improvement efforts. As planned, the Provost met with deans and chairs to discuss the revised policy. In addition, the Provost is meeting with all untenured faculty in mathematics, science and engineering to ensure their understanding of the University's support for K-12 work and of making "the campaign for tenure within the context of UTEP's mission and values". This spring, Dr. Jarvis presented the proposed new policy to the Faculty Senate, noting the essential linkage between the University's mission and faculty work to improve education K-12, and indeed K-16. A central aspect of this presentation, and of subsequent meetings and discussions, was making clear the "unique importance" and value of faculty work on K-12 education, which places it in a special category, above other improvement efforts. A Faculty Senate committee is now working on the policy, which is expected to be recommended for passage by the full Senate in the coming academic year.

II.2 Key Element Two: Building School and District Capacity

Objective 2.1: Establish Principals' Academy to facilitate and sustain school improvement efforts.

In Year Four, one hundred K-12 principals took part in over 120 hours of professional development designed to support their leadership and campus implementation of MSP. Principal Academies prioritized three key areas: development of content leadership through content-based case studies and classroom observations that provided opportunities to examine classroom practice in mathematics and science; data-driven dialogue related to mathematics and science student achievement to uncover assumptions and misconceptions about student learning and teacher practice; and engagement with school teams in developing habits of mind and dispositions that support student learning at high levels of cognitive demand.

MSP district directors provided district and campus-based professional development and assistance to principals in order to align and address specific district needs related to mathematics and science student achievement. Principals perceive MSP district directors as advocates and resources for their campus and teachers. In one district, all principals were engaged in a full day session focused on levels of cognitive demand using student responses from district-based assessment instruments. This full day session provided an extension opportunity for both directors and staff developers to follow up with campus-based professional development. By leveraging the monthly principal instructional meetings to provide focused sessions on mathematics and science, district directors found their on-site classroom observations with principals more purposeful and useful in accelerating the conversation and implementation of high-quality teaching and learning. Principals now have a deeper understanding of the classroom observation protocol to ground their instructional interactions with teachers. In one urban district, MSP was instrumental in the design of a two-day Principal Institute to address the use of formative assessment and the analysis of local student achievement data to change classroom practice. The cognitive demands that are a part of the K-16 Curriculum Frameworks became the basis for conversation about the level of rigor in classrooms and the strategic use of teacher questioning as a tool for formative assessment. Staff developers and the MSP district director for this district were active participants and served as content experts in the analysis.

In March 2006, the fourth MSP Teaching and Learning Day afforded over 180 K-12 educators and district leaders, along with five post-secondary faculty, the opportunity to use the MSP Teaching and Learning Classroom Observation Protocol in 14 schools across the El Paso region. As a result of these activities, principals have become interested in developing local Teaching and Learning Days for their faculties. This past year, eight school-wide MSP Teaching and Learning Days were held and principals, the MSP district directors, and the staff developers took the lead in organizing and implementing each one. Principals have come to recognize the value of having a common vision for high quality classroom instruction specific to mathematics and science. As staff developers utilize common planning time and conference periods for regular, department-wide professional development, principals observe that the protocol is a valuable tool for promoting the dialogue about and study of conceptual math/science teaching and learning.

Objective 2.2: Build District Level Capacity for School Sites

El Paso MSP leaders continue to meet with district Superintendents on a quarterly basis. These focused conversations provide them with the opportunity to strengthen the partnership and the districts' collective commitment to high-quality teaching and learning of mathematics and science. El Paso Collaborative staff and district assistant superintendents and directors of curriculum and instruction meet every 6 weeks to check the pace of implementation of MSP across the district and to make necessary adjustments to maximize effectiveness.

In Year Four, the impact of MSP on curriculum, instruction, and particularly on professional development is evident at all levels, and district and campus leaders have sought the support of Collaborative staff in making MSP-developed tools, strategies, and best practices a lasting part of their districts. One district's executive director considers that the tools of MSP have been invaluable in her leadership role within curriculum and instruction. She has instituted the use of content-based case studies as a method for engaging aspiring administrators, her department, and campus principals in conversations about classroom practice. The MSP staff developers, acting as residence-based coaches, have been an influential model for professional development, now embraced across districts. One district office, for example, has initiated professional development in the MSP coaching model to equip district instructional personnel with the skills necessary to provide quality feedback and support to their campuses. Both of its executive directors have attended the 48 hours of training along with the 45 members of their staff. Other districts have invested in formally training two principals, one staff developer and a district instructional staff member to ensure that professional development in coaching is institutionalized and sustained after MSP. Going further, a large urban district has asked MSP Collaborative staff to assist in the development

of a district-wide coaching model for use with 150 instructional coaches to be implemented in Year Five of MSP. A select group of staff developers, across districts, have undertaken to participate in designing and constructing professional development to be used with these math and literacy coaches. Their expertise and authentic experiences as instructional coaches will allow them to address the many challenges faced by resident-based coaches in this long-range planning and will facilitate cross-district and region-wide conversation on the MSP models.

MSP staff developers and district directors are recognized as critical resources in every district. As positions are created that require knowledge of and expertise in MSP math and science content and instruction, staff developers and district directors are sought out for these positions. For example, three staff developers have assumed, respectively, an assistant principal position, a campus/district leadership position, and a post-secondary position this past year. Throughout the region, people who are knowledgeable practitioners and committed advocates of MSP models, strategies and objectives have become important leaders in schools and districts.

Objective 2.3: Engage parents and community to support mathematics and science reform.

Year Four MSP parent engagement activities began with presentations on MSP goals and projected activities for the year to district-wide meetings of parent educators and liaisons. Major parent seminars at UTEP were focused on the importance of students having access to rigorous, high-level math and science throughout K-12, promoting a home/school college-going environment from the earliest grades, and how parents have a critical role in their students' academic success. One seminar for parents addressed the gap between groups in student achievement, with parents looking at student achievement data in math and science and discussing in groups possible causes of and remedies in closing this gap. After this, Dr. Milijana Suskavcevic, UTEP Department of Physics, shared her own experiences in pursuing a career in science and the value of science in their own children's education. Then Dr. Suskavcevic led parents in a hands-on science experiment and on understanding the scientific method. In a follow-up seminar, parents reviewed a compendium of their previous discussions on the student achievement performance gap and began to look at actions they might take in supporting their school in closing the gap. They also worked on inquiry-based, mathematics activities they could then share with their families. In the final part, 40 college students joined parents for round-table discussions on going to college with parent support. The May seminar had parents exploring a richness of resources for summer learning activities for children of all ages and creating math and science activities to do at home. In addition to the seminars, feeder-pattern trainings were conducted at urban district middle and high schools (e.g. Wiggs Middle, Socorro Middle, Coronado High) and in schools in the Clint and San Elizario districts.

The 8th Annual Regional Parental Engagement Conference was held at San Elizario High School in November of 2005 with the participation of over 800 parents. The MSP Parent Coordinator was also an active organizer and presenter in district-wide parent conferences and academies in the El Paso, Ysleta and Socorro ISDs. Presentations on parent engagement were made to pre-service teacher classes at UTEP and EPCC, and presented at district sessions for summer school parents. In late April, a survey was sent out to parent liaisons at all MSP middle and high schools in the region to gauge the level of parent engagement at their schools. From the response, it is evident that parents are involved in their children's schools in a multiplicity of activities. Of those specifically targeting college-going and supporting students' academic success, respondents counted up to 50 activities, with an average of 16 per school. Among the most successful of these were Science and Math Night, Senior Project Presentations, and Mathematics Hands-on for Parents, with an average attendance of 100 plus parents. Although some respondents were cautious on reporting improvement, over 50% reported that parent engagement had noticeably or significantly increased at their schools.

Aside from parent engagement, the Collaborative has continued to strengthen community relationships in support of the MSP work. Through THINK COLLEGE NOW (TCN), there has been

consistent interest on behalf of city-wide business and community volunteers to become presenters for the THINK COLLEGE NOW—Texas Scholars program. So much so, that the Greater El Paso Chamber of Commerce Education and Workforce Division has chosen the THINK COLLEGE NOW—Texas Scholars program as the vehicle to fulfill their goal of informing eighth and ninth grade students in Region 19 about higher educational opportunities through 600 classroom presentations by 2010. According to its mission and goal statements, the Greater El Paso Chamber of Commerce has committed itself to recruit 350 private sector volunteers by 2010 to conduct classroom presentations.

There has been continued success in recruiting education and social science majors to participate in the program and receive extra-credit for volunteering as presenters. THINK COLLEGE NOW has also developed a link among those UTEP students majoring in the sciences and engineering through the Women in Science and Engineering (WiSE) program. The WiSE program is a university-based, on-campus, undergraduate organization that provides support for female undergraduates who are majoring in engineering and sciences, and promotes careers in STEM fields for females through community outreach activities, developmental workshops, and academic stipends. During the 2005-2006 academic year, the WiSE program elected to participate in the THINK COLLEGE NOW—Texas Scholars program as one of their outreach activities in which 41 WiSE students conducted presentations to encourage 8th and 9th grade students, girls especially, to become interested in going to college and entering a STEM career path. In addition to the WiSE students, 114 STEM career professionals are also part of the volunteers who present to middle and high school students through MSP's THINK COLLEGE NOW.

The Collaborative has also continued to honor those high school students who graduate as Texas Scholars—by completing the Recommended High School Program or the Distinguished Achievement Program. This year, over 10,000 medallions were delivered to every high school in the MSP Region (34 high schools). In addition, Collaborative representatives were requested by 9 MSP high schools (all Ysleta Independent School District high schools and 2 from the Socorro Independent School District) to personally address and congratulate those students who received the Texas Scholars medallion at their graduation ceremonies.

II.3 Key Element Three: Aligning Curriculum, Instruction, and Assessment of Mathematics and Science Education

Objective 3.1: Fully align high school college-preparatory mathematics and science courses, including Algebra I, Geometry, Algebra II, Biology, Chemistry and Physics to meet state and national standards, as well as college/university expectations and assessments, so as to ensure success in rigorous college math/science courses.

Objective 3.2: Fully align PreK-8 mathematics and science curricula with newly redesigned high school courses to develop a seamlessly aligned math/science teaching and learning program, PreK-16.

In summer 2006, the K-16 Mathematics Working Group, comprised of K-12 teachers from urban and rural schools and postsecondary faculty from the Community College and University, will be completing the revision of frameworks for Mathematics K-8, Algebra I, Geometry, Algebra II, and Precalculus. The K-16 Science Working Group, with the parallel teacher and faculty composition as the math group, completed the high school Biology curriculum frameworks this summer. As with mathematics, this completes the development of frameworks for Science K-8, Chemistry, Physics, and Biology. These frameworks, and alignment of K-12 mathematics and science will ensure students in El Paso area schools have access to and are able to participate in challenging mathematics courses and curricula that will prepare them for success in college-level math, science and engineering. Professional development was provided to mathematics and science staff developers and K-12 teachers to assist them in implementing these frameworks, in preparing lessons and unit activities. Since some of the math and science state

standards have been revised, part of the summer will be used to edit the frameworks to incorporate state revisions.

The development of the Algebra II final exam continues. This year, high school mathematics teachers and postsecondary faculty met several Saturdays during the academic year for the purpose of scoring constructed items in last year's Algebra II pilot exam. They received training in constructing scoring rubrics, scoring, and calibrating scores for constructed response items. Data from these scored items was analyzed, and teachers and faculty used this analysis to construct an Algebra II exam. This second, refined exam was piloted in May 2006 with over 350 students in high school mathematics classrooms, and will also be piloted in Fall 2006 in freshman college mathematics classrooms. The purpose for using the two populations is to compare scores from students who have taken the Algebra II course and those who have placed in freshman college mathematics courses that have been identified as being ready for college level mathematics. In Fall 2006, we will bring in teachers and faculty to score these exams and collect data again. This second analysis of data from the exam will be used to construct an aligned Algebra II midterm exam and a final exam that will assess student readiness to enroll and succeed in a college level course. Phil Daro (Senior Consultant) and David Webb (University of Denver) were brought in to facilitate the Algebra II Assessment Group sessions.

Objective 3.3: Make recommendations to local school districts, Community College, and University regarding policies affecting mathematics and science curriculum and instruction.

During MSP Year Four, significant progress was made on K-16 policies affecting mathematics and science curriculum alignment, student academic support and postsecondary mathematics placement. Specifically, work intensified with the large districts toward ensuring that all mathematics and science courses are aligned, both vertically—from grade to grade—and horizontally—across classrooms and schools teaching the same course or at the same grade level. MSP Alignment Frameworks have been used to develop districts' scope and sequence documents that have become the districts' formal curricula. This work should ensure improved focus on the most important math and science topics at each grade level or course, with the added and important emphasis on the level of cognitive demand to be expected of the student work related to each topic.

Both the University of Texas at El Paso and the El Paso Community College made significant strides in adding to the academic student support services provided to students upon entry to their institutions, as well as streamlining access to those services. Both UTEP and EPCC have increased the number of programs provided to students to ensure that students are fully prepared for college-level work. These programs, provided to students in the summer before their freshman year, include intensive advising regarding course selection for their first year, assistance in understanding the changed demands and expectations of college versus high school, and academic "ramp-up" activities in mathematics and literacy that help prepare students for college-level work. An important new policy regarding mathematics placement, led by UTEP Provost and MSP Co-PI Richard Jarvis, was also put into place in MSP Year Four. That policy provides students an expanded range of options for taking needed math developmental courses in an abbreviated timeframe, with additional support by trained UTEP math students and lecturers. It also allows students that test slightly below the college-level math cut-score to "challenge" college-level math courses, with additional intensive support. These new programs and policies represent a major new effort by UTEP and EPCC toward ensuring that more students enroll and achieve success in college-level mathematics early in their college years, hopefully leading to increased numbers of students opting for STEM degrees and careers.

At EPCC, the President and Vice President continue to be strong supporters of MSP. Key science and mathematics faculty have been given release time from their teaching loads to participate in MSP objectives and activities. The three MSP retreats held at EPCC this year were strongly supported by deans and department chairs. One of the major ways the deans supported MSP goals and objectives was

by providing substitutes for faculty to participate in workshops and retreats. EPCC administrators have given MSP faculty lead roles in core committees of the College's initiatives that address curriculum, instruction, and assessment. The EPCC Director of Alignment has been given the opportunity to provide presentations on the alignment work to national audiences.

The MSP PI, Susana Navarro, and Project Director, Alicia Parra, have continued meeting with college and university leaders (presidents, provosts, deans) to discuss the most effective policies and practices for the placement of students. This was a key factor that brought the Vice President of El Paso Community College together with the Provost of the University to convene the El Paso Mathematics College Readiness Consortium that, linked with the Collaborative Board, brings together administrators from the urban and rural school districts, the Education Service Center Region 19, the Community College, and the University. One of the major undertakings of the Consortium was developing and implementing a plan to administer the Accuplacer Placement Test to high school seniors during Spring 2006 *while students were still in high school*. This was an enormous undertaking involving the scheduling of hundreds of high school seniors to take the test, complete the UTEP/EPCC admission applications, and in some cases take a preparation session before the Accuplacer and test unsuccessful students a second time. This past year, over 3,780 students took the test in high school. We anticipate that even larger numbers will take it next year, as all districts will be involved. Though data are not yet available regarding the performance of those students, it is expected that under this new high school testing program, far larger proportions of students will test into college level mathematics.

Objective 3.4: Integrate PreK-16 Alignment with postsecondary educators, including math/science teacher educators in EPCC.

Year Four brought three new EPCC faculty to MSP activities bringing the total faculty participants to fourteen. MSP is now represented at all five campuses of the El Paso Community College District. This will greatly facilitate dissemination of MSP goals and objectives to all college faculty. MSP faculty met during Year Four as campus groups and also as discipline groups. In addition to these smaller group meetings, whole group meetings were held monthly. The smaller group meetings facilitated recognition and utilization of the mathematics and science course frameworks. During Summer 2006, a smaller group is continuing to meet to begin development of a resource book of new and engaging activities that span the levels of cognitive demand mapped in freshman mathematics and science courses for pre-service teachers. Another important part of the resource book will be to make connections between mathematics and science concepts with topics common in STEM courses, and use technology to enhance teaching and learning.

The EPCC MSP group has completed and disseminated course framework matrices mapping content to cognitive demands for three math courses (two developmental and one freshman level), two physics courses, two chemistry courses, two biology courses, and two geology courses. These courses were all selected because they are freshman STEM courses in the pre-service teacher programs. They have been presented to faculty as evolving documents and have encouraged all STEM faculty to submit suggested revisions. MSP faculty will take suggested revisions and produce another draft after the end of Year Five.

In addition, EPCC focused on reducing the number of students placing into remedial mathematics. Toward this end, we reviewed data on mathematics course placement and found that only three percent of students tested were actually placed into an EPCC remedial algebra course. This fact resulted in a complete restructuring of our remedial mathematics courses. Two MSP faculty are participating in a district-wide math committee to examine and restructure the remedial course sequence. As a result, we have been able to receive complete endorsement for attaching our framework matrices to the newly revised Official Course Syllabi for each of the revised courses. The restructuring will also result in condensing 4 remedial mathematics courses into 3 remedial mathematics courses. Because of this, we now have both the rationale to align assessment and, more importantly, the leverage to align cut scores for

course placement. More data will be collected as the newly restructured courses are offered and will be used to determine better predictive cut scores. EPCC will also take part in the Algebra II pilot exam during the fall semester and we will use the data to inform and refine course placement cut-scores.

During Year Four, three retreats were held for EPCC STEM faculty. To allow more faculty participation, the retreats were scheduled over 2 days, Friday afternoon and Saturday morning. In Fall 2005, two retreats were held to accommodate more people—a mathematics faculty retreat, on September 16–17, and the science faculty retreat, on September 23–24. A third retreat was held on March 24–25 for STEM faculty. EPCC MSP participants presented activities showing how course frameworks were used in designing activities and modeling what the activities looked like during classroom instruction. At each retreat, the mathematics and science course frameworks were disseminated along with activities supported by the frameworks. Copies of the frameworks were also distributed at district-wide and campus-wide discipline meetings during Faculty Development Week in both Fall 2005 and Spring 2006 semesters. MSP faculty used the books, *How Students Learn Mathematics/Science in the Classroom*, NRC 2005, to focus dialogue and discussion around what research tells us about teaching and learning, and how that is related to the design of the frameworks.

MSP faculty presented professional development workshops during EPCC Faculty Development Week at the beginning of both Fall 2005 and Spring 2006 semesters. These workshops included the following topics: implementing STEM frameworks in classroom instruction; connecting STEM concepts among mathematics and science disciplines; using research to align mathematics; relating levels of cognitive demand to classroom instruction and learning in STEM courses; and, dialogue and discussions around research from the National Research Council books of the National Academies Press. Each session was well attended and evaluations indicated that faculty would like to learn more about how to use the frameworks. This will be addressed in our Year Five Implementation Plan.

The academic year ended on a very positive learning note for EPCC mathematics faculty. Because more national experts are calling for better preparation of elementary mathematics teachers, the Mathematical Association of America, MAA, held a conference on Preparing Mathematicians to Educate Teachers, PMET, at the El Paso Community College. In May 2006, EPCC and UTEP faculty participated in a five day Professional Enhancement Program offered by MAA. The conference was coordinated by two MSP mathematics faculty members working in conjunction with an MAA program director. The sessions addressed undergraduate mathematics and focused on useful mathematics activities for preservice elementary school teachers. Twenty-two postsecondary STEM and Mathematics Education faculty from EPCC, UTEP, and three out-of-state faculty participated and heard from noted mathematicians and mathematics educators including, Hung-Hsi Wu, Bernie Madison, William McCallum, Lew Romagnano, Gary Kader, and El Paso's own Art Duval and Olga Kosheleva. MAA's PMET is supported by the National Science Foundation and has additional support from Texas Instruments.

Objective 3.5: Integrate PreK-16 alignment with postsecondary educators, including math/science teacher educators in UTEP's College of Science.

Remarkable progress was made this year in aligning math curricula within the El Paso MSP. A committee led by Associate Dean Nancy Marcus and comprised of 20 members from the school districts, EPCC and UTEP, came to an agreement on common teaching approaches and common textbooks for Pre-calculus and Calculus I. Initially, each entity (UTEP, EPCC, each school district) submitted to Dr. Marcus a list of topics that they cover in those two courses. About 80% of the topics were common to all the entities. In subsequent meetings of the committee, representatives from each of the entities agreed to add or give up topics until 100% commonality was agreed upon for both courses. The committee then agreed to common, state-approved textbooks for each of the courses that best fit the new curricula. Formal approval of the changes on the part of all entities is expected in the fall.

In addition, two faculty members from each area—geology, biology, chemistry, and physics—have been designated by their chairs to help with the frameworks and to be point people for alignment issues. All are participating in the geology/biology framework effort. In addition, the Teachers for a New Era (TNE) math and science work groups have also become interested in alignment issues. They have recently invited EPCC faculty to join those work groups. Associate Dean of Science, Kate Miller, plans to leverage these interactions to broaden contact between EPCC and UTEP Science faculty.

II.4. Key Element Four: Increasing College-Going Rates

Objective 4.1: Implement the THINK COLLEGE NOW Initiative.

To improve students' chances to succeed in college, the THINK COLLEGE NOW initiative emphasizes the importance of student enrollment in rigorous academic programs during high school, and is informed by studies which show that students who take rigorous high school programs do better in college courses and are more likely to complete a college degree. In addition, students who take higher level courses are less likely to enroll in remedial classes during their first year of college. This is important and consistent with the MSP's priorities to ensure that students are better prepared for success in higher education. The THINK COLLEGE NOW initiative is an integral part of MSP in that it provides substantive evidence to the entire school community (students, faculty, parents, and the outside community) that encouraging middle and high school students to enroll in higher level math and science courses will increase their chances of college enrollment and completion, and their chances in STEM careers.

Through Texas Scholars—one of the two initiatives under THINK COLLEGE NOW—volunteers conduct presentations that focus on the importance of preparation for college, promote the Recommended High School Program and enrollment in high-level math and science courses, as well as participating in Advanced Placement courses and dual-college credit courses offered by their schools. The Texas Scholars program continues to recruit and train business leaders and other community representatives in the El Paso region to deliver presentations to all 8th and 9th grade students. During MSP Year Four, 279 business and community volunteers, and 164 college students were trained in Texas Scholars presentations. Volunteers conducted 443 8th grade and 9th grade class presentations, reaching a total of 10,510 8th and 9th grade students throughout the El Paso MSP area.

Objective 4.2: Implement MSP Counselors' Initiative: Creating College-Going Pathways.

During Year Four, THINK COLLEGE NOW has continued to provide supplemental materials and/or professional development to those high schools that have sustained operations of their college advising centers or GO Centers. GO Centers are physical locations on the school's campus which provide information and services to their school community focusing on academic preparation for post-secondary education, on applying and submitting financial aid forms, on enrolling in post-secondary institutions, and on career counseling. Communication with the GO Center sponsors—high school counselors and their District Counseling Directors—have been scheduled throughout the year to discuss issues regarding the integration and maintenance of the high school center, providing new college admission and scholarship information, as well as promoting any professional development or student leadership training regarding college readiness.

On November 30, 2005, the Collaborative, UTEP, and the El Paso Community College, provided special training to new high schools that have shown interest in developing their own centers, as well as those high schools with running GO Centers. A total of 20 high schools participated in this year's GO Center Conference held at UTEP. This included over 20 high school counselors and approximately 200 high school students (peer educators that help run the GO Centers).

In addition to this regional conference, on-site leadership workshops for student peer educators were also conducted at the request of each high school. These on-site workshops were led either by the TCN Coordinator or a college student peer educator from UTEP or EPCC.

To increase networking capabilities among the high school counselor sponsors, meetings were held to discuss best practices. In addition, high school sponsors were asked to submit baseline data to calculate how many student contacts were being made in the GO Centers by the GO Center peer educators, and if these contacts were affecting the number of students applying to colleges, scholarships, and financial aid. Eight of the 15 high schools which have a running GO Center reported data for the Fall of 2005. Only 2 high schools provided end-of-the-year data. Data showed that a combined total of 3,866 contacts with students were made inside their GO Centers and 7,964 student contacts were made outside of the GO Centers, by the peer educators, either during classroom presentations or informal social groups. The majority of the student contacts, over 65%, were made with high school seniors. High school sponsors explained that they had decided to concentrate on the seniors to make sure that these students applied for colleges and scholarships before the end of the Fall deadlines. In fact, a combined total of 2922 college applications were submitted (53% to UTEP, 35% to EPCC, 3% to other Texas colleges or universities, and the remainder were out-of-state). Financial aid and scholarship data was not complete due to the lack of Spring 2006 data. This data will be collected during the next academic year.

High school counselors also reported on the conditions needed in order to sustain and manage an efficient and effective college-advising center. Most importantly was the commitment by their high school principal. A supportive high school principal was more likely to designate a physical space (either an unused corner of a central location or a full classroom) to the center as well as computer equipment—both items identified as being crucial to an effective GO Center. The last item that was most helpful to the high school sponsors was the use of the high school peer educators or G-force members, as well as the Collegiate G-force members. The high school G-force was most effective when they were seen as counselor aids. They were used to track new scholarship information, keep records of who was entering the GO Center and other data, provide one-on-one assistance to any student or adult who wanted information from the GO Center, as well as to conduct presentations in the classrooms. The Collegiate G-force assisted in providing a link to the college experience. They provided the “real world” touch to the classroom presentations and workshops. All in all, those high schools which had at least one year running the GO Center were convinced that this strategy was one of the most effective ways to promote and provide college preparatory information to their school community, and so were committed to continue the use of their Centers.

Objective 4.3: Implement and Support the Infinity Project

This activity was eliminated from MSP Agenda at the end of Year Three and will be under the sole auspices of the College of Engineering.

II.5. Key Element Five: Implementing a research agenda that advances knowledge and understanding about the systemic improvement of mathematics and science education.

Objective 5.1: Develop math/science, field-based, research pedagogical Laboratories (RPL)

The goals of the work in the field-based research pedagogical laboratories are basically two-fold: 1) to provide professional training and guidance in integration of content and methodology based on research for math and science teachers; and, 2) to produce original research results that contribute to improvements in teaching and learning in the math and science classrooms. All of the action steps proposed under this objective are moving forward in a rich and complex environment of professional development and research activities.

In the original proposal, work under objective 5.1 was to take place in six specific “RPL” schools. However, as new faculty were hired with varying research interests and the needs of teachers and administrators changed, the work evolved, such that it is now most easily sorted into four categories:

- 1) *Major RPL Schools* – these are schools with larger-scale research projects and professional development activities underway that involve multiple UTEP faculty members and graduate students. These schools are Andress High School, El Dorado High School, Henderson Middle School, and Wiggs Middle School. All of these are among the originally proposed six RPL schools. Work at El Dorado High School had to be abandoned this year due to personnel changes and state-mandated testing pressures at the school.
- 2) *Satellite RPL Schools* – these are schools where a few smaller, independent research projects are underway. Generally speaking, these projects owe their origin to a teacher or administrator approaching UTEP faculty and asking for RPL activity in their school. Schools that fall in this category this year include Coronado and Americas High Schools and Ysleta Middle School.
- 3) *Action Research Projects by MAT Students* - A large number of Action Research Projects are either completed or underway under the auspices of the research requirement in the MAT programs. All of this work is guided by UTEP faculty. While these are primarily professional development activities, they are contributing to a larger research base, through meeting presentations and peer-reviewed publications.

This year, the impact of these projects has affected approximately 7 different schools, more than 20 teachers and MAT graduate students, and over 4000 students in the schools.

Here we highlight the research progress at one school, in order to illustrate the kind of impact our research is having and will have on improving teaching and learning in science and math classrooms. Last year we reported that at Henderson Middle School, 3 UTEP faculty members were working with 12 teachers and 1100 students to see how affective approaches may change teachers’ expectations and improve mathematics learning on the part of students. The hypothesis is that student achievement will increase as teachers raise expectations. Over the past year, the UTEP faculty team provided a support system for teachers by providing materials, professional development, and motivational activities, as well as by guiding reflective practice, and modeling positive expectations. Extensive data sets were collected including self-efficacy inventories, math interest inventories, focus group interviews, teacher interviews, and TAKS scores. These data have now been analyzed and the results are impressive. Henderson Middle School was recognized with a Gold Performance Acknowledgment from the Texas Education Agency for having top quartile improvement in math TAKS scores among schools with similar demographics. These test results are accompanied by a significant increase in scores on the Middle School Self-Efficacy Inventory ($p < .001$) and perhaps the first individual-level correlation between TAKS scores and the Middle School Self-Efficacy Inventory: $r = .215$, $n = 406$, $p < .001$, which has important implications for high stakes testing. These results have been submitted for publication

While the new data for the 2005-06 school year is still being gathered and analyzed, preliminary work suggests that there has not been the same level of progress/achievement this past year. This is possibly due to factors such as increased math class size, anxiety about high-stakes testing and its repercussions, reduced math faculty size, and questions about time spent using reform curriculum or TAKS drills.

Objective 5.2: Provide research training to MSP math and science staff developers and district directors.

Objective 5.3: Award small research grants to teachers for classroom research.

A major objective of this program is for participants to develop research skills that they will be able to draw upon during and following the program, in order to be effective "reflective practitioners."

Teachers are expected to confront challenges in their classrooms by applying systematic methods of question development, data collection, analysis, and interpretation. However, we have found that the opportunity to guide teachers through this process has been somewhat limited within the constraints of this program, which calls for small-scale, nine-month classroom research projects. Thus, we evaluate teachers' experiences in the program through meetings with individual participants and their faculty mentors, feedback solicited at the annual action research colloquium, surveys in which participants rate and describe their experiences in the program, and the maintenance of a database for recording changes in participants' professional experiences (e.g., entering master's/doctoral programs, career shifts). Also, it should be noted that the NSF Scholars Program and the MSP Induction Program (Objectives 1.3 & 1.5) allows teachers to explore action research more thoroughly within a master's level, 30-week course.

In Year Four, the Center for Research on Educational Reform (CRER) awarded the third round of MSP Action Research Grants for Teachers. Six new awards of \$4,000 each were presented to middle and high school math and science teachers on the basis of their competitive proposals to conduct classroom action research. Teachers may work individually or in pairs on their projects, and one pair of high school teachers proposed a joint project in the current year. A competition was also held to award "follow-up grants" to last year's recipients for replication or extension of their research. As there was unexpectedly low participation in this competition, only one teacher was awarded a follow-up grant in the amount of \$1,000.

The seven teachers participating in the award program include 3 math and 4 science teachers; 5 high school and 2 middle school teachers; 4 women and 3 men; and, 3 Latino, 3 White non-Latino, and 1 Asian teacher.

In October, CRER hosted its second annual research colloquium where teachers and faculty mentors discussed their research projects. This provided an opportunity for new recipients to gain exposure to more experienced teacher-researchers and STEM faculty mentors.

Participants in the program were assigned to a math or science faculty mentor, whose expertise corresponds to the participant's proposed research project. Three participants who had previously conducted research with STEM faculty were assigned to those same faculty members. The faculty mentor provides support regarding the math or science content relevant to the participant's project. Dr. Espinoza, Assistant Director of CRER, provides additional support regarding research design, data collection, and data analysis. Progress reports submitted by participants were reviewed by mentors and Dr. Espinoza to provide feedback to participants. All participants will submit a final project report on August 31, 2006. Upon submission of the report, participants will be asked to complete an evaluation survey to rate and describe their experiences in the program.

Objective 5.4: Implement a well defined research and evaluation agenda that provides evidence of El Paso MSP progress and success.

In Year Four, El Paso MSP's comprehensive research and evaluation agenda got underway with the implementation of eight research studies designed to advance our knowledge and understanding about the systemic improvement of mathematics and science education (K-16) and, ultimately, student achievement. Critical components of our research studies are based on MSP's key features and interconnected elements that include: improving teachers' knowledge of mathematics and science and their ability to use it to deliver high quality, engaging instruction; building school and district capacity to provide high quality math and science education through the use of math and science, resident-based coaches; ensuring challenging courses and curriculum by aligning curriculum, instruction, and assessment (K-16); and, engaging postsecondary STEM faculty to work with K-12 partner schools, teachers, and administrators to improve K-12 mathematics and science education for the long term. The direction and implementation of the research studies was divided among three organizations: the Consortium for Policy

Research in Education (CPRE), Policy Studies Associates (PSA), and the UTEP Center for Research on Educational Reform (CRER).

The eight studies and related interview protocols, surveys, and classroom observation instruments are attached as Microsoft Word documents. The two CPRE studies are: 1) the Impact of MSP Initiatives at the Middle School Level; and, 2) the Effective Coach Study. The three PSA studies are: 1) Study of High School Sustained Effects; 2) A Case Study of the El Paso MSP K-16 Partnership; and, 3) Study of School Principal Leadership Development. These are followed by the three research studies conducted by CRER: 1) Study on Culture Change in Postsecondary Education; 2) Targeted Descriptive Study of the Ways that Postsecondary Faculty are Engaged in the MSP Partnership Work with K-12 Schools and Teachers; and, 3) Targeted Study on the Impact of MAT Degree Programs in Mathematics and Science on the Teaching Practices of Graduates.

III. QUANTITATIVE DATA: STUDENT ACHIEVEMENT AND TEACHER QUANTITY, QUALITY AND DIVERSITY

This section of the report provides El Paso MSP student achievement data and other data that measure the effectiveness of the MSP Partnership. Data relative to the following are presented in this report:

- K-12 Mathematics and Science Student Performance on the Texas Assessment of Knowledge and Skills (TAKS);
- Course enrollment and completion in secondary, college-preparatory mathematics and science courses;
- High school graduation and college preparation rates;
- SAT/ACT participation and performance;
- Postsecondary course placement in mathematics;
- Mathematics and Science Teacher Preparation.

K-12 Student Achievement Data

The primary indicator of K-12 mathematics and science student performance for El Paso MSP is the Texas Assessment of Knowledge and Skills (TAKS), administered for the fourth year in 2005-2006. In each of the first four years of the State's administration of the TAKS assessment, which was first administered in 2002-2003, standards for the percent passing were increased yearly. This year, the passing standard reached the highest level for all grades tested.

Mathematics

Review of Table 1 (below) reveals that the percent of students passing TAKS has increased significantly since the beginning of MSP. As is clear from review of the data, performance has improved at each grade level, with the greatest increases occurring at the middle and high school levels where MSP efforts have been concentrated. Of particular note are the increases at grade 6—21 percentage points—and the increase at grade 11—29 percentage points. Thus, the Year Four benchmark that at least 70% of area students would pass TAKS math was met in grades 3, 4, 5, 6, and was within 1 percentage point at grade 11. It was not met at grades 7 through 10.

Table 1

El Paso MSP TAKS Mathematics Percent Passing in MSP		
Grade	2005—2006 Standard	
	2002—2003 %Passing	2005—2006 %Passing
3	69	76
4	65	79
5	62	76
6	50	71
7	42	61
8	41	58
9	30	45
10	33	51
11	40	69
Total	47	64

Source: 2002-2006 AEIS Region Performance Reports, Texas Education Agency.

Challenges in TAKS mathematics performance are also evident in reviewing achievement data by ethnicity. Table 2 shows that the gap between Hispanic and White students has decreased to an average of 15 percentage points. The gap is smallest at grade 6 (9%) and is largest at grade 9 (20%). Despite the fact that the gap is continuing to decline, it is still too large, and of concern to all MSP partners.

Table 2

El Paso MSP TAKS Math Data, 2006 Passing Rates by Ethnicity and Gaps Between Hispanics and Whites					
Grade	Ethnicity			Total	Gap Between Hispanics and White
	Hispanic	White	African American		
3	75%	85%	71%	76%	10%
4	78%	89%	73%	79%	11%
5	75%	87%	67%	76%	12%
6	71%	80%	58%	71%	9%
7	60%	78%	54%	61%	18%
8	56%	72%	53%	58%	16%
9	43%	63%	42%	45%	20%
10	49%	68%	44%	51%	19%
11	68%	84%	59%	69%	16%
TOTAL	63%	78%	58%	64%	15%

Source: 2006 AEIS Region Performance Reports, Texas Education Agency.

Science

Performance on TAKS Science also showed significant improvements since the beginning of MSP. As shown in Table 3, all students have made impressive gains across the years, with the greatest percentage point increase—37 points—occurring at grade 5. Large increases also occurred at the other two tested

levels. Despite the increases, the Year Four benchmark that 70% of students would pass TAKS science was not met.

Table 3

El Paso MSP TAKS Science Percent Passing in MSP		
Grade	2005—2006 Standard	
	2002-2003 % Passing	2005-2006 % Passing
5	29%	66%
10	29%	46%
11	44%	64%
TOTAL	29%	58%

Source: 2002-2006 AEIS Region Performance Reports, Texas Education Agency.

Gaps between student groups, shown in Table 4, continue to be quite large. The smallest gap between Hispanic and White students is at grade 5, with the largest gap at grade 10. At grade 11, where the passing standard increased this year, the same pattern as noted in previous years occurred: the gap increased from 20.3 percent last year to 28 percent this year. This once again suggests that while Hispanic students may perform close to the level of Whites on lower level science material, they may not be as well prepared as White students on the higher level material.

Table 4

El Paso MSP TAKS Science Data, 2006 Passing Rates by Ethnicity and Gaps Between Hispanics and Whites					
Grade	Ethnicity			Total	Gap Between Hispanics and White
	Hispanic	White	African American		
5	64%	87%	67%	66%	23%
10	43%	74%	46%	46%	31%
11	60%	88%	65%	64%	28%
TOTAL	56%	83%	59%	58%	27%

Source: 2006 AEIS Region Performance Reports, Texas Education Agency.

Course Enrollment and Completion

Since the beginning of the El Paso MSP, partners have focused on increasing the numbers of students enrolled in college preparatory math and science courses. In MSP Year Four, large gains in the proportion of students enrolling and passing those courses were seen. As a result, across urban and rural MSP districts, virtually 100 percent of students are enrolled in Algebra I and II. While 84 percent of students enrolled in Geometry by 10th grade, 80 percent passed the course, just shy of the 85 percent benchmark for Year Four. Large increases have occurred once again this year in the numbers and proportions of students enrolling in Biology and Chemistry (see Table 5). Despite the fact that 30 percent of all seniors are now enrolled in physics, and that 93 percent of those students pass the course, the Year Four Benchmark that physics enrollment would increase 50 percent over baseline was not met.

Table 5

Math/Science Course Enrollment and Pass Rates El Paso MSP Districts 2004-05 Academic Year					
		Hispanic	White	African American	Total
Algebra I*	Enrolled	99	97	95	99
	Passed	81	89	78	83
Geometry**	Enrolled	83	90	83	84
	Passed	79	88	84	80
Algebra II***	Enrolled	100	100	100	100
	Passed	85	92	90	86
Biology**	Enrolled	100	100	88	100
	Passed	82	89	86	83
Chemistry***	Enrolled	86	84	93	86
	Passed	83	90	90	84
Physics	Enrolled	28	43	33	30
	Passed	92	95	97	93

*By End of Grade 9

**By End of Grade 10

***By End of Grade 11

Source: Calculations based on data provided by Region 19 from the Public Education Information Management System, TEA.

High School Completion and Preparation for College

During Year Four of MSP, the graduation rate among students across all MSP districts was 78%. This graduation rate is higher than all other urban areas in Texas. Similarly, the percentage of El Paso MSP students completing the State's Recommended High School Program is among the highest in the state. Over 90% of graduates completed the rigorous set of college-preparatory courses during MSP Year Four.

Mathematics Placement at UTEP and EPCC

The performance of students taking math placement tests upon entry into UTEP or the El Paso Community College has long been an indicator of importance to the MSP partnership. Data from the beginning of MSP Year Four indicates that placement test performance at both UTEP and EPCC has remained stable. During Year Four of MSP though, a great deal of work focused on increasing placement rates in college-level mathematics courses at both UTEP and EPCC. Among the activities undertaken over the past year is a partnership-wide effort to ensure that students (a) understand why the placement test is so important; (b) take the placement test while in high school; and (c) complete a college application form. Because this was the first time an effort had been made to test students while in high school, not all students were tested. Still, over 3700 seniors took the test in their high schools. In addition, a small number of students received special assistance or tutoring to prepare for the test. It is expected that these efforts will result in increases in the numbers of students testing into college-level mathematics during MSP Year Five.

SAT/ACT Participation and Performance

Once again, in 2004/05, more students in El Paso MSP urban districts took the SAT or ACT tests. Despite the large increase in test takers, scores on the SAT declined by only one point. While the decrease is very slight, and the overall scores still too low, it is encouraging that area students are increasingly focused on, and preparing for college.

Mathematics and Science Teacher Preparation

As in MSP Year Three, during Year Four there was an increase in the number of students enrolled in mathematics and science teacher preparation programs. As last year, seniors comprise the largest number of math/science teacher prep students, increasing yet again the number of prospective new teachers available to teach in area schools in the coming school year.

IV. MSP MANAGEMENT PLAN

El Paso MSP's PI, Project Director and all three Co-PIs remained the same during Year Four. All Deans and Associate Deans at UTEP and EPCC working on MSP remained the same. At K-12, El Paso ISD named a new Superintendent in February, 2006, Dr. Lorenzo Garcia, with whom the Collaborative has established a good working relationship. As this report was being completed, Dr. Robert Duron, Superintendent of Socorro ISD, announced his departure August 1, 2006 to head the San Antonio ISD. Because of our close working relationship with senior Socorro ISD administrators, we anticipate that MSP work will proceed smoothly.