

**The El Paso Mathematics and Science Partnership
Annual Report
October 2006 – May 2007**

I. INTRODUCTION and RETURN FOR INVESTMENT

As the El Paso MSP five-year grant comes to an end, it is clear that a tremendous amount has been accomplished and that major improvements in math/science education in El Paso K-16, have occurred. While the most recent student achievement data are not yet available, there is compelling evidence of impact from the broad MSP agenda. Among the many achievements of El Paso MSP over the last year, the following stand out as impressive indicators of change:

- Unanimous passage of a revised tenure and promotion policy, by the UTEP Faculty Senate, providing appropriate recognition for faculty who seek promotion or tenure based in part on contributions to the advancement of math and science education and/or improvements in K-16 education;
- Institutionalization of Master of Arts in Teaching Mathematics and Master of Arts in Teaching Science degrees specifically designed for working teachers and developed to improve the quality of math and science instruction in area schools;
- Creation of mathematics instructional reforms at UTEP, including developmental courses offered in hybrid/online modes and accelerated 6-8 week versions, thereby, accelerating and supporting students to enroll and complete their first college-level math course;
- Full implementation of UTEP's Enhanced New Student Orientation which provides a 6-hour math workshop for new students testing into developmental math and resulted in 48% of students re-testing at least one course level higher, and 31% re-testing out of developmental math altogether;
- Completion of the math and science K-16 alignment efforts, including the K-12 curriculum frameworks, the Algebra II assessment, the development and application of frameworks at the postsecondary levels, and the continuation of alignment work at UTEP;
- Institutionalization of math placement testing in the junior and senior years of high school across all MSP districts to alert students and schools to prepare students for college-level coursework and avoid placement in developmental math courses in college;
- Development of math and science tools to improve the quality of teaching and learning in the classroom, including the Effective Coaching Tools, the Math/Science Classroom Observation Protocol, and the Professional Teaching Model;
- Assuring the sustainability of MSP goals and priorities at K-12 throughout the El Paso region via the integration of MSP math and science directors and staff developers into K-12 district and school leadership positions.

II. OVERVIEW OF YEAR FIVE IMPLEMENTATION: Activities and Findings

In the past year, El Paso MSP addressed all of the key elements outlined in our strategic plan with a special focus on the following: strengthening relationships among postsecondary leaders, disciplinary faculty in math and science, and K-12 MSP partners; utilizing the expertise of postsecondary math and science faculty to deepen teachers' pedagogical content knowledge; building leadership and instructional capacity to sustain quality math and science teaching and learning across MSP districts; establishing policies and procedures that improve student readiness for and success in college; putting into place K-16 alignment process to ensure high quality courses and curricula, instructional strategies, and assessments; and, deepening the culture of evidence through the MSP research studies.

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 third MSP-MAT Mathematics cohort, Cohort III, completed its program of study in spring 2007. The graduating class was comprised of 22 teachers from throughout the El Paso area, including fifteen high school and seven middle school teachers. The members of Cohort IV completed their first year of coursework and Cohort V began its two year program in June 2007. The MAT Mathematics Cohort Program, designed specifically for working teachers, has been fully adopted by the Department of Mathematics and will be continued beyond MSP funding. In addition, the degree plan was changed to better meet the needs of working teachers. The plan was lengthened from two to three years, with students taking one course per semester rather than two. The changes accommodate teachers' schedules and provide them the time to focus on one course and reach a deeper understanding of mathematical concepts.

MAT Program in Science:

Eleven MSP Master of Arts in Teaching (MAT) Life/Earth Science students and seven MAT Physical Science students have begun their final term of courses. The Life/Earth Science cohort, which is 72% middle school teachers, will complete the program with Geology of the Southwest, a field-based class; and Biology Education in Theory and Practice. The all-high school teacher Physical Science cohort will complete the program with Wave Phenomena and Optics, and Contemporary Topics in Biochemistry. The eighteen cohort members will graduate August 2007. Upon graduation, students from both cohorts will have earned the ability to teach dual credit courses in their chosen discipline. Word of the program has spread among the teaching community, and plans for new non-MSP funded cohorts are in the works for fall, 2007.

The UT System process for approval of the MAT in Science continues to move forward. The revised degree proposal was submitted for approval in March. It reflected the following changes: Dr. Laura Serpa has been named as program director/advisor; the program was redesigned with two tracks, one for in-service and one for pre-service teachers; and, course sequencing was redesigned so it could be taken over three years rather than two. The revised curriculum will also prepare each participant to become certified as a Master Science Teacher. Finally, the MAT has been designed to improve the level of science instruction in area schools with curricula and pedagogies that both align with the TEKS and improve TAKS student success.

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 science and mathematics cohorts were awarded stipends in the form of participant support in each of the summer, fall and spring semesters. Support was dependent upon the number of courses in which they were enrolled. Full support, for two course per semester enrollment, was distributed as follows: \$700 in the Fall 2006 semester, \$800 in the Spring 2007 semester, and \$1000 in the Summer 2007.

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 goals of objectives 1.3 and 1.5 are to improve the knowledge and teaching skills of novice teachers and to keep them in the field of teaching. 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 for this supplemental program is attached.) During the fifth year of El Paso MSP, the third cohort of NSF Scholars and MSP Induction Program participants took part in the TGEMS seminars.

NSF Scholars Program for Alternative Certification Professionals (ACP)

In Year Five, the NSF Scholars Program for Alternative Certification Professionals (ACP) consisted of 16 middle and high school math and science teachers, including: 9 math and 2 science teachers, and 5 who teach both; 2 high school and 14 middle school teachers; 9 women and 7 men; 11 Latino and 3 White non-Latino individuals, 1 Asian individual, and 1 individual who listed ethnicity as "Other." Of these participants, 10 have completed or are enrolled in a master's degree program (4 M.Ed., 2 M.A.T., 3 M.S., 1 M.M.T.). Three new ACP teachers were admitted to the NSF Scholars Program immediately prior to Year Five. They were able to join when two teachers (who nevertheless remained in teaching) left the program for personal reasons in Year Four.

In Year Five, we tracked the teachers in prior ACP cohorts who had completed the program. Among ACP Cohort I participants who had completed the entire program ($n = 6$), 4 teachers continue to teach at the secondary school level in El Paso, 1 teacher relocated to a different city, stating an intention to continue teaching, and 1 teacher became an MSP staff developer. Among ACP Cohort II participants who had completed the entire program ($n = 9$), 7 teachers continue to teach at the secondary school level in El Paso, 1 teacher relocated to a different city, stating an intention to continue teaching, and 1 teacher now teaches at the college level.

MSP Induction Program

In Year Five, the MSP Induction Program consisted of 8 middle and high school math and science teachers, including: 6 math and 2 science teachers, 2 high school and 6 middle school teachers, 7 women and 1 man, 5 Latino and 2 White non-Latino individuals, and 1 Asian individual. Of these participants, 4 have completed or are enrolled in a master's degree program (2 M.Ed., 1 M.A.T., 1 M.A.). In the first semester of Year Five, one teacher left the program and secondary school teaching to teach at the local community college.

In Year Five, we tracked those teachers in prior MSP Induction Program cohorts who had completed the program. Among Induction Program Cohort I participants who had completed the entire program ($n = 9$), 6 teachers continue to teach at the secondary school level in El Paso, 1 teacher relocated to a different city and continues teaching at the secondary school level; 1 participant changed careers to real estate and is pursuing an M.B.A., and 1 participant could not be located. Among Induction Program Cohort II participants who had completed the entire program ($n = 15$), 9 teachers continue to teach at the secondary school level in El Paso; 4 teachers relocated to a different city, stating an intention to continue teaching; 1 teacher is deceased; and, 1 participant changed careers to law enforcement.

Both ACP and MSP Induction Cohort III participants recently completed an evaluation survey to rate and describe their experiences during the two-year programs. Analysis of the data across Cohorts I-III will be conducted for the final report.

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.

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

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

After the first full year of MSP in middle schools, staff developers planned, designed, and provided a summer Mathematics and Science Institute for teachers focused on pedagogical content knowledge and student misconceptions. Then, to launch Year Five of MSP, each district director met with principals to ensure MSP was an integral part of the campus action plan. As a result of the early planning with principals, six middle schools allocated more time for common planning among math teachers and science teachers. In each district, staff developers were utilized as content experts for district and campus-based professional development. In addition, MSP tools implemented by the staff developers; such as, the Professional Teaching Model and the data disaggregation process, were used during Year Five of MSP by district and campus leaders to support and monitor curriculum and instruction.

Bi-monthly professional development for staff developers was continued in Year Five to further enhance pedagogical content knowledge and skills. Staff developers received over 100 hours of professional development. The focus was on two key areas: 1) development of content case studies that were based on common and relevant issues of practice; and 2) discussion and analysis of Effective Coaching Tools in mathematics and science, a research-based tool developed in conjunction with the Consortium for Policy Research in Education (CPRE) and the Consortium for Achievement in Math and Science. The content-based tools are useful for identifying and examining the most problematic mathematics and science concepts for middle school students, including commonly held misconceptions.

A set of eight mathematics and seven science case studies were written by staff developers. Each staff developer selected a classroom scenario that focused on a challenging mathematics or science concept and proceeded to write about it. The MSP district directors used guiding questions included in each case study to lead and deepen the dialogue. Some of the topics addressed included models, scientific measurement, functions, scientific method and inquiry, and multiple representations. The risk-free learning environment encouraged delving into the content and brainstorming solutions and strategies to immediately take back to the schools and influence practice.

Post-secondary faculty members facilitated training sessions for staff developers in the use of the mathematics and science Effective Coaching Tools. Three faculty members from the University of Texas at El Paso (UTEP), two from El Paso Community College (EPCC) and one genetics scientist (who is also a CPRE researcher) led a total of six mathematics and six science sessions for staff developers. Each session included a literature review of a particular content topic, an in-depth discussion of potential student misconceptions, and identification of instructional strategies to address the misconceptions. The discussions on the tools enhanced staff developers' understanding of mathematics and science content, and provided an opportunity to extend their understanding of pedagogical content knowledge. In Fall, 2006, CPRE convened content experts and practitioners to develop additional tools. Two math and two science MSP staff developers were selected to participate in the writing endeavor. The Effective Coaching Tools were used by the staff developers to facilitate instructionally-based department seminars and challenge the content knowledge of faculty members in non-threatening ways. Among the topics discussed were: variables and functions, division, genetics, seasons, weathering and erosion, and measurement.

In May, 2007, 129 middle school mathematics teachers participated in the second and final administration of Drs. Deborah Ball and Heather Hill's survey of Content Knowledge for Teaching Mathematics (CKTM). The survey was administered by CPRE's Dr. Henry May. This second administration of the survey provided the CPRE researchers comparison data to measure the growth of

participating teachers' pedagogical content knowledge. Upon completion of the survey, teachers had the opportunity to continue their exploration of the pedagogical content knowledge necessary to maximize student learning. They engaged in a discussion of the most challenging survey items and developed strategies for addressing those challenges. High teacher turnout and active engagement reflected teachers' genuine interest and willingness to address issues related to this critical concept.

In Year Five, MSP district directors and staff developers continued to work with high school department chairs to maintain MSP efforts in the high schools. Over twenty high school department chairs attended instructional coaching training aimed at helping them to re-conceptualize their role as instructional leaders in their content area. District directors also provided department chairs with one-on-one support through district meetings, and by utilizing e-mail correspondence to distribute research-based articles related to practice, assist with data analysis, and plan professional development. Regular communication helped to maintain MSP goals and priorities at the forefront.

The sixteen staff developers who were active in Year Five of MSP made significant contributions to their districts and schools. A good indicator of the value of their work, as well as the districts' commitment to sustaining the MSP goals and activities beyond the life of the grant, was the integration of directors and staff developers into their district staffs. In two urban districts, all the MSP staff developers were asked to remain in the district in positions similar to the ones they held under MSP. The Executive Director of the Education Service Center-Region 19 places such great value on the work of MSP and staff developers that he has retained three of the four staff developers, as well as the district director, on staff to continue providing support to rural schools in Region 19.

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

At the end of Year Four of MSP, the goals of this objective were significantly changed for Year Five. As was explained in last year's annual report, despite major efforts to increase the number of National Board Certified teachers in El Paso school districts, many prospective teacher candidates informed us that there were few incentives to put themselves through the rigorous year-long process of assessment for National Board certification. From a national perspective, it is evident that the areas that were most successful in building a cadre of NBC teachers were those that had either attractive statewide incentives, such as North Carolina which leads the nation in NBC teachers, or had district-wide incentives. With this in mind, intense efforts were invested in getting local school districts and school boards to create incentives for teachers in their districts to become National Board certified. Already the previous year, this effort had been successful with one of the small rural districts.

In Year Five, a major breakthrough occurred in this work. Due to the diligent work of the MSP-funded Coordinator of the National Board initiative, the senior administrators of the largest school district in the region (El Paso ISD) created a system of incentives for teachers in their district earning National Board certification. On June 26, 2007, the El Paso ISD board approved the incentives, which include a \$2,000 stipend per year for NBC teachers who work in traditional schools, and a \$5,000 stipend per year for NBC teachers who work in "at risk" schools.

Recently, interest in and requests for information about the program have increased. Now, teachers interested in National Board certification take the initiative in contacting the coordinator to ask for assistance and support in beginning the certification process. As word of the incentives offered by EPISD spreads, it is projected that inquiries and interest will continue to increase, and that the two other large school districts in the region will be prompted to consider incentives for their own teachers. As evidence that this accelerating interest will be sustained, the MSP National Board coordinator will offer a for-credit graduate class for teachers in fall, 2007, to support prospective candidates in applying and commencing the year-long assessment process.

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

Significant increases in, and support for STEM faculty involvement in K-12 and K-16 efforts have occurred during MSP Year Five. While a number of faculty members have long been engaged in teaching the MAT programs, another measure of faculty involvement is the percent of UTEP science and math faculty who teach courses required of pre-service teachers. During the 2006-2007 academic year, 55% of Biology, 71% of Chemistry, 57% of Geology, 43% of Mathematics, and 86% of Physics faculty taught pre-service or in-service teachers.

As in previous years, the College of Science made a concerted effort to gain a deeper understanding of the breadth and variety of College faculty participation in K-12 activities. Each department submitted spreadsheets that summarize outreach activities. For the 2006-2007 school year, these spreadsheets document 75 to 85% of faculty involved. Activities in the past year included judging at science fairs, hosting Earth Science Week, making math or science presentations to school faculty or students, motivating middle school students toward higher education, rocket launching demonstrations at an area middle school, providing content-centered professional development, and hosting a "Geoscience week" at the University for K-12 students. In a collaborative effort among the Departments of Biology, Geology and the College of Education, faculty members instituted IPY-ROAM, the "International Polar Year - Research and Educational Opportunities in Antarctica for Minorities" program, in part to engage UTEP faculty in additional direct work with high school teachers.

The Mathematics Department, bi-weekly "Mathematics Teaching and Learning Brown Bag Lunch" seminars, continued in spring 2007 semester and were well attended by math faculty as well as faculty from other science disciplines. In addition, the Dean and Associate Dean of the College of Science continue to address the importance of teacher education and of engaging in work with K-12 at department and college faculty meetings, as well as in on-on-one sessions.

Finally, among the highlights of MSP Year Five, the UTEP Faculty Senate unanimously passed revisions to the Tenure and Promotion Policy. These revisions provide appropriate recognition for faculty who seek promotion or tenure based in part on contributions to the advancement of math and science education and/or improvements in K-16 education. The prompt and unanimous Senate endorsement in June 2007 was the culmination of the carefully crafted and collaborative approach to the policy change taken by UTEP Provost, Richard Jarvis. After one year of close work with Deans and faculty about how best to move forward policy change, the Provost and Deans carefully examined faculty folders for faculty who were hired with expectations of contributions to K-16. The Provost himself then drafted additional text for the Handbook of Operating Procedures that outline some important new concepts with regard to specifying terms of appointment and renegotiating assignments and responsibilities in an agreement between faculty member, chair and Dean. (See full text of proposed changes to the Handbook of Operating Procedure, Attachment A.) Provost Jarvis made the presentation to the full Senate on behalf of the new policies, after which the proposed revisions were referred to committee, then back out for a vote by the full Senate in June. The recommendation for change from the Senate now goes to UTEP President Diana Natalicio, then on to the UT System for legal language review prior to final incorporation in the Handbook of Operating Procedures.

This policy change is an important part of ensuring El Paso MSP's lasting and sustained impact on UTEP's policies, practices and culture. Preliminary evidence of the impact of MSP work on this issue are tenure recommendations regarding two MSP-funded faculty in the College of Science. The two faculty members—the only ones among several MSP-funded faculty members up for tenure this year—received positive recommendations at all points from the departmental to the presidential level. The process of receiving tenure for both is expected to be finalized at the August meeting of the University of Texas Board of Regents. At a time when the tenure process is increasingly demanding at UTEP, these decisions

send strong signals regarding the University's commitment to seriously valuing work on K-12 and math/science education.

Key Element Two: Building School and District Capacity

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

In Year Five of MSP, over 35 MSP Teaching and Learning Days were held across the city as a way of showcasing exemplary math and science instructional practices. Over the last three years of MSP, the Teaching and Learning Day has been a key component of the Leadership Development Seminars. The sessions provide administrators a chance to team up with teachers at their campus and explore practice in the moment. At the same time, many teachers report that they feel a value and pride in having administrators visit their classrooms. The effectiveness of the Teaching and Learning Day strategy has been recognized by both district and campus leaders, and one urban district has made the commitment to continue this professional development practice, and of extending its application to the area of English language arts. Under the leadership of MSP district directors, each staff developer organized and facilitated at least one Teaching and Learning Day per semester.

Principal Academies held during Year Five prioritized three areas of focus: engaging school teams in developing habits of mind such as, asking questions to extend knowledge, applying metacognition, and using prior knowledge to construct new learning; strengthening content leadership through the use of case studies and classroom observations to raise relevant issues of practice; and engaging in data-driven dialogue within the context of mathematics and science student achievement. Because staff developers participated in the Academies as part of school teams, they were able to work closely with principals to replicate the activities at their home campus. One principal of a high school of three thousand students found the academies so helpful that she has partnered with the El Paso Collaborative for Academic Excellence/ El Paso MSP to provide training to her entire K-12 feeder pattern in the following areas: data driven dialogue, habits of mind in core content areas, and Cognitive Coaching for content-focused planning and problem solving. This principal's Superintendent has committed to extend professional development in these areas to her lowest performing schools in the 2007-2008 school year. An important addition to the Academies were the sessions led by UTEP faculty for over 250 K-12 principals, assistant principals, and district leaders to extend administrators' content leadership of research-based practices that improve math and science teaching and learning.

MSP district directors continue to be valuable resources for campus leaders, in particular, newly appointed assistant principals. The directors continue to utilize the MSP tools, such as the Classroom Observation Protocol, to enhance content leadership. In one urban district, the MSP director scheduled "classroom walk-throughs" with each middle school principal on a nine-week schedule. The Classroom Observation Protocol was used to examine classroom instructional practices, and was followed up with collaborative conversations with teachers to plan for next steps in instruction. The MSP director acted as a facilitator for the principal, extending responses and asking questions related to the protocol. As a result of the protocol, conversations and meetings about content and instruction increased between the principal and teachers. Two other middle-school principals indicated that they understood the value of classroom observation data in improving teaching and learning practices, and committed to using it to monitor classroom instruction. Many principals said that their knowledge of instructional practices improved significantly as a result of classroom observation experiences. Finally, this strategy was an important tool for MSP directors in establishing and maintaining relationships with school principals.

Objective 2.2: Build District Level Capacity for School Sites

El Paso MSP leaders at the El Paso Collaborative continued to meet with Superintendents at school district offices on a quarterly basis. In addition to the individual meetings, top K-12, post-secondary, business and community leaders were convened at regular board meetings by El Paso MSP to discuss

issues relevant to K-16. Data presentations and robust dialogue led to program, practice and policy recommendations related to mathematics and science at the district level. El Paso Collaborative directors maintained regular communications (every 6-9 weeks) with executive directors and assistant superintendents of school districts to sustain a focus on MSP goals. In Year Five, MSP district directors intensified their role in working closely with district leaders of curriculum and instruction in order to gain their support on issues related to mathematics and science instructional practice. For example, district directors were an integral part of monthly curriculum and instruction meetings and often led district-wide professional development sessions. This kind of working relationship gave MSP directors full access to the district leadership and the ability to guide and influence decisions regarding math and science education. Among the areas in which their influence was notable were: integrating and using cognitive demands in curriculum guides and district scope and sequence documents, establishing professional learning communities in mathematics and science, and analyzing student work to determine the effectiveness of teaching and learning. In the largest urban district, the MSP director and staff developers worked with over 470 mathematics and science teachers in district-wide, professional development content institutes.

One of the driving forces of MSP, from the beginning, was to sustain the mission, goals, and objectives of MSP beyond the life of the grant. Toward this end, instructional coaching training modules were presented to 180 district coaches so that they would be able to carry-on the work of the math and science staff developers at the various campuses. This same urban district is providing each elementary, middle and high school with a full-time math and literacy coach. These coaches will be joined in 2008 by science coaches. The key MSP coaching tools, including the Professional Teaching Model, the Classroom Observation Protocol, the process for analyzing student work, and content-based case studies, have been adopted by the district for the school-based coaches to use in their work. The El Paso MSP instructional coaching training modules were developed by a group of staff developers representing all El Paso MSP districts. They also provided the coaching training. By having representation and drawing on expertise across district lines, capacity was built not only in the host district, but among staff developers who have become “consultants” for school-based coaching training in their own districts.

As MSP concludes Year Five, the number of key math and science instructional positions across districts that have been filled by MSP directors and staff developers indicates a strong commitment to sustaining the work of MSP. Among these positions are the following: math and science director for districts; lead coach positions responsible for curriculum, instruction and assessment at assigned campuses; math and science specialist positions at the district level; staff development specialists; and instructional leaders at the campus level. At the Education Service Center, the director and two staff developers have been funded to take the MSP work to the next level in the implementation of the El Paso T-STEM (Texas-Science, Technology, Engineering, and Mathematics) Center under the leadership of the El Paso Collaborative.

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

In Year Five of MSP, parent engagement efforts began at the district level, engaging district and school parent liaisons/coordinators to ensure participation in MSP activities throughout the year. Major parent seminars at UTEP continued to emphasize the importance of rigorous, high-level math and science throughout K-12; promoting a home/school college-going environment from the earliest grades; and the many ways parents can support their child’s academic success. Each seminar contained presentations on current student performance in math and science, followed by discussions on how to raise achievement. Seminar activities included hands-on math and science projects for parents to do at the session and then take home to share with their families. Among other activities, parents worked with prisms, constructed a color wheel, used mirrors to measure reflection and refraction, created fraction kits, brainstormed how to increase math and science vocabulary (in two languages), and learned that observing and investigating are processes of science inquiry and then applied the processes to four projects. In addition, college

graduates came to share their schooling experiences and how their parents helped them achieve their educational goals.

In May, parent coordinators/liaisons from across the region attended a 2-day “Workshop on Workshops” presented by the Intercultural Development Research Association (IDRA) of San Antonio. School-site trainings were carried out at Roberts, Newman, H.R. Moye, and Johnson Elementary Schools, and at Horizon Middle School. These were instrumental in increasing the number of parents who were invited to and attended the UTEP seminars. The 9th Annual Regional Parental Engagement Conference was held at Canutillo High School in November of 2006 with the participation of over 800 parents. In January 2007, the MSP Parent Coordinator helped to organize and presented workshops at the district-wide, El Paso ISD parent involvement conference. Presentations on parent engagement and the importance of high-level math and science teaching and learning were also made to pre-service teachers at UTEP and EPCC throughout the year, and these concepts were incorporated into the syllabus of a Saturday education class at UTEP taught by the Parent Coordinator. Throughout the region, an attitude and practice of parent engagement that emphasizes the support that all parents can give their students towards higher academic achievement and post-secondary education has developed and continues to grow. The parent engagement efforts supported by MSP have contributed significantly to this environment.

Aside from parent engagement, the Collaborative has continued to strengthen community relationships in support of the MSP work. Through THINK COLLEGE NOW there has been consistent interest by business and community volunteers to become presenters for the THINK COLLEGE NOW—Texas Scholars program. This has led the Greater El Paso Chamber of Commerce Education and Workforce Division to chose the THINK COLLEGE NOW—Texas Scholars program as the vehicle to fulfill their goal of providing higher education information to eighth and ninth grade students in 600 classrooms 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.

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 (35 high schools). In addition, Collaborative representatives were requested by 7 MSP high schools (all Ysleta Independent School District high schools) to personally address and congratulate those students who received the Texas Scholars medallion at their graduation ceremonies.

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.

Meetings of MSP K-16 Mathematics and Science Leaders to discuss K-16 math/science alignment for the academic year were enhanced by the El Paso Mathematics Summit held in September, 2006. Hosted by the El Paso Community College and supported by El Paso MSP and the El Paso Collaborative, the Summit provided an opportunity for MSP K-16 Mathematics and Science Leaders to meet and discuss mathematics alignment and disseminate the revised curriculum frameworks. Over 110 participants

attended the Summit including the president of EPCC, the provost of UTEP, superintendents from area school districts, the executive director of the Regional Education Center, deans and department chairs from both UTEP and EPCC, principals, K-12 mathematics teachers, department chairs, and postsecondary faculty. The day-long Summit provided participants an opportunity for review of K-16 math and science achievement data, analysis of factors related to achievement outcomes, especially related to alignment, and development of recommendations for action by school districts, college and university toward improving math/science student learning. The Summit is an outstanding example of the extensive impact of El Paso MSP and the continuing influence it has had on K-16 partnerships, curriculum and instruction, and postsecondary's commitment to improving K-12 math and science education.

The fall, 2006/spring, 2007 administration of the Algebra II end-of-course exam in high school and postsecondary classrooms completed the second pilot of the exam. Beyond administration of the exam, the process involved convening the Algebra II Assessment group to score the items, analyzing the data, meeting with our consultants and a subset of faculty to look at an analysis of the data, and revising the exam based on the data. Three forms of a revised Algebra II exam are currently being written to pilot during the end of the next academic year. It is gratifying that many educators in Texas are interested in El Paso MSP's end-of-course exam for use in their own districts and as a resource for developing other mathematics end-of-course exams.

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 Five, area school districts, the El Paso Community College, and UTEP have intensified and institutionalized efforts toward ensuring increases in the numbers of students prepared for college level mathematics and reductions in those requiring developmental math courses upon entry to college.

At UTEP and EPCC, senior University and College administrators have taken key leadership roles regarding the issue and reframed it from how the university and college can best *place* students into developmental courses to how they can best *support students toward completion* of required college level courses. This reframing has led to a change in strategy from a sequence of traditional semester-length developmental courses, whose effect is to attenuate preparation, to placement in hybrid or compressed hybrid developmental courses or directly into college-level courses with as much concurrent and supplemental support as needed. In addition, UTEP and EPCC have put into place new Summer Bridge programs and an Enhanced New Student Orientation that are required for students placed into developmental math. The three-day orientation provides an overview of the Accuplacer exam plus a six-hour math review workshop, and an opportunity to re-take the placement test. Results of the first year of full implementation reveal that of more than 1500 students enrolled in the new orientation, half tested at least one course higher and one-third retested from developmental into college-level math. Moreover, of those students who tested at higher developmental math levels, but who accepted UTEP's offer to challenge the college-level course with additional help, over 60% passed the course. It is clear that the overarching goal of all of these new efforts—acceleration of student efforts to successfully complete their first college-level mathematics course—is already well on its way to being met.

Work on this issue among area school districts has also been enhanced and institutionalized. During academic year 2006-2007, all seniors in 10 of 12 districts and juniors in 8 districts were provided the opportunity to take the college placement test. While data regarding the number that took the Accuplacer test have not yet been finalized, the three large districts tested all seniors. Prior to testing, students were provided an orientation to the placement test that included information on the purpose of the test and on the significance of test results, the design of the test, and sample items and tips for approaching test sections. Also included was information regarding websites providing test review opportunities. Finally, numerous districts set up interventions for students that place into developmental math. These include

after-school, Saturday and intersession workshops or tutoring, and ensuring that high school course content addresses placement test content. It is expected that these many and varied efforts at K-12 will lead to significant increases in the number of students prepared for college-level math upon high school graduation.

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

Year Five of MSP at EPCC focused on dissemination and implementation of the four previous years' work on enhancing instructional methods to create successful learning environments. The primary goal this past year was to institutionalize effective teaching strategies using the mathematics and science frameworks to sustain successful implementation of new instructional methods. MSP faculty from all EPCC campuses met four times to plan and coordinate activities and projects. In addition to system-wide meetings, campus-based Discipline Study Groups (DSGs) were initiated. Discipline Study Groups at each campus held semester-long discussions on improving math and science education, collaboration with colleagues, and sharing classroom experiences. Specific DSG activities include:

- 1) developing questions to detect student misconceptions in Algebra;
 - 2) developing activities to address misconceptions;
 - 3) developing an MSP/EPCC web site listing available resources;
 - 4) observing DSG faculty to encourage collaboration and sharing best practices;
 - 5) revising frameworks to include problem solving strategies that encourage critical thinking;
- and,
- 6) revising frameworks to include more connections between courses, connecting and applying mathematics to science.

The creation of the campus-based Discipline Study Groups makes clear the value of MSP and its contributions to the goals of EPCC. Leaders at EPCC anticipate that the DSGs will continue and that all EPCC math and science faculty will participate in such collaborative efforts toward improving math and science teaching and learning.

Through the leadership and commitment of El Paso Community College president, MSP faculty at EPCC continue to receive support to participate in MSP activities. Following the president's lead, the Vice President for Instruction has emphasized his support of MSP activities to campus and instructional deans. In addition to the Discipline Study Groups, MSP faculty receive support in attending meetings and developing new instructional approaches matched to the course frameworks. The MSP alignment director, coordinators, and faculty have worked with the College's professional development coordinators to schedule sessions to disseminate the frameworks and strategies for their use for new faculty in mathematics and science. The College alignment director has accompanied the President and other administrators to present at major national conferences to highlight MSP work. In addition to this, the Director was appointed to and is now Chair of the College Developmental Education Council. Recognizing the potential to disseminate and use the alignment work in mathematics, the President nominated the alignment director to represent the college in the Statewide Vertical Team for Mathematics, established by the Texas Higher Education Coordinating Board and Texas Education Agency, to write college readiness standards for mathematics.

To study assessment of both remedial and college level course placement, representatives of EPCC's and UTEP's mathematics department continued to meet to align common mathematics courses, and placement into these courses. Both departments have been reviewing placement scores to see if they are appropriately predicting course performance. One of the results of this collaboration is course redesign of a college entry-level mathematics course that will accelerate student success in their first college mathematics course. The goal is to submit a joint proposal to the Texas Higher Education Coordinating

Board for a formal course redesign, to include supplemental instruction to support student success in the college-level course.

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

In Year Five, UTEP took the lead in initiating K-16 textbook and curriculum alignment for four undergraduate mathematics classes: PreCalculus, Calculus I, Calculus II, and Calculus III. A math alignment committee consisting of representatives from UTEP, EPCC, and area high schools met weekly during the 2005-06 academic year, and proposed a curriculum and textbook series for all four classes at the college level and for PreCalculus and Calculus I at the high school level. Each entity then held meetings during 2006-07 to work toward approval of the committee’s recommendations. Two of the largest school districts, EL Paso ISD and Ysleta ISD, decided not to adopt the proposed textbooks but did adopt the proposed curriculum. UTEP, EPCC, and the remaining school districts adopted both the textbooks and the curriculum. The adoption of textbooks and curricula is set to begin in the Fall of 2007. In addition, UTEP is now in the process of building a practice testing site, a tutorial site, and a formal testing site for each of these courses that can be used by students in area high schools, EPCC, and UTEP. PreK-16 alignment work will be sustained at UTEP as it is also an important priority and component of the work plan for the Teachers for a New Era (TNE) initiative.

Key Element Four: Increasing College-Going Rates

Objective 4.1: Implement the THINK COLLEGE NOW Initiative.

To improve students’ chances to enroll in and 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.

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 the Distinguished Achievement Program, and enrollment in high-level math and science courses, as well as participation in Advanced Placement courses and dual-college credit courses offered by their schools. The Texas Scholars program continues to maintain its existing relationships with business leaders and other community representatives in the El Paso region to deliver presentations to all 8th and 9th grade students. During MSP Year Five, a refresher training course was held for previously trained volunteers, and an additional set of presenters were trained in Texas Scholars presentations through a partnership with the Center for Civic Engagement at UTEP. Think College Now staff and volunteers conducted 316, 8th and 9th grade classroom presentations, reaching a total of 8,002, 8th and 9th grade students throughout the El Paso MSP area.

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

During Year Five, THINK COLLEGE NOW continued to provide 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. In Year Five, work focused on strengthening relationships with the Region 19 Counseling Network, District Counseling Directors, and high school counselors/GO Center sponsors. Communication with the GO Center

sponsors—high school counselors and their District Counseling Directors—was focused on renewing the commitment to creating a college-going culture at every high school campus. These meetings were quickly followed by discussions of issues regarding the integration and maintenance of the high school GO Centers, as well as promoting professional development and student leadership training regarding college readiness and discussing best practices in general. To further facilitate these efforts, networking occurred with other UTEP organizations to increase the capabilities of THINK COLLEGE NOW to create college-going pathways on high school campuses.

In March, 2007, THINK COLLEGE NOW provided special training to local high schools that had shown an interest in developing their own GO Centers, as well as to those high schools with existing GO Centers. A total of 18 high schools participated in this year's conference held at UTEP. This included over 20 high school counselors/sponsors and approximately 100 high school students (both peer educators that help run the GO Centers and students that had expressed an interest in becoming peer educators). Conference sessions were led by either THINK COLLEGE NOW staff or staff members of the following UTEP entities: Office of Student Financial Aid, Office of Admissions and Recruitment, Educational Talent Search, Upward Bound, Student Success Programs, and New Student Orientation.

The counselors/sponsors had the opportunity to discuss the conditions necessary to sustain and manage an efficient and effective college-advising center. The consensus among the high school counselors/sponsors was that the key ingredient for the achievement and implementation of a successful college-advising center is administrative support at both the campus and district levels. Having a supportive high school principal translates into access to physical space (either an unused corner of a central location or a full classroom) for the center, as well as computer equipment. Supportive and committed district administrators ensure cooperation at all levels and reinforce the message of the college-going culture campaign.

The academic year ended with remarkable progress for the THINK COLLEGE NOW initiative. As an indirect result of all efforts, two local school districts have taken ownership for creating college-going cultures and have made a firm commitment to accomplish their goals. The Ysleta Independent School District has proposed creating a GO Center Advisor position for each of its high school campuses, a role that would directly impact increased student awareness of and enrollment in higher education. It has also committed to providing computer equipment, and more importantly, unified district-wide support for its GO Centers. Currently, the district has instituted monthly GO Center counselor/sponsor meetings at different GO Center locations each month, giving the group an opportunity to network and share ideas to improve and strengthen GO Centers. Another district, Socorro ISD, has committed to incorporating a GO Center location in its new high school building plans. Additionally, they have taken the first steps towards integrating and developing a curriculum with the goals of the GO Center in mind.

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.

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 (RPLs)

The goals of the work in the field-based research pedagogical laboratories are two-fold: 1) to provide research-based professional training and guidance in integration of content and methodology to math and science teachers, and 2) to produce original research that contributes to improvements in teaching and learning in math and science classrooms. Two examples of RPL work—led by Drs. Mourat Tchoshanov

at Wiggs Middle School and Larry Lesser at Henderson Middle School—provide clear portraits of the RPL work in action.

The project at Wiggs Middle School, entitled “Development of Middle School Participants’ Mathematical Habits of Mind and its Impact on Student Achievement” involved 6 middle school math teachers and 283 regular math education middle school students. During the 2006-07 academic year, 12 content-focused professional development workshops were conducted by UTEP staff with the Wiggs MS Math teachers.

In the workshops, TAKS data were used as a way of raising cognitive pedagogical issues with teachers. The main strategy was to identify error patterns in students’ TAKS performance and to use item analysis to engage teachers in conceptual discourse on how to overcome the disequilibrium and change their teaching practices. Each workshop session was launched and driven by particular TAKS items correlated with a specific TEKS objective, with most of the session focused on the TAKS items on which student performance was the poorest.

Two major sources of data were used to evaluate the effectiveness of the project: student performance on benchmark tests and student scores on the 2007 TAKS exam. The positive impact the work is having on teachers and on the math/science student achievement is evident in the increase in scores on benchmark pre- and post-tests.

The increases from benchmark pre- to post-tests include: 23% for sixth grade, 20% for seventh grade, and 22% for eighth grade students. A paired t-test was performed on each of the groups; the results from the paired t-test gave a p-value of 0.000 for each subgroup, which indicates that there is a statistical significant difference between the pre- and post-tests in each group. Preliminary data on students TAKS scores also indicate a significant increase from 64% passing in 2006 to 72% passing in 2007.

The project at Henderson Middle School is entitled “A Content Knowledge & Self-Efficacy/Motivational/ Affective Approach to Professional Development and Mathematics Learning.” The UTEP team offered outreach events and professional development workshops throughout the year. Dr. Lesser delivered a well-received fall 2006 workshop to all Henderson math teachers on using graphing calculators (TI-73 and TI-83/84) in the classroom. He also worked with individual Henderson teachers who participated in courses and workshops at UTEP. Many MSP teachers attended a fall 2006 Conference where Dr. Lesser gave a keynote presentation.

In Year Five, the research focused on identifying, organizing, matching and processing the huge amount of existing data (e.g., self-efficacy scores before and after the TAKS test.) Presentations and publications have resulted from the work and data analysis will continue through the summer of 2007. The efforts at Henderson Middle School are already producing results as the school’s TAKS passing rate for the spring 2007 exam was up 21 percentage points from last year.

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

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

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

In Year Five, the Center for Research on Educational Reform (CRER) awarded the fourth round of MSP Action Research Awards for Teachers. Nine new awards of \$3,000 each were presented to middle and high school math and science teachers on the basis of their competitive proposals to conduct classroom action research. A competition was also held to award "follow-up grants" to last year's recipients for replication or extension of their research. Two teachers were awarded follow-up grants of \$3,000 each.

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 become more effective "reflective practitioners." Teachers are expected to confront challenges in their classrooms by applying systematic methods of question development, data collection, analysis, and interpretation. 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. While we have found that the opportunity to guide teachers through this process has been somewhat limited within the constraints of this nine-month program, the NSF Scholars Program and the MSP Induction Program (Objectives 1.3 & 1.5) a master's level 30-week course has proved to be very good program framework for developing those skills.

The 11 teachers participating in the award program this year included 4 math and 6 science teachers, and 1 who teaches both; 8 high school and 2 middle school teachers, and 1 elementary school teacher (who was admitted to the program only after reviewing all other applicants and on the basis of a strong proposal and prior collaboration with the faculty mentor); 3 women and 8 men; 4 Latino and 7 White non-Latino individuals. In October, 2006, CRER hosted its fourth annual research colloquium where teachers discussed their research projects with colleagues and faculty mentors. This provided an opportunity for new recipients to gain exposure to more experienced teacher-researchers and STEM faculty mentors.

In contrast to previous years in which grant recipients were assigned a faculty mentor, this year teachers were asked to select a STEM faculty mentor whose expertise would correspond to the proposed research project. This change was made in order to increase the faculty member's role in the development and execution of the action research proposal. Faculty mentors of those teachers awarded a grant were provided a \$1000 honorarium for mentoring the teachers throughout the year. Such modifications to this year's program appear to have yielded a high number of well-developed proposals and closer collaborations between teachers and faculty mentors.

The faculty mentor's primary responsibility is to provide support to the teacher-researcher in the use of math/science content for the project. Dr. Espinoza, Assistant Director of CRER, provides additional support regarding research design, data collection, and data analysis. Progress reports submitted by participants are reviewed by the mentors and Dr. Espinoza to provide feedback to participants. All participants will submit a final project report on August 31, 2007. Upon submission of the report, participants will be asked to complete an evaluation survey to rate and describe their experiences in the program.

Summaries of the teachers' projects are provided below.

Craig Peters
Americas High School
Course: Pre-AP Physics

Mentors: Dr. Juan Noveron & Brenda Porta

Learning Communities: A New Approach to Increase Students' Performance on the Texas Assessment of Knowledge and Skills (TAKS)

In this study, the concept of "Learning Communities" was applied to Pre-AP Physics classes in order to influence students to actively participate in the learning process. Students took on specialized roles in three to five-person teams to develop a project consisting of a scientific newspaper. The publication, which will include articles on scientists and on the applications of physics concepts, is expected to improve student TAKS performance by reinforcing skills on how to interpret scientific data.

Mary Howell
Hanks High School
Course: Pre-Calculus
Mentor: Dr. Matthew Winsor

The Effect of Integrating Mathematics History in a Pre-Calculus Classroom on Student Learning and Attitudes

This project investigated whether integrating lessons on the history of mathematics into the Pre-Calculus curriculum would positively impact student learning and attitudes toward math. The math history lessons included material on the lives of mathematicians and discussions about the historical background of math concepts. As part of the intervention, students completed a math history project. A goal of the study was to influence high school juniors to take an advanced math course in their senior year.

John Murillo
Montwood High School
Course: Physics
Mentor: Dr. Eric Hagedorn

Interactive Electronic Whiteboard Use for Analyzing Kinematics Video and Graphs

This project investigated whether Physics students' understanding of kinematics concepts would be improved by using technology, including interactive whiteboards, motion-detectors, and a digital video camera. The study focused on difficulties students commonly face in constructing, predicting, and analyzing kinematics graphs. Students in the treatment group, digitally recorded physics lab work on video, and analyzed them on the whiteboard. The technology allowed graphs to be annotated and lessons to be saved and re-played.

Gene Palyu
Cordova Middle School
Course: GT Science
Mentor: Dr. William Robertson

Genetics Online Using Math and Science

In this study, eighth-grade science students participated in an online learning community to improve their understanding of inherited traits and the universality of human traits. Students gathered data on genetic traits, graph the data, and statistically analyze the results. In sharing their data on the Internet with classes around the world, students were expected to internalize the lessons of this unit. Student learning was assessed using TAKS questions on heredity, traits, and genes.

Olivia Henderson
Socorro Middle School
Course: Eighth-Grade Math
Mentor: Dr. Mourat Tchoshanov

How Does Teacher Collaboration Affect Student Learning?

This project deals with the critique that teachers often conduct their practice in isolation. Recently, school districts and college educators have suggested that teachers use collaboration to plan lessons. This study investigated the characteristics of effective lesson planning time and examined its impact on students' TAKS scores. The planning meetings of sixth, seventh, and eighth grade math teachers were analyzed and compared.

Brian Gillis
Jefferson High School
Course: Pre-AP Physics
Mentor: Dr. Eric Hagedorn

In this study, AP Physics students participated in an intervention consisting of exposure to cutting-edge physical science and engineering research at UTEP and at other institutions. The intervention was expected to increase student participation in science fairs and interest in science careers. In field trips to science labs, students received mentoring and gained knowledge that will facilitate their development of science fair projects. A goal of the intervention was to positively impact students' learning and motivation to study science.

Jessica Meléndez-Carrillo
Canutillo Elementary School
Course: Two-Way Dual Language Math
Mentor: Dr. Olga Kosheleva
Bringing Technology into the Classroom

This project was aimed at improving the way in which students in a Two-Way Dual Language class understand and solve mathematical word problems. The study used qualitative methods to examine students' thinking and representations when interpreting arithmetic operations in a variety of word problems created by the researcher. Students used Tablet PCs to record their approaches to solving the word problems.

Robert Casao
Montwood High School
Course: AP Physics
Mentor: Dr. Milijana Suskavcevic

To PhET or Not to PhET: That is the Question

This study investigated Physics Education Technology (PhET), which consists of downloadable simulations that demonstrate various physics concepts in kinematics, dynamics, and electrodynamics. The purpose of the study was to determine if the use of PhET simulations in place of hands-on laboratories increase the conceptual understanding of high school physics students. If the PhET simulations are shown to improve student learning, they may be incorporated into the physics curriculum.

Hector Rodriguez
Coronado High School
Course: Conceptual Physics
Mentors: Dr. Juan Noveron & Hugo Alarcon

Meta-Data Super Notebooks: An Art and Science Approach to Increase Students' Performance on the Texas Assessment of Knowledge and Skills (TAKS)

This project tested an intervention in a Conceptual Physics course that aims to raise students' scores on the exit-level TAKS. The intervention consists of the development of "Meta-Data Super Notebooks," posters that synthesize information on science TAKS objectives. Students worked in teams to develop a poster in which a concept is explained, used in problem-solving, and illustrated with artwork. The posters will be displayed on the high school's website.

Sergiu Slavnicu
Mountain View High School
Course: Algebra II
Mentor: Dr. Eric Hagedorn

A Comparison: The Best Way to Teach an Algebra II Class

This study tested two methods of instruction, teacher-centered and student-centered, to determine which is more effective in enhancing students' learning of Algebra II concepts, including quadratic, exponential, and logarithmic functions. Students in each condition completed pre- and post-tests, as well as surveys on the quality of their instructional experience. The results of this study will inform the researcher of how to enhance teaching of these concepts.

Glenn White
Clint High School
Course: Algebra I
Mentor: Dr. Larry Lesser

What's in it for ME: Intrinsic Motivation and Improved TAKS Scores

This study investigated whether there is a consistent and significant difference in student performance on the TAKS during the years in which passing the exam is a requirement for advancement. Data collected from the Clint Independent School District was used to compare students' performance at grade levels in which TAKS results determine promotion or graduation (such as in the third, fifth, eighth, and eleventh grades) to performance at grades where scores do not determine such outcomes. If the hypothesis is confirmed that students do perform better when specific outcomes are at stake, then educators should discuss ways to motivate students to perform at high levels even in years when the test is relatively less critical.

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

In Year Five of MSP, the comprehensive research and evaluation agenda continued to progress under the direction of the Center for Policy Research and Education (CPRE)/Teachers College (TC), Policy Studies Associates (PSA), and the Center for Research on Educational Reform (CRER). The research studies were based on MSP key features and were designed to advance knowledge and understanding about the systemic improvement of mathematics and science education, K-16, and, ultimately, student achievement. Reports of the research studies, describing what occurred in Year Five, will be submitted in September, 2007.

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.

This Student Achievement section reports the most recent data available for all indicators. In most cases, these data are for academic year 2005-2006. With the exception of TAKS (see note in Mathematics section below), data reported this year were not reported in last year's report.

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. Last year, the passing standard reached the highest level for all grades tested.

TAKS Mathematics and Science data reported here are for the 2005-2006 academic year. While data from that year were reported in last year's MSP Annual Report, significant changes to the data were made by the Texas Education Agency (TEA) in the final reporting of the data in February, 2007. For that reason, El Paso MSP will report final, "clean" 2005-2006 data in this year's Annual Report, and not report TAKS data for 2006-2007 until finalized by TEA.

Mathematics

Review of Table 1 (below) reveals that the percent of students passing TAKS Mathematics 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 concentrated. Of particular note is the increase at grade 6—22 percentage points—and the increase at grade 11—30 percentage points.

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	86
6	50	72
7	42	61
8	41	58
9	30	45
10	33	52
11	40	70
Total	47	65

Source: 2002 AEIS Region Performance Reports, Texas Education Agency; Texas Education Agency aggregate data files 2005-2006 <http://www.tea.state.tx.us/student.assessment/reporting/taksagg/download.html>.

Among the most significant changes seen in the final, “clean” 2005-2006 data are in the gaps between Hispanic and White students on TAKS mathematics. Table 2 shows that the gap between Hispanic and White students has decreased to an average of 11 percentage points. Of particular note, is the very small gap between groups in grades 3 through 6, with gaps in those grades ranging from 1 to 5 percentage points. The gap is smallest at grade 5 (1%) and is largest at grade 9 (19%).

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 Whites
	Hispanic	White		
3	75%	78%	76%	3%
4	78%	83%	79%	5%
5	86%	87%	86%	1%
6	71%	75%	71%	4%
7	61%	75%	61%	14%
8	56%	70%	58%	14%
9	44%	63%	45%	19%
10	51%	69%	52%	18%
11	69%	84%	70%	15%
TOTAL	64%	75%	65%	11%

Source: Texas Education Agency aggregate data files 2005-2006 <http://www.tea.state.tx.us/student.assessment/reporting/taksagg/dnload.html>.

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.

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%	47%
11	44%	64%
TOTAL	32%	60%

Source: 2002 AEIS Region Performance Reports, Texas Education Agency; Texas Education Agency aggregate data files 2005-2006 <http://www.tea.state.tx.us/student.assessment/reporting/taksagg/dnload.html>.

While corrected data, shown in Table 4, indicate that gaps between student groups on TAKS Science have declined, they continue to be quite large. The smallest gap—16 percentage points—between Hispanic and White students is at grade 5, with the largest gap at grade 10. At grade 11, where the passing standard increased, the same pattern as noted in previous years occurred: the gap increased from 20.3 percent last year to 25 percent. 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 Whites
	Hispanic	White		
5	64%	80%	66%	16%
10	43%	73%	47%	30%
11	61%	86%	64%	25%
TOTAL	57%	80%	60%	23%

Source: 2006 AEIS Region Performance Reports, Texas Education Agency; Texas Education Agency aggregate data files 2005-2006
<http://www.tea.state.tx.us/student.assessment/reporting/taksagg/dnload.html>.

Course Enrollment and Completion

In 2005-2006, the proportion of students enrolling and passing college preparatory math and science courses, in most cases, was either maintained or improved slightly. As a result, across urban and rural MSP districts, 100 percent of students are enrolled in Algebra I and II, as well as in Biology. Increases were seen in the percentage of students enrolled in Geometry by 10th grade, this year reaching 92% enrolled and 83% passing. Significant increases—from 83% to 90%—occurred in the proportion of students passing Algebra I. A slight decline—from 30% to 26%—occurred in the percentage of seniors enrolled in Physics, though pass rates improved.

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	100	100	100	100
	Passed	87.6	87.6	86.7	89.5
Geometry**	Enrolled	92.1	90.0	84.4	91.7
	Passed	81.5	88.9	83.2	82.5
Algebra II***	Enrolled	100	100	95.4	100
	Passed	87.5	90.5	86.8	87.9
Biology**	Enrolled	100	97.1	91	100
	Passed	83.1	88.1	88.9	83.7
Chemistry***	Enrolled	87.1	76.4	74.5	85.6
	Passed	86.1	90.8	90.2	86.7
Physics	Enrolled	24.0	38.0	33.7	25.9
	Passed	94.2	95.7	97.6	94.5

*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 2005-2006, the graduation rate among students across all MSP districts was 80%. This graduation rate is higher than all but one urban area 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. The most recent data available reveal that over 90% of El Paso MSP graduates completed the rigorous set of college-preparatory courses.

Mathematics Placement at UTEP and EPCC

Data from the 2006 indicate that placement test performance at UTEP has improved significantly and has remained stable at EPCC. During 2005-2006, a great deal of work focused on increasing placement rates in college-level mathematics courses at both UTEP and EPCC. Among the activities undertaken was 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.

SAT/ACT Participation and Performance

Once again, in 2005/06, 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 improved by four points. While the overall scores are still too low, it is encouraging that area students are increasingly focused on and preparing for college.

Mathematics and Science Teacher Certification

In 2005-2006, there was an increase in the number of students certified to teach mathematics and science. The large numbers of students in math/science teacher preparation programs has resulted in 44 new mathematics teachers—an increase of 9 over last year—and 31 new science teachers, an increase of 10 over last year.

IV. MSP MANAGEMENT PLAN

El Paso MSP's PI, Project Director and all three Co-PIs remained the same during Year Five. All Deans and Associate Deans at UTEP and EPCC working on MSP remained the same. At K-12, Socorro ISD named a new Superintendent in January, 2007, Dr. Sylvia Atkinson, with whom the Collaborative has established a good working relationship.